VOLUME 37, NUMBER 4 APRIL 2022

PRI

PERFORMANCE RACING INDUSTRY MAGAZINE

SAFER BY DESIGN

HOW THE INDUSTRY IS DEVELOPING NEXT-LEVEL PROTECTION FOR DRIVERS, VEHICLES AND RACE TRACKS

INSIDE

MODIFIED MARKET | FORD ENGINES | FUEL SYSTEMS | HIRING | ONLINE SELLING | & MORE

...BUT YOUR ENGINE IS CLEAN

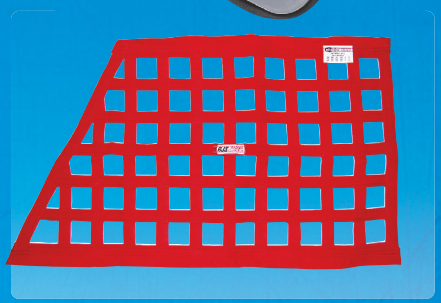
Schaeffer's®

- Eliminate Engine Varnish
- Reduce Deposit Buildup
- Increase Performance
- Decrease Operating Temperatures
- Conquer Your Home Track

SERIOUS PERFORMANCE.

SERIOUS WHOLESALE POWER BY ATECH MOTORSPORTS.

- Access to Over 1,500 Brands
- Unbeatable Service and Satisfaction
- Huge Inventory—We Stock it so You Don't Have to
- FAST, FREE Shipping—Reliable 1-2 Day Delivery
- Drop Ship Service at No Additional Fee
- We Export at Competitive Rates



Trick Flow Specialties

MICKEY THOMPSON M/T TIRES & WHEELS

ALPHA

FTI competition converters & transmissions

QFB GO FAST BITS Performance Without Compromise

FEATURED BRANDS

APPLY TODAY!

AtechMotorsports.com

FOUR LOCATIONS—MILLIONS OF PARTS!

ATECH MOTORSPORTS

Global Wholesale DISTRIBUTOR

Powered by SUMMIT RACING EQUIPMENT

TALLMADGE, OH • McDONOUGH, GA • SPARKS, NV • ARLINGTON, TX

800.517.1040 • 1.330.630.0888 • FAX: 1.330.630.5365

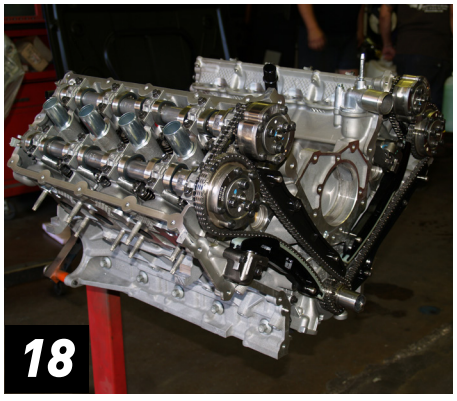
WHSE22PR

CONTENTS

APRIL 2022 | VOLUME 37, NUMBER 4

performanceracing.com | mail@performanceracing.com

16



18

26

COLUMNS

DEPARTMENTS


WE HAVE A GRIND FOR IT!
CROWER
every part for power
WE HAVE BEEN DESIGNING
& GRINDING HOT-STREET
AND CUTTING-EDGE FULL RACE PROFILES
FOR OVER 66 YEARS
AVAILABLE IN 5 PERFORMANCE LEVELS
FROM STOCK REPLACEMENT TO
ALL-OUT MODIFIED RACING ENGINES
GROUND TO YOUR SPECIFICATIONS
PROUDLY MANUFACTURED IN THE USA
Shop Online
CROWER 66 YEAR ANNIVERSARY 1955 2021
CROWER ALSO
REGRINDS CAMSHAFTS...
• Acura • AMC • Buick • Chevrolet • Chrysler • Corvair • Cummins • Dodge • Ford • Ford Modular
• Ford Flat Head • GM LS • GM Ecotec • Hemi 5.7 & 6.1 • Hemi VVT • Holden • Honda GSR • Honda H22
• Honda SOHC • Mitsubishi • Nissan • Oldsmobile • Pontiac • Toyota •Volvo • Volkswagen • Etc.
Get social with us
www.crower.com | 619.661.6477 |

CONTENTS

APRIL 2022 | VOLUME 37, NUMBER 4

performanceracing.com | mail@performanceracing.com

74

FEATURES

SAFETY SECTION

MODIFIED MARKET COVERAGE

PRI MEMBERSHIP

ON THE COVER
Cover Photography: PRI

ROBINS SINCE 1983 Signature brand

Exactly

NEW

RUBi-Smart New Series

SG8 XL-Smart

SEAT & GUIDE MACHINES

Simple - Smart !

Designing & Manufacturing Patented Technologies

US 7.726.819B | US 2018/0074467A1

Introducing New and most advanced R&D by Robins - machine valve seats the Rubi-Smart way

ROBINS 'Smart Control' Simple-Manual-Auto-Reliable-Tuff

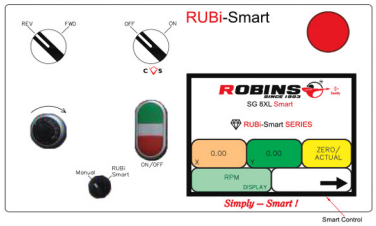
- Machine valve seats– to equal depth-
  - without using any switches.
  - without looking at Smart screen.
  - without setting mechanical stops.
  - without using any dial indicators.

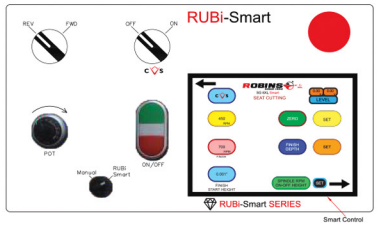
2 in 1 Manual / RubiSmart

CVS Constantly-Varying Speed

US Patent - for Chatter-Free Seats!

Mini, Standard and heavy duty tooling using 6mm.9.52mm & 20mm shank dia carbide pilots.
Inventors of Spring-Free Tooling (US Patent)





SG8 XL-Smart with Cummins ISX 24 Valve Cyl. head

- New Smart Control made "SIMPLE"
- Smart-Manual / Auto modes switch to either system anytime.
- Reliable-Intelligent Control.
- After Zero Setting -no need to look at screen while machining.
- Machine to precise Zero Seat depths effortlessly - "Robins-First"
- Dual-Axis Level aligns both axis simultaneously.
- Hand held sensor can be parked away from workhead. Keeps level sensor cable off the machining area.

• Revolutionary Advanced Technology • Ultimate Quality • Plug n Play • Proven Reliability • Affordability

ROBINS the same company supplying high-end Seat & Guide Equipment and Valve Refacers since 2002, is now offering High Precision, Low Cost Seat & Guide Equipment with Patented Quick-Change spherical Spring-Free-Tooling, designed for small to heavy duty cylinder heads featuring a simple foot-print.

ROBINS Seat & Guide, Valve Refacers, Cylinder Boring, Cylinder Honing, Valve Guide Honing, Cyl. Head & Cylinder Block Surfacing are the perfect solution to get your business upgraded to next level of evolution in design and nano precision machining accuracies.

WE THE ROBINS SINCE 1983 Signature brand Exactly

Designing & Manufacturing Patented Technologies

US 7.726.819B | US 2018/0074467A1

vncnc7@gmail.com

www.RobinsMachines.com

Simple - Smart !

Enquiries from Canada and outside USA --contact Factory directly. "Robins" ware house distributors within U.S.A. please contact:

EASTERN U.S.A

MEC

MEC CNC

Anthony Usher (949) 800-7176

anthony@meccnc.com | www.meccnc.com

STATES COVERED

AL, CT, DE, FL, GA, IL, IN, IA, KY, ME, MD, MA, MI, MN, MO, MS, NE, NH, NJ, NY, NC, ND, SD, SC, OH, PA, RI, TN, VT, WV, VA, WI

WESTERN U.S.A

Hopper

HOPPER EQUIPMENT & SUPPLY INC.

Jeff Murchison (909) 226-9922

Jeff@HopperShop.com | www.HopperShop.com

STATES COVERED

AK, AZ, AR, CA, CO, HI, ID, KS, LA, MT, NM, NV, OK, OR, TX, UT, WA, WY

FROM THE PRESIDENT

DR. JAMIE MEYER
jamiem@performanceracing.com

TECHNOLOGY DRIVES US

Like most of you, I grew up on fast street cars that slowly became drag-dedicated race cars. As a kid in the late-1980s, there was a lot of great Detroit iron to choose from as the muscle car resurgence was in full swing. In fact, when I graduated high school in 1987, you could choose from V8-powered pony cars from Ford, Chevy, or Pontiac; a V8 Corvette; a couple surprising turbo-4 Mopars; or a turbocharged V6 Buick that was faster than all of them. It was a magical time for a small-town kid hooked on the excitement of going fast and beating the guy in the other lane.

Those cars, and the legions of fans that they fostered, spurred the imagination of an awaiting aftermarket. Fuel injection and overdrive transmissions were the stuff of lunar landers, but you guy/gals figured them out quickly. Aftermarket superchargers, as well as some aspiring turbocharger bolt-on kits coupled with bigger fuel injectors, and even aftermarket piggy-back computers, started to make a real impact. By the mid-1990s, modifying modern cars was common—simple really—and it wasn't a matter of imagination, but more the size of your wallet that drove the competition.

Most interesting to me was that Detroit was clearly paying attention to what you were doing. Cars like the 5.0 Mustang that were once a great foundation for aftermarket modification became the car that Ford Performance started offering parts for… from the factory. When the 2003 SVT Cobra came out, it changed everything. A factory supercharged DOHC V8 that made 390 hp (with loads more potential) showed us the way. The Shelby GT500s that followed only added to the capabilities. Meanwhile, Chevrolet was continuing to ramp up the Corvette and Camaro. By 2014, they came equipped with supercharged LS engines, huge brakes, amazing magnetic ride suspension, and a sleek design. But perhaps it is Dodge and their SRT team who have had the biggest impact in Detroit. Yes, they literally put a Hellcat into everything. These traditional hemi-headed wonders come with a big 2.4-liter supercharger (or bigger), and with at least 707 horsepower, they have inspired an entire new generation of Mopar fans around the world. Buying a stock 10-second car just isn't a big deal anymore.

Smart aftermarket companies have become suppliers for OEMs that allowed them to sell their hot rod parts right back to the factory. As the aftermarket has evolved, so has the performance of new cars. It's a wonderful relationship that has allowed the new car buyer to enjoy a performance level unimaginable in 1987.

Of course, I must mention the legions of foreign vehicle performance addicts that have joined in. When Honda-powered street cars (like the ones built by my friends at PFI Speed) run in the 8s, you need to pay attention. Not to mention this upstart American car company based in Texas called Tesla that makes battery-powered luxury cars. Their Plaid, which routinely runs 9.2s in completely stock trim, is the fastest car in a straight line ever produced.

So, why have I spent this time with you walking through the last 40 years of high-performance street cars? Because the NHRA just did something that is going to completely change our market—and your business if you are in this game. As I write this in early March, NHRA has moved to dramatically change the safety equipment requirements of 2008-later vehicles. Relying largely on the incredible safety equipment that comes standard in these new vehicles, NHRA is going to allow these new cars to run as fast as 9.0/150 without the installation of a roll bar or roll cage. The details are spelled out in this issue's Industry News section, but the key point is captured in this quote from NHRA National Tech Director Lonnie Grim: "Each year, automotive manufacturers continue to push the limits of performance by building production vehicles that are quicker and faster than the previous year's models. At NHRA, we very much support their commitment to performance and recognize that there is still a very large market for performance cars. At the same time, we acknowledge that NHRA needs to keep pace with the current trends, which is why we've announced these rules adjustments."

As a drag racer, I always knew that those safety rules were there for a reason. But as a race promoter, I knew that I was losing maybe twice the car count because no one wants to cut up a new car and run bars through it. Plus, I think this will result in a much safer racing industry. You don't need to test that fast Corvette on the street now. Just take it to your local NHRA track to make those test hits.

This rule change will dramatically open the market to drag strips, to promoters, to parts manufacturers, and our entire industry. NMCA and NMRA have already wisely adjusted to this new rule change, designing classes specifically for fast street cars. Guess I better get to work on my Z06… PRI

RaceQuip

THE ULTIMATE SOURCE FOR YOUR SNELL SA2020 HELMET NEEDS!

racequip.com 813.642.6644

PRO20 HELMETS

- Pre-Preg Composite FRP Shell
- HANS/FHR M6 Threaded Inserts Installed
- Expanded Polystyrene (EPS) Liner
- Slick Aero Design With Chin Spoiler
- Great Peripheral Vision

SNELL MEMORIAL FOUNDATION SA2020

- Comfort Fit Blended Nomex® Interior
- Distortion Free 3mm Polycarbonate Shield
- Aluminum Pivot Kit W/Adjustable Friction Lock
- Silicone Eyeport Seal Keeps Out Dirt
- Stocked in Sizes XXS - 3XL

Available In All The Colors Shown Above Plus White And Hot Pink

PRO20 TOP AIR

CARBON FIBER VERSION

- Low Profile For Extra Cage Clearance
- Cools and Eliminates Shield Fogging
- **New** For 2020
- HANS/HNR M6 Threaded Inserts In Shell

COMPOSITE FRP VERSION

- Expanded Polystyrene (EPS) Liner
- Comfort Fit Blended Nomex® Interior
- Distortion Free 3mm Low Fog Shield
- Great Peripheral Vision

FIA FULL CONTAINMENT COMPOSITE RACING SEATS

- FIA 8855-1999 Certification – Hologram Affixed
- Pro Racing Design With Thigh And Hip Support
- Integral Shoulder and Rib Bolsters
- One-Piece Lightweight FRP Composite Shell
- Accommodates All Head & Neck Restraints
- Five Seat Belt Guides Handle 4, 5, or 6 Point Sets
- Energy Absorbing Foam for Comfort And Safety
- Black Mesh Fabric Cover For Breathability
- Shiny Black Gelcoat Finish On Exposed Areas
- Four Built-In 6mm Side Mount Fasteners (Brackets Not Included)
- Optional RaceQuip Brackets Allow Seats to Go From 0° Upright to 30° Layback
- Available In Size Medium, Large, and X-Large

FIA FULL CONTAINMENT SEATS

STANDARD FIA RACING SEATS ALSO AVAILABLE

PRO20 CARBON FIBER

- **New** For 2020
- HANS/FHR M6Threaded Inserts
- 3mm Low Fog Shield
- Comfort Fit Nomex® Interior
- Carbon Fiber & Kevlar® Construction

OF20 OPEN FACE

- HANS/HNR M6 Threaded Inserts
- FRP Composite Shell
- Expanded Polystyrene (EPS) Liner
- Great Peripheral Vision
- Now Available in Gloss Black or White

PRO20 SIDE AIR

- Inlet uses 1.250” Hose
- Air Flows Across Faceshield
- HANS/HNR M6 Threaded Inserts

CARBON FIBER VERSION AVAILABLE

FROM THE EDITOR

Here's what I think about this edition's special section on cutting-edge developments in race safety:

DAN SCHECHNER
dans@performanceracing.com

I THINK THIS ISSUE OF *PRI MAGAZINE* provides some of the most in-depth, informative, and downright fascinating reporting we've ever done on the subject of safety in motorsports. Simply put, our series of articles on the latest advances in driver, vehicle, and race track protection are a must-read for anyone in the business of racing. The piece titled "Safety Engineers" by writer Drew Hardin reveals how companies like Bell Racing are developing purpose-built helmets for different applications, each with unique airflow management systems. "Models from five or 10 years ago don't have many of those features, or the helmets were more generic and less specific," Bell's Kyle Kietzmann told us. Among other eye-openers is Stroud Safety's new SFI 20 boot, which debuted at the 2021 PRI Trade Show and, with a nod toward the emerging EV race market, comes standard with an electrical charge resistance—in addition to heat and chemical protection—in the sole.

On the vehicle side, safety product manufacturers continue to scrutinize every inch of the car to determine where and how upgrades can be made without sacrificing driver comfort or performance. The team at RaceQuip, for example, recently found "a composite matrix fiber-reinforced polymer that allows us to build very strong, yet lightweight and affordable seats," according to Patrick Utt, who added that the discovery led to their launching five new models within the last 12 months. It hardly stops there, though, as safety belts and harnesses, fire suppression systems, fuel cells, and even steering wheels have benefited from a greater understanding of how different components perform under impact.

Speaking of which, our "Special Report: Follow the Science" by writer Steve Statham offers a comprehensive and insightful look at the work being done—much of it behind the scenes—by top-tier medical professionals on behalf of racers and teams across the competition spectrum. From nutrition and sleep requirements to the proper level of hydration for drivers and crew members, Statham's piece uncovers how relatively new revelations about biometrics and how the body works are reducing driver fatigue, dehydration, and more. Driving much of this research is a marked shift in perception about racers: "When I started this, race car drivers were not even considered athletes. They just thought they sat there and drove their car around the race track and nothing much happened," explained Michigan State University professor Dr. David Ferguson. "[But] we now know that they are considered athletes. Their cardio-respiratory fitness is pretty much equal to an elite triathlete. The G-forces they're going to experience are quite massive—actually, every race car driver would qualify for the Apollo space program for the amount of G-forces they can handle." Heady stuff…. And there's a lot more where that came from, so we invite you to dig into our safety coverage, beginning with Statham's report on page 34, and give some thought, as we did, on where these developments, and evolving technologies, could lead our sport in the years to come. PRI

PRI MAGAZINE

PRESIDENT
Dr. Jamie Meyer

GENERAL MANAGER
Jim Liaw

EDITORIAL
EDITOR
Dan Schechner

MANAGING EDITOR
Meredith Kaplan Burns

SENIOR EDITOR / SOCIAL MEDIA MANAGER–EDITORIAL
Christen D'Alessandro

ASSOCIATE EDITOR
Laura Pitts

CONTRIBUTORS
David Bellm, David Deatsch, Jim Donnelly, Dana Ford, Drew Hardin, Bradley Iger, Jim Koscs, Mike Magda, Steve Statham, Jeff Zurschmeide

SALES
VICE PRESIDENT OF SALES
Warren Kosikov

INDUSTRY SALES DIRECTORS
Andrea Brake
Becca Butler
Jeff Dahlin
Scott Hartwick
Celina Ingargiola
Alan Josse
Brian Paik
Monica Terlouw

SALES ASSISTANTS
Madison Danna
Angelica Hubbard
Marel Del Rio
Lisa Schafer

MARKETING
MARKETING MANAGER
Jon Shakill

PRODUCTION
ADVERTISING COORDINATOR
Brandon Benson

ART
SENIOR ART DIRECTOR
Paul Graff

GRAPHIC DESIGNERS
John Cabral
Jeffrey Chhan

PHOTOGRAPHERS
Michael Allio, Richard Barnes, Michael Bartholomew, Mike Campbell, Scott Crawford, Kevin DiOssi, Driveline Studios, Dana Ford, Dave Hill, Heath Lawson, John Lee, Bruce Monson, Andre Niesing, Ryan Roberts, Laurent Vu

ACCOUNTING
PAYABLES
Lily Huang

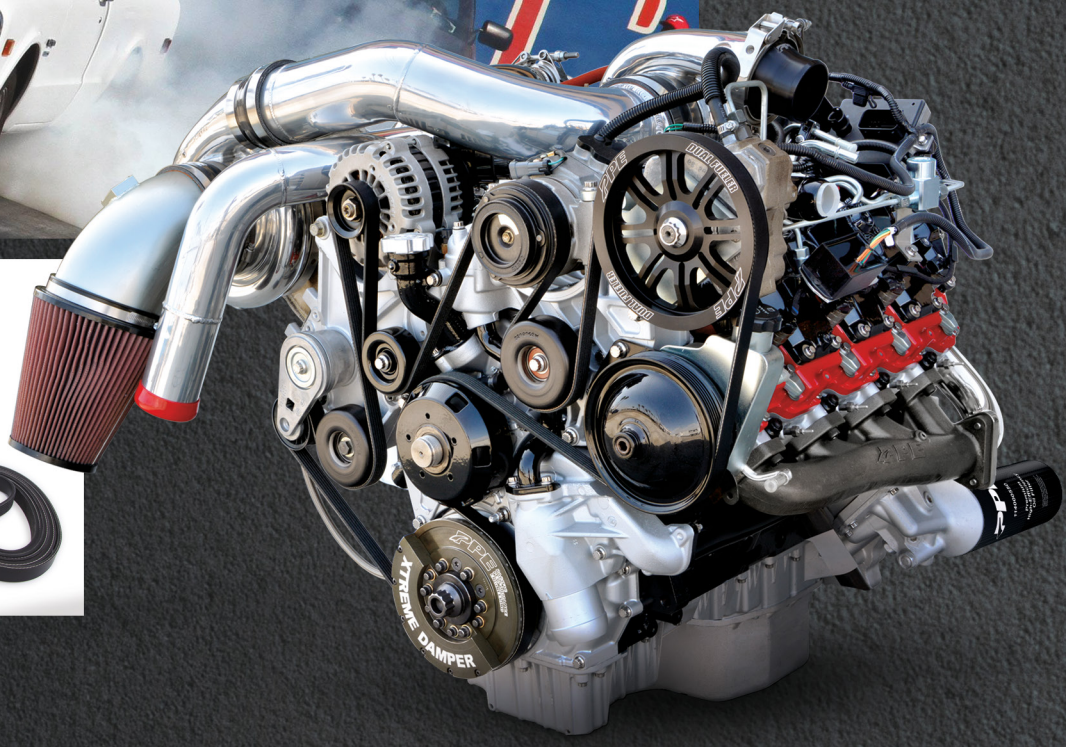
Performance Racing Industry (ISSN 1045 3024) is published monthly in the interest of the growth and development of the racing market, consisting of manufacturers, retailers and racing participants. *Performance Racing Industry* can be contacted at 27081 Aliso Creek Rd, Suite 150, Aliso Viejo, California 92656, 949/499-5413, Fax 949/499-0410. Periodicals Postage paid at Laguna Niguel, CA 92677, and additional mailing offices. **Postmaster:** Send address change to *Performance Racing Industry*, 27081 Aliso Creek Rd, Suite 150, Aliso Viejo, California 92656.
Printed in U.S.A.
PM # 40702022, Return Undeliverable Canadian Addresses to: Station A, PO Box 54, Windsor, ON N9A 6J5. Email: cpcreturns@wdsmail.com

MEMBER
PRINTED WITH SOY INK

WHETHER YOU NEED A RE-POWER, MORE POWER - OR BOTH

REPUTATION IS ON THE LINE

GO WITH A PROVEN RACE WINNER - GO WITH PPE



DUAL FUELER™

DUAL FUELER INSTALLATION KIT WITH CP3 PUMP

Bolt on performance and power. The PPE belt-driven Bosch CP3 fuel pump kit works in conjunction with the stock fuel system and is controlled by a sophisticated microprocessor module. For racing applications, this kit provides fuel flow to maintain fuel pressure to 26,000+ psi that is essential for highly modified race engines that are seeking to produce high horsepower.
50 States Emissions Legal (E.O. D-701-22)

Applications: 2001-2016 GM 6.6L Duramax

Innovations in performance.

PPE

PPEpower.com | 725.238.2002


SIMPSON
Hybrid
PRO
RAGE

LEAD POSITION

"Racers won't bat an eye at putting a $50,000 engine in their [race car]," noted Jacob Brown of K1 Race Gear, "but they will balk at spending $1,500 on a custom suit to keep them safe." That's always been the rub for sellers of driver safety gear, though, hasn't it: How to market products that don't directly affect the vehicle's performance. But what if that same equipment was proven to help improve the racer's performance? For helmets, that could mean better airflow, or a larger eye opening for greater visibility; for fire suits, it may be three versus two layers, or independent sleeving for freer movement. Indeed, as another one of our sources explained: "The more comfortable a racer is in the vehicle, the more they'll be able to concentrate on the task at hand, which is driving, right? They're not thinking about an uncomfortable suit, shoes, or gloves." Something to consider, as we invite you to read more on the latest gear for drivers—helmets, suits, and related accessories—in our in-depth report titled "Safety Engineers," beginning on page 44, part of this month's special section on safer products, equipment, and practices in motorsports.

ASK THE EXPERTS

ONLINE SELLING

While e-commerce can be a highly profitable sales stream, key factors must be considered before expanding into motorsports' virtual marketplace.

By Drew Hardin

"Now is a great time to enter the booming world of aftermarket vehicle parts," said Dan Mermelstein of Vivid Racing, Gilbert, Arizona, when asked how to advise a race-oriented business that's considering going into online retail. "The amount of data, technology, and distribution is at a great place compared to 15 years ago."

That said, he and other experienced online sellers we spoke with believe there are some essential best practices to put in place when entering—or expanding your presence in—the virtual marketplace.

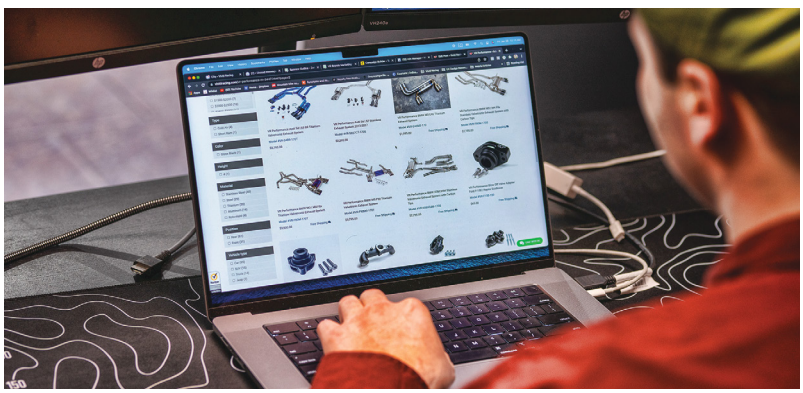
OUTSOURCE OR IN-HOUSE?

Mermelstein said initially setting up the sales portal is best done in-house. "If a company hires someone, they won't know the important stuff in the weeds and will already be behind the profit curve," he explained. "Better to invest their time to learn and understand the systems, which will help in their long-term growth."

He pointed at "amazing tools on the market that make setting up an online store very easy. Someone who can download a template, write some good content, and work with Excel data is 10 steps ahead of many others. Platforms like Shopify, BigCommerce, and WooCommerce are out there. Great CRM [customer relationship management] tools that offer desk ticket support, live chat, and even accounting, such as Zoho.com, are a great all-in-one solution."

Not every business has that kind of in-house resource. Joe Francis of Day Motor Sports in Tyler, Texas, was faced with rebuilding his company's website when the business changed hands about 10 years ago. He admitted he "had no knowledge of websites, and we didn't have the manpower or anyone who could do that for us at that time."

What followed was three to four years of struggling with out-of-state web developers who over-promised and under-delivered. Compounding the problem was the fact that during the handoff from one web team to the next, "they turned off our website, and we lost everything," Francis said, "Google rankings, everything. When we finally turned the new website on, we were at the bottom of everything.



Establishing a web-based sales portal can either be outsourced or done in-house. Our source from Vivid Racing opted for the latter, citing "amazing tools on the market that make setting up an online store very easy."

While our contact at Vivid Racing was optimistic that supply-chain shortages would ease in 2022, he still advised that "the more a company can drop-ship and hold less inventory, the freer it may feel to work on marketing and customer service."

We had to hire companies to get our rankings up. It's very important to be at the top of that [web search] page."

Ultimately, Francis hired a web developer that was not only local, making collaboration easier, but also one with deep experience in online commerce. Now, Day Motor Sports has an employee whose full-time job is keeping the website—and Google rankings—up to date.

"Look for someone who's built a site comparable to what you want to do," Francis advised. "See what they've done, check out other websites they've built, and talk to the companies they built websites for to make sure they're happy with their service."

INVENTORY VS. DROP-SHIP

Supply-chain troubles have made it difficult to get parts of all kinds. "Anything steel is really hard to get," Francis said, noting particular shortages of engine and suspension parts, and even wheels. "In different times a company could have something drop-shipped. Now it's so hard to get parts, they better have them in their own shop."

Mermelstein was more optimistic, acknowledging that while "2020–2021 was hit hard with supply chain issues, most see this getting corrected in 2022. With that being said, the more a company can drop-ship and hold less inventory, the freer it may feel to work on marketing and customer service. If that company is platform-focused, such as only on Ford Mustangs, it may want to stock hot movers. But if it is trying to sell everything, it should have good inventory reports from vendors, so it knows how to service customers on ETAs."

DO'S AND DON'TS

When asked if there was one thing a business should not do when selling online, Francis returned to the parts availability issue. "Don't put something on the website that isn't in inventory or can't be kept in inventory. That seems to be the number-one complaint we get: 'I ordered it, and you don't have it.'"

"When selling online, do not break MAP [minimum advertised price] policies," added Mermelstein. "Nearly all vendors have this set up and policed. Consumer confidence goes across the industry, so if one company acts like a fly-by-night, customers will feel many others are like that, too."

When asked what a company should do, Mermelstein said, "Buy from the Vividracing.com wholesale team, of course!" But he also advised, at the start of the process, carefully considering "what kind of shop will it be? Will it sell everything or be platform-focused? This is an important decision in picking the company name and domain. The last thing a company wants to do is choose something like BigBlockPerformance.com and then later go into selling UTV parts."

"The website has to be phone-friendly," Francis said. "Young kids don't want to talk to anybody. They just want to place an order on the computer or the phone and be done with it." Even people who come into Day Motor Sports' retail store "will sit at our counter and look at our website—or other people's websites—on their phone and say, 'This is what I gotta have.'"

Francis' last piece of advice is one that transcends the online space. "We pride ourselves in taking care of our customers and standing behind our products. Even though they're ordering online, we still have to do customer service, making sure they get their parts and get them in a timely manner." PRI

SOURCES

Day Motor Sports
daymotorsports.com

Vivid Racing
vividracing.com

STOP DOING THAT...DO THIS INSTEAD

HIRING PRACTICES

Looking to fill that open position with just the right person? Determine the best fit for both company and prospective employee with these useful strategies.

By Jim Donnelly

Whether it's a football team driving from the two-minute warning, a group of physicians performing critical thoracic surgery, or an entrepreneur trying to launch a new product or organize a race team, the proper personnel are an essential element of any successful endeavor. When it comes to picking people, leaders sometimes get things seriously wrong, with potentially punishing consequences. Here's a hard and fast rule: No one can succeed in any initiative—ever—without the right staff. Getting it wrong involves a litany of mistakes that no one wants to repeat.

"The first problem is when people just hire anyone to fill a position or a seat," said Chicago, Illinois-based management consultant Barry Moltz, who has been a breakout speaker on hiring practices at both the PRI and SEMA shows. "They're too quick to hire because they just want someone in there doing the job. They don't thoroughly vet them. The second problem is when people hire only for skills, not for cultural fit. And the third one is, they don't give the person any training when they get to the job."

What's cultural fit? It's an assessment of whether a new hire is going to mesh smoothly with the new employer and co-workers. One immediate consideration, as Moltz expressed it, is whether the new hire shares the same burning passion for racing as everybody else in the company. "If they don't really care about motorsport, the chances are they aren't going to stay for very long."

In Moltz's estimation, put yourself in the position of the new hire: Everybody's amped about winning races except you. Would you stick around?

"It's all about being comfortable in the company that you work in," he explained. "Employees don't leave companies. They leave other people. It's like hiring someone to work with the NFL. On Monday, everyone's going to come in and talk about the games. If you don't watch the games and don't care about them, you're going to feel left out. When I had my own company, I only hired people who were interested in that industry. I had a great saleswoman who didn't last long because she couldn't connect with the people around her."

One hiring consultant advises clients to post live recruiting videos to social media showing existing employees enjoying the workplace. "You're killing two birds," he explained. "One is, look at the cool work that we're doing for our customers, and you're also speaking to potential employees, showing them your current employee who's having fun and making a difference in the world."

Experts warn against hiring to fill a position without considering whether the candidate is a good cultural fit. "If they don't really care about motorsport, the chances are they aren't going to stay for very long," said our source. "It's all about being comfortable in the company that you work in."

The flip side of this scenario involves due diligence on making sure the prospective employee is right for the company. But post-COVID-19, with firms of every description struggling to hire and retain personnel, prolonging the evaluation process can mean a candidate could jump elsewhere before the evaluation is complete. Part of the reason may be that human resources hasn't explained why the firm is worth joining. That's a corollary to what Lancaster, Pennsylvania, hiring consultant Ed Krow stressed while speaking about employee retention at the PRI Trade Show last year.

"You can get a job anywhere today. Candidates want to know what kind of work experience they're going to have with you," Krow emphasized. "If you look at companies today, they tailor everything in their social media toward the customer—how great is our product or service. What they're not harnessing through social media is what it's like to work there, what kind of candidate gets behind those cool products and services. What I'm working on with my clients is to have them using their social media accounts and have their marketing team do the same things they do to engage customers to instead engage potential employees. That's next-level recruiting. Once they see the light, it becomes part of how they recruit."

To Krow, at least, blaming COVID-19 and staffing shortages for hiring issues misses the problem, and solution, entirely. "Most companies that are actively recruiting, and telling their stories, are having success drawing the types of people to them that they need to run their business," he explained. "It's because they can tell their story better than their competition."

Krow advises his clients to make live recruiting videos for social media, wherein existing employees explain why they love their jobs, and about the enjoyable tasks they do. "You're killing two birds," he said. "One is, look at the cool work that we're doing for our customers, and you're also speaking to potential employees, showing them your current employee who's having fun and making a difference in the world. That's what recruits want to see."

One wound employers commonly inflict on themselves is what Krow calls the we'll-get-back-to-you blunder. "That candidate is going to be employed and gone by the time you call him back," he warned. "I tell my clients, you love this guy, and I know you've got other interviews scheduled, but you need to tell him—within the next week—here's what's going to happen. You're bringing him back and you'll have an offer within a week. Tell him that. If he doesn't feel the love, you're going to lose him. Organizations have to understand that right now, this is a seller's market.

"Given the numbers in our population and baby boomers retiring, I don't see this talent shortage going away anytime soon," Krow said. "If we have the opportunities, we can draw the right people who want to work." PRI

SOURCES

Ed Krow
edkrow.com

Barry Moltz
barrymoltz.com

MAKE THE CASE

GODZILLA VS. COYOTE

With an all-aluminum, dual-overhead cam design and decades of development behind its modular architecture, the Coyote has been the Ford V8 of choice for performance applications for some time now. But with compact packaging, big displacement, and the ability to make a ton of power without much fuss, the Godzilla V8 offers compelling advantages of its own.

By Bradley Iger

GODZILLA ENGINE ADVOCATE:
Jason Youd,
Mast Motorsports

"WITH VERY MINOR CHANGES, THE GODZILLA ENGINE IS CAPABLE OF MAKING 650 HORSEPOWER ON THE DYNO NATURALLY ASPIRATED."

The iron-block, 7.3-liter OHV Godzilla V8 was developed by Ford to replace the 6.8-liter modular V10 as the base engine in its Super Duty pickups. While it's a purpose-built truck motor, it's factory rated at 430 horsepower and 475 pound-feet of torque in stock form, and it doesn't take much to get a lot more out of it.

Since this engine was just introduced in 2020, the aftermarket support for it is still very limited. The bigger players in the aftermarket haven't really started making parts for these engines yet. But we got our hands on one back in February 2020, and in the time since we've created our own camshafts, valve springs, intakes, and other components for it. We also failed the engine on the dyno three different times, and those failures allowed us to find weaknesses and design parts to address those problems.

Compared to a Coyote V8, the Godzilla V8 has some very clear advantages in a motorsport application. The first one is cost: This engine is roughly one-third the cost of a Coyote engine. It's also smaller than a Coyote engine in terms of packaging, and the torque output is higher in factory form. And with very minor changes, the Godzilla engine is capable of making 650 horsepower on the dyno naturally aspirated. We're talking about modifications that can be done for less than 10 grand. And we just made 1,100 with our supercharged combination a few weeks ago. It doesn't really take much to wake these engines up.

Since there's only one camshaft involved, goals can be achieved a lot faster and for less money than with a Coyote. Here we're dealing with one camshaft instead of four, the parts are generally cheaper, and the Godzilla cylinder head design offers a significant airflow advantage. It's a truck engine, so it's set up for low-end torque, and that makes it a good option for off-road racing and disciplines like that. The all-aluminum Coyote has some advantages in disciplines like road racing and drifting because of its lighter weight, but with the right combination of parts, the Godzilla V8 can be dialed in for just about anything.

Because it has an iron block, and the design lends itself to low-end response, I think the Godzilla V8 is particularly well suited to drag racing. It can handle a lot of boost, and the bottom end is very stout. And because it's dimensionally smaller than the Coyote, it's also a good option for swap applications. It's slightly taller in factory specification compared to the Coyote, but the factory intake manifold is the main issue here, and low-profile performance intakes for this engine are already on the market.

Since the Godzilla is still so new, there are still a few important things that the aftermarket hasn't produced but are definitely needed—engine bearings, for instance. It's just a matter of time before we start seeing aluminum blocks and aftermarket cylinder heads, although those are probably still a few years away. While I doubt the Godzilla V8 will end up replacing the Coyote in performance and racing applications, I do think it could eventually supplant older Ford pushrod V8s like the 351 and 460.

COYOTE V8 ADVOCATE:
Michael Rauscher, L&M Engines

"THE COYOTE HAS A CYLINDER HEAD AND VALVETRAIN DESIGN THAT'S BETTER SUITED TO HIGH-RPM APPLICATIONS THAN PUSHROD ENGINES LIKE THE GODZILLA ARE, SO IT'S REALLY GOING TO SHINE IN DISCIPLINES LIKE ROAD RACING AND AUTOCROSS—FORMATS WHERE YOU REALLY NEED THOSE REVS."

The cylinder head and camshaft setup of the Coyote V8 is magic. It provides great airflow while also meeting the emissions and fuel economy targets that Ford needs to achieve in its production vehicles.

Three-hundred-and-two cubic inches isn't a huge amount of displacement, but Ford designed the engine to rev really high and make a lot of torque at the top end, and that's why it works really well in performance applications.

With the twin-cam setup, we're able to change camshaft timing at will, and to get the Brake Mean Effective Pressure up, they increased the static compression ratio to 11:1. But because we're able to modify the intake and exhaust valve timing, the effective compression ratio could be 5, or 6, or 7:1, and that eliminates a lot of the problems that high compression motors have with today's fuel. At higher rpm's we have less cycle time, so we can move the cams around for more efficient cylinder fill and see more of that 11:1 ratio.

Initially everyone was afraid of having four chains and four cams because it wasn't what they were used to with pushrod engines. But the design is actually very straightforward and relatively simple, and eventually the market caught on to that. The Coyote has a cylinder head and valvetrain design that's better suited to high rpm applications than pushrod engines like the Godzilla are, so it's really going to shine in disciplines like road racing and autocross, formats where you really need those revs. DOHC is the best setup for that; the engines being used in IndyCar and series like that all use multiple-cam engines, and it's been that way for a long time.

Meanwhile, the Godzilla engine was designed for the requirements of a truck, so that means low speed, high torque. That doesn't mean that people can't make a hot rod engine out of it, but it's going to be beyond the pocketbook of the average builder. Unless we get to a point where there's millions of units out there, which seems doubtful given the direction that the industry is headed in, I think aftermarket support for the Godzilla is going to continue to be very limited. That means a lot of custom work for racers in order to get them where they need to be, and that typically isn't cheap.

From a general performance perspective, the Coyote is a superior design. When you start factoring in the costs involved and realize that the Godzilla engine is also going to be more expensive to build, the choice seems obvious to me. PRI

EDITORS' CHOICE

Hundreds of new product announcements cross the desks of PRI editors each month. Following are our top picks for April.

NDURANCE EXPANDED PERFORMANCE OIL RINGS

TOTAL SEAL

totalseal.com

Designed specifically for turbocharged and high-boost engines, the new Ndurance expanded performance oil rings from Total Seal offer not only higher tension for better oil control but will also retain that tension for a longer time.

The key is a special process that incorporates a gas-nitriding heat-treatment of the steel expander. This changes the metallurgy, grain structure, and color of the steel.

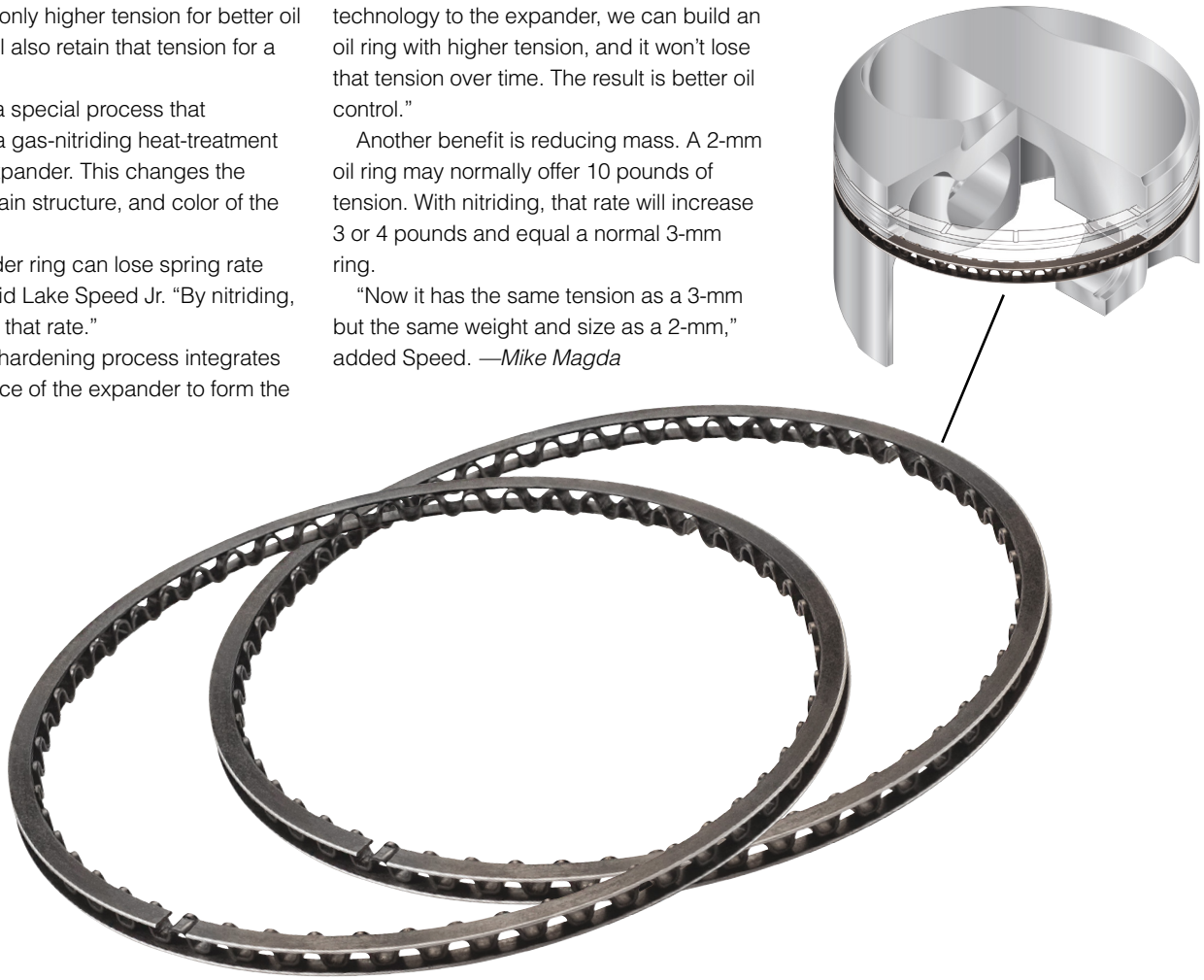
"An expander ring can lose spring rate over time," said Lake Speed Jr. "By nitriding, it doesn't lose that rate."

The nitride hardening process integrates onto the surface of the expander to form the nitride layer.

"We're already using nitriding in other parts of the engine, including the valve springs to keep them from losing spring rate," noted Speed. "By applying that same technology to the expander, we can build an oil ring with higher tension, and it won't lose that tension over time. The result is better oil control."

Another benefit is reducing mass. A 2-mm oil ring may normally offer 10 pounds of tension. With nitriding, that rate will increase 3 or 4 pounds and equal a normal 3-mm ring.

"Now it has the same tension as a 3-mm but the same weight and size as a 2-mm," added Speed. *—Mike Magda*



ELIMINATOR SPEC MOTORS

LINGENFELTER PERFORMANCE ENGINEERING

lingenfelter.com

Different power levels are being offered in the Eliminator Spec engine program at Lingenfelter Performance Engineering.

"The Eliminator Spec motor package works three ways," explained Mark Rapson. "The S Spec is designed to run on pump gas and is street oriented. The R Spec is designed for higher compression and for race fuel or E85. The X Spec is more of an R&D program; that is, anything we're working on that can't be put in a category."

Lingenfelter has already scored a major success with an Eliminator R Spec engine built for Jake Rozelle's C5 Z06 Corvette that won the 2021 Optima Ultimate Street Car Invitational. The 454-ci LS7 makes more than 800 horsepower.

"That was a 13.5:1 compression engine with one of our Eliminator cams that is not sold separately," noted Rapson.

An example of an X Spec engine is a 1,200-horsepower supercharged LS engine built for a ZL1 Camaro test bed at Lingenfelter. It measures 866 lb./ft. of peak torque.

"We did that program to see how far we could take the engine without modifying anything on the car," said Rapson.

The core of the program is the Lingenfelter blueprinted and CNC-machined block. Internal components from the aftermarket are subsequently manufactured to a Lingenfelter specification. —*Mike Magda*

FABRICATED RACE CAR CENTER CONSOLE

SPEEDWAY MOTORS

speedwaymotors.com

Speedway Motors makes building a race car a little easier with a fabricated center console.

"It can secure critical switches, toggles, push buttons, and brake-bias knobs within easy reach," said Kelsey Bugjo.

Constructed from dimple-die-punched 14-gauge aluminum, the piece is lightweight, yet strong enough to support race gear needed by the driver. Angled flanges allow mounting directly onto transmission tunnels inside the driver's cabin. The kit includes 10-32 button-head screws and nylon lock-nut fasteners, and it's available in a bare finish or with a black powder-coat finish.

"This unit is designed to keep all wiring neatly tucked away under the console," added Bugjo.

The overall height is just over 5 inches. The surface plate is 10.25 x 5.64 inches. Switches, lights, etc. can be mounted directly on the top surface by drilling the appropriate size hole. For an even cleaner install, premade switch panels that are available from Speedway Motors can be mounted by cutting a clearance hole and screwing or riveting it in place.

Car builders can also make the console easy to remove by using quarter-turn fasteners and springs to mount the console to the tunnel. —*Mike Magda*

LS3 FLAT-TOP TRANS-AM TA2 POWERPAK PLUS PISTON SET

MAHLE MOTORSPORT

us.mahle.com/en/motorsports/

The PowerPak Plus piston line from MAHLE Motorsport now includes the LS3 flat-top pistons homologated for TA2 Trans-Am applications.

The pistons are available in three bore sizes: 4.065-, 4.070-, and 4.075-inch diameter. Incremental bore sizes are available by special order.

"These pistons come from the same motorsports facility that produces parts for all the high-end race teams," said Joe Maylish. "Engine builders like these kits because they come with everything: pistons, rings, wrist pins, and clips. And they're all designed to work with each other."

The PowerPak Plus pistons are forged from 2618 aluminum alloy and feature a hard-anodized top ring groove, should the engine builder add nitrous or boost to a particular application. Other advanced features include slipper-skirt style design, phosphate crown and ring groove coating, horizontal gas ports, and Grafal anti-friction skirt coating.

These pistons come with a .945-inch diameter wrist pin and a 1.0-, 1.0-, 2.0-mm file-fit performance ring set. The compression height is 1.330 inch. Weight ranges from 513 up to 517 grams, depending on the bore size.

With a 70cc combustion chamber and .051-inch gasket, these pistons provide a 10.7:1 compression ratio. The sets are designed for Trans-Am racing applications and meet the requirements and specs of sanctioning bodies in which it will compete. *—Mike Magda*

SENSOR COVERS

DESIGN ENGINEERING, INC.

designengineering.com

Excessive heat is a demon that can reduce the performance of, if not damage, numerous parts in a race car. Delicate sensors and wire connections are often at risk due to their locations near turbo and exhaust heat. Protecting these sensors from heat will help ensure more accurate readings.

A new protective cover from Design Engineering, Inc. (DEI) helps provide double protection with an innovative overlaying combination arrangement.

"This cover works with any type of sensor on the engine," said Mike Buca. "We have two sizes that will nest together. It was something that we first saw on a production application. There was a sensor close to the turbo that had a cover shield."

Constructed from an aluminized insulation, the covers come in 25- and 32-mm sizes that have slit openings on one end. The larger end slips over the sensor, or the 32-mm cover can double over the 25-mm cover.

These thermal covers are also effective at protecting sensitive parts from moisture and dirt. They're lightweight and easy to install. There's also a large 62-mm version for bigger components.

"It's not a high-dollar piece," noted Buca. "But if you melt a connector, that can end your day racing." *—Mike Magda*

FOUR-STAGE DRY-SUMP SYSTEM FOR SBC

AVIAID

aviaid.com

Aviaid offers different small block Chevrolet four-stage dry-sump oil systems that give car builders the option of mounting the kit on either the left or right side of the engine. This option allows more flexibility in packaging the engine with regards to steering gear or other tight-fitting equipment.

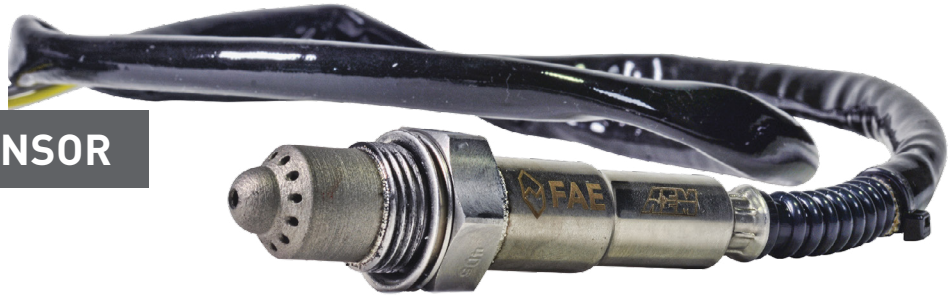
"We don't just build the pump, we build a package around the pump that will bolt on an engine for particular applications," said John Schwarz. "Remember, everything we're putting on is actually foreign to the engine compartment—the pump, the drive, the tank. So we can build for passenger- or driver-side mount."

The kit includes a three-pickup, 5-inch-deep oil pan with windage screen, a four-stage pump with AN-12 fittings, 1-inch wide belt drive, and remote filter with billet adapter. The oil reservoir size is determined by the application.

"We want engine builders to know that we can sell them everything they need when a customer said he wants a dry sump on his engine and they've never done one," explained Schwarz. "The engine builder doesn't have to pick the parts. We do that."

Alternative pumps and pans are available; plus, the tanks and breathers are sold separately. *—Mike Magda*

WIDEBAND UEGO SENSOR



AEM ELECTRONICS

aemelectronics.com

AEM Electronics, in conjunction with FAE, has developed its own wideband sensor that is durable enough to not only operate with race fuels, it also carries a two-year warranty.

"It's designed to run with leaded fuels running past it and survive two-step events and hard-cut rev limits," said Lawson Mollica. "Those situations can shock a typical ceramic construction."

As noted, the new sensor was developed in partnership with FAE, which is a global automotive supplier based in Spain that is well respected for its work in multi-layer ceramics and microelectronics integration.

AEM had previously used the Bosch 4.9LSU with its X-series and Classic Digital gauge-based wideband UEGO (universal exhaust gas oxygen) controllers. While the Bosch sensor is popular with OEM production vehicles, AEM was seeing diminished performance and even failures in motorsports applications.

The AEM/FAE sensor was subjected to extensive testing in race vehicles, dyno cells, and street-legal vehicles assigned to long driving loops. After a full year of tests, not a single sensor failed. Testing also revealed the AEM sensor scored 10% faster response time than the Bosch 4.9.

"To my knowledge, no manufacturer backs their wideband sensor with any warranty, and we're offering a two-year warranty in a motorsports environment," said Mollica. "As a racer, if you replace your wideband four times per year, you could save around $500 by investing in our new sensor technology. As a dyno operator, those savings could be in the thousands." *—Mike Magda*

NEWLY APPOINTED

ROMAIN THIEVIN

The former racer brings his Las Vegas-based Exotics Racing and dedication to safety to SPEEDVEGAS, taking on the role of CEO of the recently combined venture.

By Jim Koscs

Not everything that happens in Vegas stays in Vegas. Romain Thievin, a former racer and stunt driver, wants enthusiasts who visit SPEEDVEGAS to leave this motorsports experience with memories they'll long treasure. Thievin joined SPEEDVEGAS as CEO in December 2021, combining his own Exotics Racing business with SPEEDVEGAS Motorsports Park, which had recently been revived out of bankruptcy under new ownership. The new enterprise is touted as the largest "arrive-and-drive" motorsports destination in the US, with a fleet of the latest supercars, plus off-roaders and go-karts.

Born in France in 1979, Thievin became a racer and won championships in Peugeot Cup and French Super Production series. He also became a stunt driver, racing instructor, and host/driver of a French racing TV show. He has also raced in numerous segments in Europe and the US.

Thievin's initial projects at SPEEDVEGAS included major renovations and safety upgrades, improving the Vegas Off-Road Experience dirt track, and launching the Vegas Superkarts go-kart track. He discussed his plans and goals with PRI.

PRI: What was the purpose behind combining Exotics Racing with SPEEDVEGAS?

Thievin: The goal was to create a unique motorsports park open seven days a week. Visitors can drive supercars, off-road vehicles, and go-karts, each providing a different type of adrenalin rush. Exotics Racing had the best operations, and SPEEDVEGAS had the best location, so it made sense to combine both companies to build a strong leader in this market.

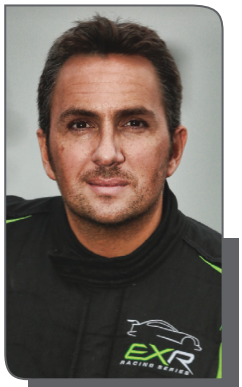
PRI: You once spoke out about safety concerns at SPEEDVEGAS. Describe the safety improvements you and your team are making.

Thievin: Safety is our number-one priority. To make sure everything was up to our standards, we changed a large portion of the supercar and off-road tracks. We shortened the straight and added new asphalt run-off areas, gravel traps, and F1 Tecpro safety barriers. We also reviewed and improved safety processes and training.

PRI: What are you most looking forward to in your role as SPEEDVEGAS CEO?

Thievin: To continue to share my passion with as many people as possible. We will invest $10 million in the facility by adding new buildings, race tracks, and vehicles. We always want to make our driving experiences better.

"WE WILL INVEST $10 MILLION IN THE FACILITY BY ADDING NEW BUILDINGS, RACE TRACKS, AND VEHICLES."



ROMAIN THIEVIN

TITLE:
Chief Executive Officer

ORGANIZATION:
SPEEDVEGAS

HOMETOWN:
Henderson, Nevada

FAST FACT:
Romain Thievin won a Taurus World Stunt Award for his driving work in "The Bourne Identity" starring Matt Damon.

PRI: Why the addition of the Vegas Off-Road Experience and Vegas Superkarts?

Thievin: When a group of friends comes to SPEEDVEGAS, some just want to race one another for an affordable price, and the kart track is perfect for that. We are unique in offering all those activities at the same location.

PRI: How can SPEEDVEGAS Motorsports Park attract new racers and ultimately better serve the motorsports market?

Thievin: We offer affordable arrive-and-drive experiences, from $35 for the go-karts, $199 for the supercars and $299 for the off-road. It's a perfect first step for beginners.

When a driver wants to learn more techniques, we offer the High-Performance Driving Experience that includes skid pad exercises, multiple driving sessions, and private coaching with video analysis and a ride-along.

Our EXR Time Trial World Challenge is the world's largest motorsports competition, with more than 72,000 drivers ranked. Drivers shoot for the fastest lap times against friends, colleagues, and other racers, and our live rankings allow them to compare their times against other drivers.

PRI: Safety is obviously of utmost importance in motorsports. What caused you to become such an advocate?

Thievin: I am a former race car driver, but also a stunt driver. I know that when a vehicle is moving,

"I KNOW THAT WHEN A VEHICLE IS MOVING, THERE IS A DANGER, BUT IT DOESN'T MEAN THAT YOU CANNOT HAVE FUN, DRIVE FAST, AND DRIFT A VEHICLE ON A RACE TRACK SAFELY."

there is a danger, but it doesn't mean that you cannot have fun, drive fast, and drift a vehicle on a race track safely.

PRI: What's your most gratifying professional accomplishment?

Thievin: I think my most gratifying professional accomplishment is to be able to live from my passion and to share it with my amazing team of more than 100 employees, and our customers, too.

PRI: Who has been the biggest influence in either your professional or personal life, and why?

Thievin: Ayrton Senna and my dad. I became a race car driver because of them. Senna was a pure racer, same as Max Verstappen now. They always drive to the limit. My dad was an amateur race car driver in France in the 1990s. I learned how to race by watching his races.

PRI: What is one trait that you admire in others, and why?

Thievin: Patience, because I don't have any!

PRI: What is a recent mistake you've learned from?

Thievin: A few years ago, we created the EXR Racing Series. The goal was to create an affordable arrive-and-drive racing series in the US. It was a very good experience for the drivers, but not as a business owner. We lost over $1.5 million in three years and had to end it.

PRI: Excluding your cellphone/tablet/computer, what's one thing you can't live without?

Thievin: My family, of course. But I cannot stay away from SPEEDVEGAS for more than a few days. I love to work there and drive the cars, go-karts, and trucks regularly. It's also awesome to see the smiles on our customers' faces every day. PRI

INDUSTRY INSIGHTS

DAVE ARGABRIGHT

A fixture on pit road at countless televised race events, along with contributions in myriad racing publications—including this one—the Indiana native reflects on a Hall of Fame career in motorsports journalism, and hints at future opportunities to continue telling stories.

By Jeff Zurschmeide

"ONE OF THE THINGS THAT STUCK WITH ME WAS ABOUT 30-SOME YEARS AGO, RICHARD PETTY SAID, 'THE EASIEST THING IN THE WORLD IS BEING NICE TO PEOPLE.' I NEVER FORGOT THAT."

For the past 42 years, Dave Argabright has been among the country's most influential and celebrated motorsports journalists. As a writer, his work has appeared in *National Speed Sport News*, *SprintCar and Midget Magazine*, *Road & Track*, *Car and Driver*, and right here in *PRI Magazine*. He's also been seen and heard on Speed Channel, MAVTV, CBS Sports, ESPN, TNN, Versus, Must See Racing, and the Indianapolis 500 Radio Network. In addition, he's the author of more than a dozen books on motor racing. His list of professional awards and honors is lengthy, and he's earned every one of them.

Recently, Argabright made the decision to step back from day-to-day coverage of motor racing and spend more time writing books and tackling new projects. Given his decades of experience and always-insightful thoughts on the industry, we jumped at the chance for a sit-down to discuss, among other topics, how motorsports journalism has changed over the last half-century and where it stands today.

PRI: Motorsports journalist is not a career that they tell you about in high school. How did you get into this line of work?

Argabright: It was just a fortunate accident. I'd been out of high school for a few years, and I happened to meet the sports editor of our local newspaper. I mentioned that I wrote a little bit for my high school newspaper, and he said they needed someone to cover high school football and basketball. I thought I couldn't write for a

real newspaper; there's no way. But then he said, "Well, we pay 15 bucks a story." At that time, 15 bucks was a tank of gas, so away we went.

I covered stick-and-ball sports the first couple of years, but my passion was already auto racing. So I started lobbying to cover some races and some racing personalities. The newspaper was in Anderson, Indiana, and they have Anderson Speedway, which is a legendary short track. I kept selling them on the idea that we needed to cover the local track better. Through the newspaper, I was exposed to *National Speed Sport News* and began writing for them, and that's where it all took off.

PRI: What was it about motorsports that attracted you?

Argabright: I'm not sure I really know other than the atmosphere of a great short track race, where it's loud and exciting and people are shouting. That attracted me from the get-go. Then once I got a chance to get to know some of the people behind the scenes and some of the competitors, that captivated me from day one. I never had any interest in driving a race car or trying to work on a race car for a living. That didn't appeal to me, but the idea of being able to tell some of the stories really drew me in. That was compelling to me.

PRI: If you had to go back through all the races you've ever been to, is there one that really stands out?

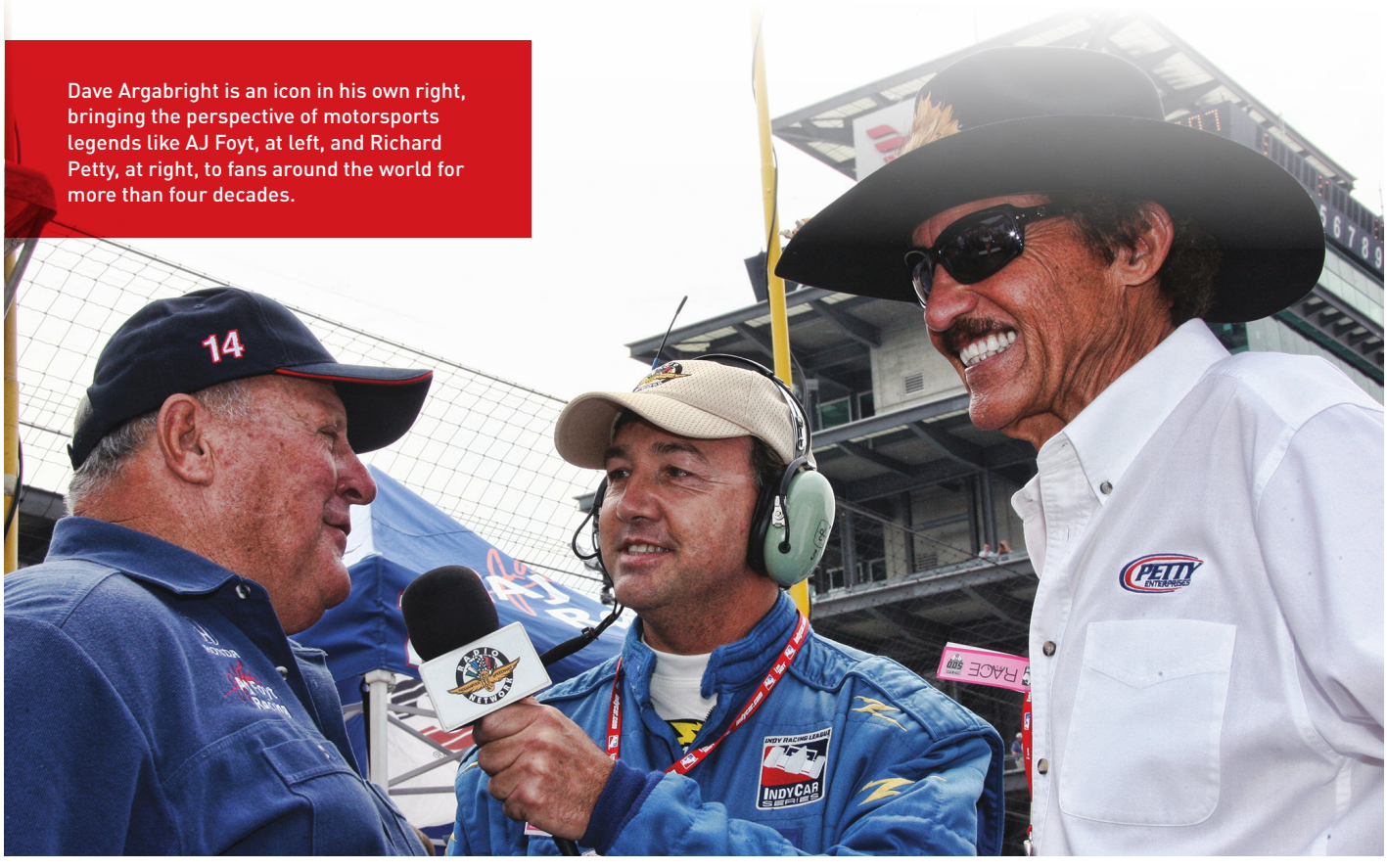
Argabright: I think it would have to be when I was 10 or 12 years old, and I went to the Little 500 sprint car race in my hometown of Anderson, Indiana, for the very first time. Because I was an impressionable young kid, that really was the moment that just truly set the hook for me for the rest of my life to love motorsports. As I said earlier, it was loud and colorful, and I had just never seen anything even remotely like all that. From that moment forward, the gears in my brain were turning and I was just fascinated.

> *"ASK A QUESTION THAT YOU THINK THE READER WOULD ASK, OR THE VIEWER WOULD ASK IF THEY HAD THE OPPORTUNITY."*

PRI: What do you know now, as you are mature in your career, that you wish you knew when you started?

Argabright: I wish I could have been a little more patient and tried a little harder to see things from various points of view. I had a tendency, like everybody else, particularly when I was younger, to want to see things in a black-and-white way. I've learned as I go along to see less and less black and white and a whole lot more gray. Things are seldom as simple as we want them to be.

PRI: The follow-up is, what's the best piece of advice, personal or professional, that you've ever received?



Dave Argabright is an icon in his own right, bringing the perspective of motorsports legends like AJ Foyt, at left, and Richard Petty, at right, to fans around the world for more than four decades.

Dave Argabright, pictured at center, has always seen himself primarily as a storyteller. "I never had any interest in driving a race car or trying to work on a race car for a living," he said.

Argabright: I was blessed with a series of mentors, in and out of motorsports. They really had a profound impact on me and the person I grew to be. One of the things that stuck with me was about 30-some years ago, Richard Petty said, "The easiest thing in the world is being nice to people." I never forgot that. That's as good a piece of advice as I've ever heard because it's true. It doesn't cost extra. Just be nice. It doesn't hurt. Then the second thing was from Chris Economaki, who drilled into me: Ask a question. Whether it's television, print, or whatever, just ask a question. Ask a question that you think the reader would ask, or the viewer would ask if they had the opportunity. That was good advice.

PRI: How has motorsports journalism evolved over the years you've been involved?

Argabright: For me, the biggest change has been the timeframe in which we have to collect our thoughts, get them organized, and get the information presented to the reader. In the magazine world, we had several weeks to gather information, contemplate a story, and get it out to different sources. We could build our story, but also our views, and we could get various points of view. We had time to do that. I think the contemplative writing and reading experience was very, very different because things were in much greater detail, and the analysis was much more thorough.

But today, everything is compressed into such a tight timeframe. I think we're missing that deep analysis and that deep view of a complex issue. We try to distill it down into something that can be read and fully understood in three minutes. Some topics, some elements, you can't understand in three minutes.

PRI: Along those lines, do you think social media is a good or bad thing for the motorsports industry?

Argabright: It's a little bit of both. Obviously, social media can help, whether you're a track or a driver. If it can help you get information out to fans quickly and efficiently, then it's great. But if it's also a vehicle where people use your social media account to say nasty, mean, negative things about you or your track or your series or your family, then it's not a good thing. But I don't know how you have one without the other, because that's sort of human nature.

I believe social media is going to be around for many years to come, but I do think we forget sometimes that it's a relatively recent social experiment. When I read about an NFL player who has been dogged with controversy because of his political or social views, and he deletes his Twitter account and then says, "You know what? It's the happiest I've been in five years. I feel like a giant weight has lifted off of my shoulders." That's pretty telling, and it may tell us a little bit about where everything's going.

"I THINK THAT NEWS—LIKE EVERYTHING ELSE IN MEDIA—HAS TO BE SOMEWHAT ENTERTAINING AT ITS CORE."

PRI: What is it that makes good news?
Argabright: I think that news—like everything else in media—has to be somewhat entertaining at its core. It has to be something the reader feels is important enough to invest their one minute, three minutes, 10 minutes in reading or watching that story.
PRI: As someone who's made his living interviewing people, what do you think makes for a good interviewer?
Argabright: Obviously, a person needs to do their homework. They need to study the subject beforehand. They need to understand where they want the interview to go. But you also learn pretty quickly that you can't get in somebody's face and ask the difficult questions, nose-to-nose, because you learn pretty quickly that you lose people. So you learn how to be diplomatic and use a

Today's fast-paced media environment presents significant challenges for journalists, said Dave Argabright, at left with Keith Kunz during the 2000 Lucas Oil Chili Bowl Nationals. "I think we're missing that deep analysis and that deep view of a complex issue," he told us.

"MOST OF THE TIME, MY GOAL IS TO HELP THE READERS KNOW AND UNDERSTAND THE PERSON AND THE SUBJECT BETTER."

lot of tact. You build their trust to where they can understand that you're not there with a hatchet, you're not there to try to put them in a bad light. You're just there to try to get their answers. It takes a lot of experience, I think, before somebody is really good at that.

PRI: Do you always have a specific goal in mind for an interview, or is it better to let it roll on and see where it goes?

Argabright: It's pretty rare that there was something really specific that I wanted. Most of the time, my goal is to help the readers know and understand the person and the subject better. I think it's better to let an interview roll on. I say that a person needs to be prepared, but I also think that it's really important to listen to what somebody is telling you, because a lot of times they'll bring up something that opens the door to go in a whole different direction. That might be the most fascinating part of the interview; something that you hadn't even thought about beforehand. You have to organically see where it's going to lead.

PRI: What do you think we can do to recruit and train the next generation of motorsports journalists?

Argabright: Bringing kids to the race track and introducing them to people and exposing them to the sport is the number-one thing we could do. But as far as attracting young journalists, that's a tough one because the state of journalism across the board, not just in racing, is very, very challenging right now. The legendary people, back in the day, such as Jim Murray and Jimmy Breslin and people like that, were great print journalists, but it was never a lucrative endeavor for them. Print journalism is very, very challenged right now because the consumers have shifted to electronic

news media, and nobody wants to pay for content. If no one is paying for content, you don't have a lot to offer that young person who's trying to get into journalism in terms of being able to make a decent living.

It's great to be passionate. It's great to dedicate yourself to a venture, but at the end of the day you've got to be able to put beans on the table. That's really the bottom line. Unless the model changes where consumers become comfortable paying for content, whether that's print, electronic, audio, video, whatever, it's going to be challenging. I'm not going to lie. I'm deeply concerned about where we're headed.

PRI: Are there any racing promoters who have really impressed you, and what did they do that really made an impact on you?

Argabright: Earl Baltes who built Eldora Speedway. I was privileged to write his autobiography with him. Earl was great because he was such a flamboyant, charismatic person. He epitomized what old school promoting could be, getting attention, creating a lot of buzz and excitement. Nobody could do that quite like he did in his day.

Then Ralph Capitani. He was the race director at Knoxville Raceway. He really helped propel the Knoxville Nationals into the modern era and make it the dynamo that it is now. I always admired how he was this great, wise, astute, patient person. In the midst of one of the biggest events and one of the most important tracks in the world, he had a knack for making people happy. He knew how to get a lot accomplished without putting people off, without making people mad at him.

Both those guys were just terrific in their own way.

PRI: What do you wish more racers understood about promoters and the challenges they face and what they do?

Argabright: I've said for a long time that every racer should have a few weeks in the promoter's chair on Saturday night to really understand how a race track works and how hard it is. And every promoter needs to spend a few weeks with a race team all week long, and then on the weekends, and truly understand how their world works. Because I think way too much of the time, promoters

and racers forget that they're really on the same team, and they really need each other to thrive in order for it to be successful.

PRI: What legacy do you want to leave in motorsports journalism for those who follow?

Argabright: I would hope that we preserved the history and the stories of racing the best way we knew how. I think over the long haul, I'm glad we were able to produce the books that we did because, despite the shift away from print and different things that are happening, books are still pretty permanent. And the books that we produced are going

"I THINK WAY TOO MUCH OF THE TIME, PROMOTERS AND RACERS FORGET THAT THEY'RE REALLY ON THE SAME TEAM, AND THEY REALLY NEED EACH OTHER TO THRIVE IN ORDER FOR IT TO BE SUCCESSFUL."

Although he's scaling back his workload, Dave Argabright's passion for motorsports is as strong as ever. "I definitely want to stay engaged in the sport, and I still want to tell some stories," he said. Argabright is pictured here, at right, with Mike Marlar, winner of the 2021 Lucas Oil Late Model Knoxville Nationals.

to be on shelves for a really, really long time to come, and that's a good thing.

PRI: Is there anything that I have not asked you that you want to talk about?

Argabright: I want to make it clear to people that even though I'm dialing back quite a bit, and even though I've ended some of my longtime monthly obligations, I'm not retiring. I've had a pretty ambitious workload for a lot of years. I don't want to work quite that hard anymore, but I definitely want to stay engaged in the sport, and I still want to tell some stories. I'm excited to explore telling the stories in a different way, through video or podcasts or some of the newer technologies. It would be both interesting and challenging to see if I could continue to tell stories in a totally different way. PRI

SPECIAL REPORT

FOLLOW THE SCIENCE

Outside of the limelight typically reserved for high-profile teams and drivers, medical professionals are quietly using breakthrough discoveries in human biology to help facilitate sharper—and safer—performance behind the wheel.

By Steve Statham

Scientific and medical advances that relate to motorsports can sometimes break through with revolutionary suddenness, but usually the process moves forward at a steady, evolutionary pace. Undertaking research to find new ways to keep drivers and crew safer, and

improving driver performance, is a marathon, not a sprint, as the saying goes.

Rest assured, behind-the-scenes research is ongoing, the equipment is improving, and the knowledge base is deepening. Much of that progress comes from the manufacturers of safety equipment themselves. "They don't rest on their laurels. They're always saying, 'How can we make our products better?'" said Tom Weisenbach of the International Council of Motorsport Sciences (ICMS), Indianapolis, Indiana.

"I think we have definitely improved the PPE [personal protective equipment] the motorcycle riders and drivers are utilizing to protect them, whether it's fire, whether it's impact collision, what have you, we've seen improvements," he said. "I give credit for that to the PPE manufacturers, to SFI, Snell, and the FIA. Those organizations are setting the standards that are now required and the specs on safety products."

Beyond the established brand names and organizations most racers would recognize, there is a substantial amount of work quietly being done by medical professionals that is leading to better outcomes for racers. Many of the high-profile medical studies in racing have traditionally revolved around patching drivers back together after crashes, but in speaking with sources for this story, we found a number of talented professionals diving deep into the basics of nutrition, sleep, and bio-mechanics, and how they relate to motorsports participants.

"Nutrition is a big thing now," Weisenbach said. "I don't care what type of racing you're in, you're seeing more and more of an emphasis put on the racer for nutrition and making sure they're eating properly. And then also getting enough sleep. That's something that I don't know people years ago even thought about. I still don't know how some of our sanctioning bodies, which run 100-plus races a year, how their crew members and racers get enough sleep. But I know if you look at Formula 1 teams, the majority of them have their own team nutritionist who works with not just the drivers but the crew members as well to make sure they're eating properly."

Research in the field is ongoing, and a number of the latest advances in safety equipment come from the manufacturers themselves. "They don't rest on their laurels," said one of our sources. "They're always saying, 'How can we make our products better?'"

TALK TO THE DOC

The casual observer might be surprised to learn how much of motorsports-related medical research is focused on fundamental aspects of human biology. At a superficial glance, some of these studies seem to concern themselves with what many would consider common-sense knowledge. Most people are at least vaguely aware of the importance of hydration, nutrition, and sleep. But the question becomes, how much sleep? What's the proper level of hydration for a driver or crew? How can proper nutrition improve driver performance? As it turns out, specific answers to these questions and how they affect racers haven't really been studied much until recently.

Now that they are being studied, some amazing data is coming out. David P. Ferguson is an assistant professor of kinesiology at Michigan State University in East Lansing, Michigan, where one area of his studies examines physiological stresses placed on race car drivers and pit crews. "I'm an exercise physiologist. Think of me as a mechanical engineer for the human body," he said. "I spend my time looking at stressors that fatigue drivers. That could be something like heat, dehydration, G-forces, vibration, anything like that. And then I use physical training, nutrition, and then even a little bit of engineering to make them fatigue less in the car. Which, of course, improves safety because they don't have as many crashes. And on the flip side, it makes them faster, which they like."

Ferguson has witnessed a major shift in attitudes since he began his studies. "When I started this, race car drivers were not even considered athletes. They just thought they sat there and drove their car around the race track and nothing much happened," he said. "In fact, when I first started doing these studies and publishing some of the initial results, manuscripts would be rejected at sports journals because they would say, 'Race car drivers are not athletes, so we can't accept your paper.'

"We now know that they are considered athletes," he continued. "Their cardio-respiratory fitness is pretty much equal to an elite triathlete. They're quite fit. When they compete, they will drive the race car for two to four hours at a heart rate of 160 to 180 beats per minute. They're going to burn 2,000 calories in the race. They're going to lose about 7 pounds of sweat, due to the fact they're in the hot cockpit and sweating quite a lot. The G-forces they're going to experience are quite massive—actually, every race car driver would qualify for the Apollo space program for the amount of G-forces they can handle. They're quite exceptional athletes."

"I'M AN EXERCISE PHYSIOLOGIST. THINK OF ME AS A MECHANICAL ENGINEER FOR THE HUMAN BODY."

A big part of being able to maintain

Racers are increasingly turning to medical experts such as Dr. David Ferguson, pictured at right with IndyCar driver James Hinchcliffe, for insight into the physiological aspects of racing, which can be applied to improve performance, safety, and endurance.

that level of performance is tied to getting enough quality sleep, and the sleep habits of athletes is another area that is receiving fresh scrutiny. Dr. Meeta Singh specializes in sleep science and has given talks at the ICMS Congress on the effects of sleep on mental health.

"I'm a sleep doctor and a psychiatrist. My expertise and experience is working with professional athletes. And I firmly think that drivers, they're athletes," she said. "When it comes to athletes of any kind, whether they're motorsports drivers or playing football, in any of the major leagues, the lifestyle of a motorsports driver, as well as the pit crew, is tough. Their schedule, their practice times, the way that they're together with their travel, the week leading up to the actual weekend of races, all of those factors make it difficult to fit sleep into their lives."

Constantly crossing time zones while living out of a suitcase can result in problems with sleep and problems with circadian rhythm disorder, she said. "The problem is that number one, being in this sport is problematic for sleep, but then it's the vice-versa that also holds true. Having impaired sleep, having irregular sleep or chronically being deprived of sleep itself can result in impaired reaction times. It can make you less accurate. Your judgment is impaired, so you are likely to put yourself in risk-taking situations. That may be okay for you and me, but imagine if you're in a car that's going 150 mph. Then those small, split-second decisions can mean the difference between winning or crashing."

Anyone who has pulled a race car onto a track knows that the track condition, vehicle setup, and constant G-forces from acceleration and negotiating turns result in constant head motion. But exactly how much head motion does the typical driver endure? That too is being studied. Dr. Joel Stitzel Jr. is a professor and chair of biomedical engineering at Wake Forest University in Winston-Salem, North Carolina. "My training started in vehicle safety, understanding how passenger vehicles are regulated and the bio-mechanics of crash-test dummies," he said. Stitzel is a past president of the Association for the Advancement of Automotive Medicine (AAAM).

"We've started to study more and more the environment of the vehicle as it relates to what we call environmental loads or accelerations or motions of the head. And also crash-related biomechanics of the head," he said. "We developed instrumentation to study head motions in sports. With NASCAR's support, we started looking at deploying this sensor system, instrumentation system, out in some NASCAR vehicles and different testing environments.

"Toyota took an interest in what we were doing, and then Toyota Racing Development has supported us to help understand the grassroots dirt track environment with this instrumentation system.

"In a nutshell, what we're learning about is what the head is experiencing when you're driving around the track on pavement or on dirt, and we're starting to look into characterizing that environment and then what sort of things you might think about down the road to improve the situation for the drivers," added Stitzel.

GATHERING DATA

The key to turning research into products and policies that benefit the driver is being able to gather data, and in that field, technology has made significant advances. "Sports analytics, data analytics are becoming a big thing in all other sports," Ferguson said. "Special sensors can be put on a bat, a football, or on a player and watch them do all sorts of stuff. But, for the first time, racing is actually leading the field. These cars collect so much data and there are so many sensors, that they're already set up to collect data on various drivers.

With its mission of studying the scientific and medical factors of motorsports, the ICMS is a leading source of information on how physiological effects relate to on-track performance.

You go to an engineer and say, 'I want to measure this,' and they've probably got a sensor for it. We have ear accelerometers in the earpieces now. In my work, for the longest time we had a bio-harness that the drivers wore. It was like a chest-piece that could measure their heartrate with an EKG, and from that we could get skin temperature and breathing rate. We would have them swallow a little pill, like a multi-vitamin, and it transmitted their core body temperatures. We could see how hot they're getting. We did that for a long time. We are actually moving away from that and going to an ear temperature sensor to measure core body temperature, just like when you go to the doctor and they take your temperature with your ear, it's the same thing.

"A lot of drivers complain about how hot it is in the new NASCAR car and the new IndyCar with the windscreen," Ferguson continued. "So we're really trying to push getting a temperature sensor in the earpiece.

"EVERY RACE CAR DRIVER WOULD QUALIFY FOR THE APOLLO SPACE PROGRAM FOR THE AMOUNT OF G-FORCES THEY CAN HANDLE. THEY'RE QUITE EXCEPTIONAL ATHLETES."

You take all that data and feed it into the car's data system and then you have everything. You've got car and driver as one. You have heart rate and oil temperature. It's pretty cool to look at.

"From where I started to where I am now, it's pretty wild. I still remember lugging a big box of batteries and wires and all this stuff, and now we're on the micro-level. It's come a long way in 15 or 20 years," Ferguson concluded.

One of the data recording devices Stitzel has been utilizing in his studies is a mouthpiece that incorporates sensors. "It goes into the roof of the mouth and it's not visible. It's not a mouth guard, so no one can see it. It's one of the systems that drivers are generally comfortable to wear," he said. "We're learning what those environments are like at a really detailed level for the head, in a way that we could use that information to design seating, design maybe a head-and-neck restraint, maybe a helmet, to improve the situation.

"Think of this like an instrumented data recorder for the head," Stitzel continued. "The instrumentation system fits within acrylic. It's almost like a retainer, a similar design that goes behind the teeth. On that system is a linear accelerometer, angular rate sensor, the stuff needed to store, the stuff needed to power, and later on we

Modern race cars are loaded with sensors, making them well-suited for sports analytics. "For the first time, racing is actually leading the field," observed Dr. David Ferguson, who is shown here collecting physiology data in a Gradient Racing Acura NSX.

connect this to Bluetooth and download the information."

Commercially available health tracking systems have also opened doors in ways that can help motorsports participants. "Typically, I focus on screening the athletes for any sleep disorders and then helping them with their sleep issues throughout the season," said Singh. "There is lots of new technology that can help. Now we have these handheld wearables, devices that can be worn on the wrist or on a ring that can help measure sleep. Just wearing these will not make sleep better, but now we can collect data about people's sleep without them having to do something. Once we get that data, we can have actionable items from that data we can do."

TRACK RESULTS

How is all that research and data gathering improving driver performance and safety? Concrete examples of how a better understanding of human biology can affect driver performance are making their way to the track.

"What's really kind of cool is what we're learning now, about how important hydration is in race car driver physiology," Ferguson said. "We just completed a study that showed if a driver becomes dehydrated,

they lose the ability to modulate, and the car kind of goes into a point of understeer. They're kind of sliding a little bit over the corner, which makes it slower, tears the tires up. They could drop a wheel and possibly spin off the track. But if they stay hydrated, and drink throughout the race session, that doesn't happen so they can optimize their performance. Our data suggest that will save a driver basically one second a lap on a road course, which is pretty exciting."

Applying those findings in an across-the-board way has always been a challenge, but there is progress on that front. "We're starting to see a lot of the manufacturers homologate drink systems in cars," Ferguson said. "We actually dictated how much fluid you should drink in the car. A lot of teams are going to say, 'We're not going to put a drink system in the car, that's added weight.' So what manufacturers are doing now is homologating it. 'You buy this car, it's got this drink system in it. Every car has this drink system in it. You don't have to worry about the weight now.' So now teams are saying, 'Okay, the driver can drink now.'"

"WE'RE STARTING TO SEE A LOT OF THE MANUFACTURERS HOMOLOGATE DRINK SYSTEMS IN CARS."

Staying hydrated during a race yields results, but eating well is just as important. "The biggest thing that was illuminating to us was how many calories these drivers actually burn," Ferguson said. "In a two-hour race they're going to burn 2,000 calories. That's what most Americans burn in a 24-hour period. Then you have to figure out how to refuel that. What's interesting, we have the equipment to not only measure the calories someone is burning, but also if they're burning carbohydrates, fats, or proteins. When a driver is in a high-G corner or really battling it out to push the car, they're going to burn more carbohydrates because carbohydrates are more easily broken down and used by your body. But if they're on a fuel-save lap or running a triple stint in the middle of the night at Le Mans or something like that, they're going to burn a lot of fat.

"With that information you can make meals for drivers—a pre-race meal, a post-race meal, you can tell them how many calories they need to include, what it should be made of, how much carb, fat, protein," Ferguson continued. "Let's take the endurance races like Daytona, Le Mans. You can actually have in-between-stint meals. 'Okay, during this stint we know what you're going to burn, so eat this, that'll get you ready to go back in

Manufacturers continually use the insights of scientists and medical professionals to develop equipment that's safer and more effective for drivers, according to our source at RaceQuip.

the car four hours from now.'"

The extreme calorie burning that racers routinely undergo produces some unexpected side effects that need to be understood. "Talk about nutrition also addresses percent body fat," Ferguson said. "Take any Olympic athlete, run their metrics, and they're around 3% body fat. Race car drivers seem to be in the 12–16% body fat range. These are people who have won multiple championships, legends of the sport. They always say to me, 'Shouldn't this be lower? I train really hard. Shouldn't my percent body fat be lower?' What we're finding out is that due to the high caloric expenditure in the car, and the big travel days that they do, these athletes actually need to store that fat to have the fuel to do what they do. It's kind of a unique thing in terms of nutrition in sport, of knowing how much fuel someone needs. They also need a certain level of body fat just to sustain performance. When we see drivers with less than that they get sick quite a lot, they fatigue a lot, and they really don't advance in the sport. It's kind of a unique thing in terms of sports nutrition."

Walking hand-in-hand with nutrition is the importance of sleep, and here small changes can provide big performance dividends. "When it comes to what sort of advice one should give, I think that even looking at really simple things can get a big bang for the buck," Singh said. "One of them is caffeine, being aware of how much caffeine you're drinking.

"Number two is being aware of how much alcohol you're drinking. Number three is this thing about light exposure. Many times,

drivers go into a new hotel room and feel they have to unwind. They may be on their laptop, they may be playing video games, they may be on the Internet scrolling social media. That will all impair their sleep. You want to keep the room cold, it should be dark, it should be comfortable. Those are some common, simple things you can tell athletes. But athletes are individuals, so some people just have difficulty sleeping when they're in strange environments. If you're one of those people, then any time you travel and stay in a hotel room you're going to have difficulty falling asleep. That may take more intensive one-on-one work, taking their history and finding out how we can help them," she said.

"The reason we talk about light exposure at night and how it impairs sleep is because our brains actually need darkness to get the signal that we're ready to sleep," Singh added. "Light is like an alertness signal at the wrong time if you get exposed to bright light at night. When it comes to light, we talk about lux. So the higher the lux, the brighter the light, the worse it is. The blue-green wavelength is worse as compared to red light. The longer you expose yourself to bright light at night, the worse your sleep is going to be. Because of that, there are some studies that show if you wear blue light blocking glasses, that might actually help you fall asleep because you're preventing your exposure to blue light, which makes it difficult to sleep."

TESTING ASSUMPTIONS

Research conducted by Dr. David Ferguson of Michigan State University in East Lansing, Michigan, has also included studies on female versus male abilities in motorsports. "We started to do some of the first studies on female race car drivers," he said. "We showed that females, if they train, are just as capable to drive the race car as males.

"I think maybe three years ago there was a big hoopla about females not being strong enough to drive the car. Nope, not true," he said. "They can do it. In fact, they can actually handle the G-forces slightly better than males. So they're equally able to drive the car. Like with any males or females, they have to train to have the skillset to drive, and then the physical conditioning to handle all the stressors." *—Steve Statham*

Stitzel's research into driver head motion could very well lead to new equipment and practices on the track. "It's not hard to make the leap that it has implications maybe for fatigue of neck muscles," he said. "How do you feel after driving for an hour or two? That has an effect. We really don't know the amount of vibration that you can handle. When you're driving a NASCAR Cup series vehicle, or a grassroots dirt midget car, there's a lot of vibration in that environment. You're shaking a ton. And we're starting to measure all that. Depending on what threshold you use, you're talking like two to three, to eight to 10 times per second that your head is moving back and forth. We're starting to look at that at a really detailed level. We don't know what the threshold is. We don't know how much is too much, how many times is too many times, so we operate under this principle of public health science. It's called 'Precautionary Principle.' Even though you don't know what the threshold is, and what you would call 'okay' versus 'not okay,' it's still a good idea to reduce it when you sense it's going on.

"You'd think it would be really easy to go out and get all this data, but it's a challenge," Stitzel added. "We're at the stage now where we've done a lot of characterization, and we've done a little bit of looking at what is possible with the Cup series cars. But we're actually just starting to think about that with the grassroots dirt vehicles."

GEAR UP

The racing equipment manufacturers are likewise examining the latest science to make their own inroads into safer gear for the track. "There is evolution taking place on the manufacturers' side," said Mike Hurst with the SFI Foundation, an organization that issues and administers quality standards for racing equipment, based in Poway, California. "They are always coming up with new weaves and blends. The biggest changes compared to years ago is how light and comfortable a good driver's suit can be today. Which then reduces the heat stress—the non-fire heat stress on the driver, which is healthy for the driver. There are hundreds of different models of drivers' suits that basically meet the same standards, and the difference between a very expensive one, a very nice one, and say an economy suit, is that comfort level and breathability of the fabric. It's light weight and it's comfortable to wear. It's a big difference."

RaceQuip in Riverview, Florida, manufactures driving suits, gloves, footwear, and other racing safety gear, and it has been able to translate the latest scientific research into readily available products.

"The study of human biomechanics coupled with auto racing crash analysis has led to many advances in everyday safety gear," said Roger Mealey of RaceQuip. "Understanding what forces your body is subjected to during an impact has caused

us to re-think how we build many of our products. Some advances are revolutionary, like a Forward Head Restraint, but most are evolutionary, like adding a containment halo around the top of a seat to limit side movement of the head. Another evolution has been the emergence of 2-inch-wide lap belts instead of traditional 3-inch wide. Testing has taught us that a 2-inch belt will tuck under your hip bone rather than riding on top of it, allowing them to be cinched tighter and load more quickly in the event of an impact.

"Our FIA-rated full containment seats, Snell SA2020 Carbon helmets, and SFI-15 and SFI-20 suits are all examples of new products that were developed using the latest technology in materials and manufacturing techniques," he said. "The seats and helmets are both lighter and stronger due to advanced composite materials. The seats feature an FRP infused matrix composite covered by an energy absorbing memory foam. The helmets utilize a pre-preg carbon fiber composite material that is then placed into tool steel molds using pressure and heat to cure. Our new SFI-15 and SFI-20 suits use advanced aramid fabrics to provide a very soft and supple multi-layer suit."

There are plenty of future scientific advances on the horizon for motorsports, but right now, a new emphasis on biomedical fundamentals is yielding fruitful results.

So get a good night's sleep! PRI

SOURCES

David P. Ferguson PhD FACSM CEP
Michigan State University
rdsp.canr.msu.edu/faculty/35-ferguson-david

International Council of Motorsport Sciences
icmsmotorsportsafety.org

RaceQuip
racequip.com

SFI Foundation
sfifoundation.com

Meeta Singh MD
meetasinghmd.com

Joel Stitzel PhD
Wake Forest University School of Medicine
school.wakehealth.edu/faculty/s/joel-douglas-stitzel


TASCA
stilo
stilo

SAFETY ENGINEERS

Constant innovation in designs, materials, and manufacturing are pushing the development of driver protection gear beyond the minimums required by tracks and sanctioning bodies. Here's how these advances are improving racers' performance.

By Drew Hardin

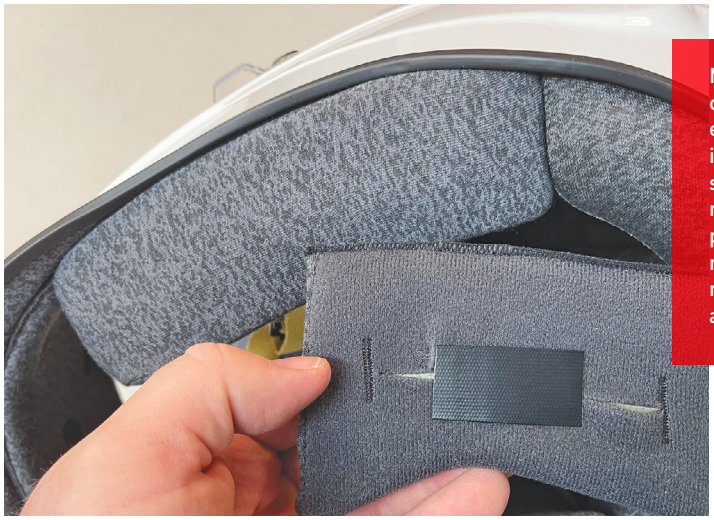
Stereotyping is never a good thing, but racers have a reputation for being willing to spend nearly anything to make a car go faster, while being much more frugal when it comes to investing in their personal safety gear.

"Racers won't bat an eye at putting a $50,000 engine in their sprint car or Late Model, but they will balk at spending $1,500 on a custom suit to keep them safe," said Jacob Brown of K1 Race Gear, Carlsbad, California. "You can always buy more race cars, but you can't buy another you. You get one life, one body. You can't just buy another."

But, a racer may be thinking, safety standards change every few years anyway. Why can't I just upgrade then?

"Those changes to homologation standards do drive requirements," said Kyle Kietzmann of Bell Racing, Miami, Florida. "There are new standards put in place every five to 10 years that help make the safety equipment better. But outside of those standards, we're constantly looking at new materials and manufacturing techniques to make our products perform better, not just according to the standard but also to offer attributes that the customer wants, like fire suits that are lighter and more breathable, and helmets using more advanced carbon materials to make a lighter shell. We're adapting and taking advantage of new technologies so we can build a better, lighter, stronger product for customers."

Let's look at some of those new technologies to explore why safety equipment should be upgraded on a regular basis.



Many safety gear changes are subtle, evolutionary improvements, such as G-FORCE's modularized liner padding that allows racers to add or remove padding to achieve the ideal fit.

HELMETS

"Helmets do change," said Ben O'Connor Jr. of Impact Racing, Indianapolis, Indiana. "The Snell Foundation and the FIA change requirements for standards every five years. The thinking is that each iteration is conceivably better than the prior specification. The helmet a racer could buy today is in theory safer or better performing than a helmet from five years ago under the last standard. I say 'in theory' because in some cases, if a company is already ahead of the curve, it doesn't need to make any changes to meet the new standard. Ideally, we want to build the safest product that we can, so sometimes when they change standards, we're already there."

While Snell and the FIA set the standards, "they don't dictate how to get there," O'Connor continued. "That's up to the manufacturers. We have virtually free rein in terms of how we develop the textiles, the fabrics that are used, the layup of the shell, the inner liner of the helmet, the densities and materials that are used. That's where the changes and advancements are being made."

"There are a lot of changes in materials," said Danilo Oliveira of G-FORCE Racing Gear, Acworth, Georgia. "Specifically, we developed a completely new set of modularized liner padding for almost all our helmets in 2021. Not only did it offer the best user customization, but it provided a much more comfortable experience in a better-quality material. Racers can choose to add or remove padding to perfect the fit. Customers who are between the standard sizes—a racer who's between medium and large, for example—can get a large helmet and put in more padding to get a perfect fit,"

Oliveira said G-FORCE made "a lot of significant upgrades in the shell composite of the Snell 2020 helmets as well, as seen on our Flash, Fusion, and Graphic models. Some of these upgrades were pioneered by the G-FORCE R&D team and are being used for the first time ever in the car racing industry. That's technology we didn't have two years ago."

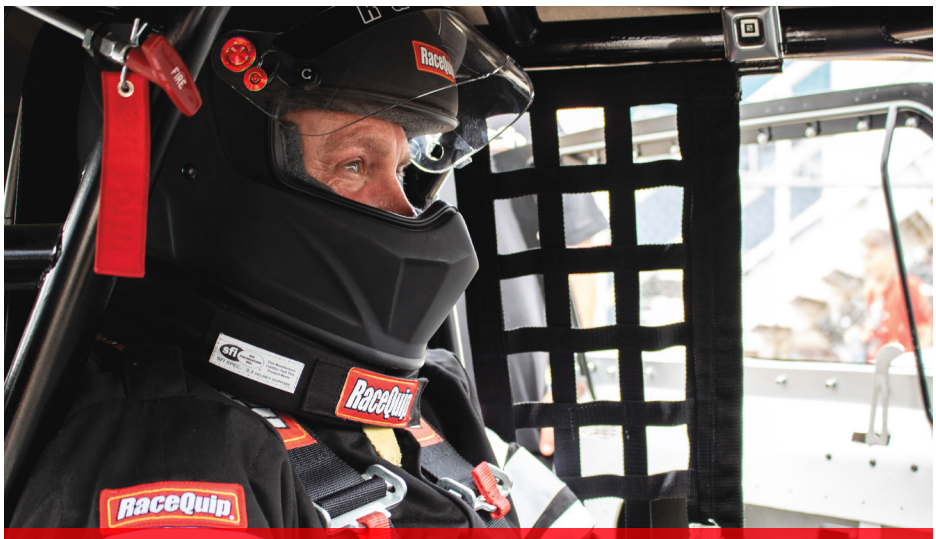
As Kietzmann indicated, the upgrades Bell Racing makes to its helmets are not just to adhere to changing standards but also to "purpose-build different models for different applications."

For example, Bell's new BR8 helmet for off-road racing was designed with a liner system "that evenly distributes airflow around the crown" and allows a choice of air inlet locations. "The way the liner is constructed internally allows airflow to circulate throughout the entire helmet, so whether it's top air, side, or 3/4-side, there's even airflow all the way around the crown, not just air ported into one area of the helmet."

Air has to come in, but dust needs to stay out. "We've added a double screen insert for the visor so it completely seals and added a kit system that can seal off the helmet except for the forced-air nozzle," Kietzmann said.

For sprint car racing, Bell's GTX3 helmet manages airflow differently. "It has a rear-facing venting system so air is not directly vented into the helmet. It's designed to create low-pressure areas in specific parts of the helmet, so as air flows over the helmet, there's a natural draw or air exchange through the helmet from low-pressure points from the rear-facing vents."

Bell's new 6-series helmets for sports car racing "address the need for more visibility with a larger eye opening, integrated ear cups for more noise attenuation protection,



Racing suits need proper care to stay effective. "Many of today's cars have such small window openings," said our source at RaceQuip. "It's easy to catch a rivet or cut the suit on a piece of sheetmetal."

Pyrotect's new helmets feature channels in the liner for improved cooling, along with a new latch and quick-release system designed for easier opening.

versatility in the radio systems we can install, and the helmet is adaptable for hydration," Kietzmann said.

"Models from five or 10 years ago don't have many of those features, or the helmets were more generic and less specific," he continued. "As we advance, we look at the application, look at the different features that need to be incorporated into the helmet, and make adjustments to meet customer demands."

Airflow was a key driver in the redesign of the SA2020 off-road racing helmets from Pyrotect of Redmond, Oregon, said Steve Russell. "The internal air channeling in our helmets has changed, with more positive channeling of airflow through the helmet. Before, if a manufacturer had a pumper helmet, that air would come out wherever it wound up coming out. With our new air channeling system, air flows through the helmet in a much more direct way."

Pyrotect has also improved its helmet liners, Russell added. "Instead of a solid liner—which is like having a heavy sock wrapped around the top of your head—our liners now have corrugated channels

all around the headliner to allow for more air movement and more cooling on top and around the head. That's a huge improvement in fogging and keeping cool."

Even the face shield has been improved, with a new front latch and a quick-release system "that allows the shield to be closed or opened much easier than in the past, when the driver was trying to find that little lip on the shield over by their ear," Russell said. "Now, all it takes is a little hand swipe up the front to open the latch. The upgraded ratchet system allows the shield to open about a quarter of an inch with one click, then there are three more clicks to allow the shield to open at different increments without it flopping around."

"IDEALLY, WE WANT TO BUILD THE SAFEST PRODUCT THAT WE CAN, SO SOMETIMES WHEN THEY CHANGE STANDARDS, WE'RE ALREADY THERE."

FIRE SUITS

Other than the SFI regulation that requires suits rated 10 or higher to be inspected and recertified every five years, "there really isn't a timeframe for replacing suits," Russell noted. "It's more of a wear-and-tear issue. I've seen racers wear suits that are 20 years old or older."

That said, racers "should keep a close eye on their suit to be sure it's not torn and there are no open seams," added Roger Mealey of RaceQuip, Riverview, Florida. "Many of today's cars have such small window openings that when a driver is trying to slide past the head restraints, it's easy to catch a rivet or cut the suit on a piece of sheetmetal."

Mealey also noted that "one of the most

BELL RACING

BR8 CARBON

- Double Screen Anti-Fog (DSAF) insert to create a positive visor seal and prevent shield fogging.
- Rear-facing Venturi airflow vents that prevent dust from entering the helmet while still allowing forced air to be introduced into the helmet.
- Unique air chamber system that evenly distributes airflow around the head regardless of the top air configuration used.
- The helmet can be used with or without ear cups (included with the BR8 Carbon and sold separately for BR8 Matte Black and BR8 White versions).
- Innovative kit system featuring a low-profile forced air insert (included). The forced air kit can be installed on the left or right front, left or right 3/4 side, or top position for the ultimate flexibility in forced air placement and management.

For more info: *bellracing.com*

PYROTECT SAFETY GEAR

PROSPORT SA2020 HELMETS

- Designed with a Carbon Composite Weave Vacuum bagged and autoclave cured lightweight shell for maximum durability.
- Stainless steel hardware and a Kevlar chinstrap.
- Center latch .125-inch Polycarbonate shield with tear-off post.
- Rubber eye port seal.
- Large eye port offers greater visibility.
- M6 inserted for head-and-neck-restraint devices.
- Fire-retardant Nomex interior.
- New head liner air channel design for better adjustability, added comfort, and improved airflow.
- Removable six-pad headliner and cheek pad system for cleaning and easy resizing for a perfect fit.

For more info: *pyrotect.com*

RACECHICK

FIERCE WOMEN'S AUTO RACING SUITS

- Designed and developed specifically for the female form combining movement and performance into a great value suit built to the highest quality standards.
- FIERCE collection featuring one-piece suits, two-piece suits, and fire jackets in off-the-rack or custom sizing, and available in many color options.
- Available in SFI 3.2a/5 safety specifications featuring FR Cotton and Nomex materials.
- Suits are made to coordinate with Racechick's women's race shoes and gloves.
- Built for women racers by women racers.

For more info: *racechick.com*

RACEQUIP

356 SERIES SFI-5 OUTSEAM GLOVES

- Double layer Nomex knit construction.
- SFI 3.3/5 rated (tags affixed).
- Soft, supple, and comfortable.
- High grip suede leather reinforced palm.
- Reverse seam for superior comfort and feel.
- Extra-long cuffed gauntlet.
- Mitered fingers for precise fit.

For more info: *racequip.com*

SAMPSON RACING COMMUNICATIONS

DIGITAL COMMUNICATIONS SYSTEMS

- Digital offers 100% communication coverage on any track in the US.
- Motorola systems.
- 29 years of quality service and support.
- Same-day shipping.

For more info: *sampsonracing.com*

STROUD SAFETY

DRAG BOOTS

- Integrated soles.
- Fire-/electric-shock resistant soles.
- Optional adjustable strap.
- SFI 20 rated.
- Made in the USA.

For more info: *stroudsafety.com*

common problems we see is drivers wearing their suits to work on the car and getting oil and dirt ground into them. This will shorten the effective life of the suit dramatically and makes it more likely to burn."

Beyond those reasons, "technology always marches forward, and the safety gear made today is much better than what was offered just 10 years ago," Mealey said. "There are always improvements being made, so updating safety equipment

"TECHNOLOGY CHANGES EVERY TWO TO THREE YEARS, SO IT'S ALWAYS A GOOD THING TO BE LOOKING FOR UPDATED PRODUCT."

can provide better protection and added features."

"Technology changes every two to three years, so it's always a good thing to be looking for updated product," said G-FORCE's Oliveira. "The suit you bought five years ago has completely changed in technology. It could offer increased protection, and in many cases it's more comfortable."

"We have a new suit in production that we've been working on for about a year, and it's now in final testing with the FIA," said K1's Brown. Yet he is "already working with our textile supplier on the next new thing. Suits continue to evolve. Materials are constantly getting better and lighter."

As recently as 10 years ago, "the suit that everybody needed was a three-layer suit," Brown said. "Then, within the last five to six years we went to a two-layer SFI 5 suit, because the new materials in the two-layer suit were actually better than the three-layer mockup." More recently, though, "a lot of the new suits are going back to three-layer. Because of the way the layers work, the

three-layer suit is actually lighter and better than the two-layer suit that we have."

"Safety goes up as textiles get better, which is certainly a strong argument for upgrading," said Impact Racing's O'Connor. "The biggest changes that we see are on the milling side of things—how the textile manufacturers weave the thread to form different air pockets. That's the goal: create insulation by creating these air pockets and trapping them in certain places. After thousands of years of milling fabric, it's hard to believe there's anything still to be found, but the makers are always figuring out better ways to create fabrics that are safer by milling them a different way."

As the textiles get better, "we can produce a suit or gloves or even shoes that are lighter than previous models and maintain and even exceed what the prior performance was," O'Connor added. "That's important in terms of safety as it relates to being comfortable in the vehicle. The more comfortable a racer is in the vehicle, the more they'll be able to concentrate on the task at hand, which is driving, right? They're not thinking about an uncomfortable suit, shoes, or gloves."

How a suit is put together is also evolving. "In the last three years or so we've gone to a diagonal stitch," Brown said. "It has the same fire retardancy, but it's stronger and holds the layers better. The suit has more longevity and is more flexible that way."

According to our source at Stroud Safety, new developments are often born out of necessity. "We live and learn a little bit," he said, pointing to padding on the knees and how epaulets are attached to the suit as two recent modifications.

"Sleeves that are independent of the jacket's torso is something new for us this year," said Tommy Cunningham of Stroud Safety, Oklahoma City, Oklahoma. "It's a fit and feel thing for me. When I'm strapped in the car and I go to move my arms, the whole front of the suit tries to move or bunch up. If the sleeves can move independently, the whole front of the suit isn't moving when I move my arms."

As a racer, "I run our product, and some of our fire suit changes are little things that I wanted, like a pocket or something," Cunningham said. "Then there are bigger things, like how our epaulets are attached. A lot of racers think those are just an aesthetic thing to make a suit look a little better, but they have a purpose. They're designed to be a handle. When a first responder gets to the car, they can get a hold of the driver and pull him out of the car by the epaulets."

Another change Stroud is making is the addition of pads on the inside of the suit's knees. "When Jon Stouffer had his wreck in Great Bend, Kansas, last year, he told me a couple months later that he broke five ribs and didn't have much pain from that, but he said he couldn't hardly walk because his knees slapped together," Cunningham explained. "That's an easy upgrade for us. We can put some foam on the inside of the knees. I hope I never need it, but at least it'll be there if I do.

"A lot of safety developments are through

Bell Racing offers a range of different helmets purpose-built for specific applications. For example, the GTX3 model for sprint car racing has a rear-facing venting system so air is not directly vented into the helmet.

necessity," Cunningham added. "We live and learn a little bit."

ACCESSORIES

If a fire suit upgrade can be a tough sell, it's even harder to convince racers to upgrade to new accessories, such as underwear, gloves, and shoes. But these products, too, are changing.

At the 2021 PRI Trade Show, Stroud Safety introduced a new SFI 20 boot that was designed with an eye to "the EV market and where it's going," Cunningham said. In addition to heat and chemical resistance, the sole has "an electrical charge resistance that will be standard in the boot. Racers won't have to order anything special for that."

"We're seeing a lot of advancement in technology in the base layers and underwear," O'Connor said. "As motorsport has progressed to being recognized for its athleticism, and as drivers—particularly on the professional side—train more, they gravitate toward replicating what is being done in other sports. One of those things was compressive base layers. Originally, a lot of drivers were using traditional athletic-type base layers for their performance aspect, but they're very dangerous to use

"THE MORE COMFORTABLE A RACER IS IN THE VEHICLE, THE MORE THEY'LL BE ABLE TO CONCENTRATE ON THE TASK AT HAND, WHICH IS DRIVING."

in motorsports because they contain fabrics and materials that could actually melt in fire."

To offer a safer alternative, "manufacturers have looked at producing fire-related base layers that still have that compression technology," O'Connor added. "Traditional Nomex type fabrics don't have a lot of memory to them. They stretch and stretch out, so they can't be used in a compressive sense." The new compressive fabrics still have fire-retardant elements, "but the fabric is inherently different from what would be used in a suit or traditional undergarments." Impact Racing's new Ion line of underwear "is a version of that. It has the fire rating of a protective undergarment but has compressive capability as well. That would have been unheard of 10 years ago."

Impact Racing also recently introduced the Transition balaclava, with a bottom portion that can be pulled down. "This was the result of a request from the AMR folks [the safety team] in IndyCar," O'Connor explained. "They wanted it so they could pull it down when they're waiting for hours on end, but could pull it up in an instant to go into action. This also made it COVID-compliant for a lot of places."

There are benefits from the driver's perspective, too. "It's very common, particularly in off-road and endurance racing, to have drink systems in the helmets," O'Connor said. "With a regular balaclava, drivers would have to either pull the balaclava all the way up to use the drink system or pull the eye port down below the mouth. Neither scenario is ideal, and [both] could be dangerous. The Transitional balaclava allows the driver to pull down the panel without disrupting the eye port area."

To give racers more options with their accessory choices, K1 Race Gear has instituted a tiered system, "a good/better/best model," said Brown. When choosing shoes, Challenger model shoes are good, GTX shoes are better, and Flight shoes are the best. With gloves, the ranking goes from Track 1 to Flex to Flight. "All three will keep you safe and meet the same specifications, but there are varying levels of comfort and maneuverability. It's like a Honda Civic versus a Cadillac. Both will get you from A to B, both pass crash tests. The choice comes down to a matter of what features the driver wants."

Impact Racing's Transition balaclava features a bottom panel that can be pulled down while waiting to race or using a drink system, and then quickly pulled back up.

'INJURIES DON'T TAKE VACATIONS'

"You can never be too safe," Brown said. "Injuries don't take vacations. We can't do everything to protect the drivers, because in racing there are so many uncontrolled

variables. But we're doing our best to control the ones we can. We have to make sure we're doing our part to make drivers safe, but drivers have to do their part to remain safe as well."

To O'Connor, that is happening. "In the 11 years I've been in this side of the industry, the attitude about safety has changed dramatically. It's gone from being a disgruntled purchase—'I have to have this stuff or they won't let me race'—to being almost a fashion statement. That's where, as manufacturers, we've had a great opportunity to increase sales when we develop better-looking product people want to wear. We don't think of style as a safety aspect, but it kind of is. If they want to wear it, they're more apt to use it."

"The best part," said Mealey, "is that all these advances in safety equipment have not come at much expense. Today's safety gear prices are on par with the past, if adjusted for inflation." PRI

SOURCES

Bell Racing
bellracing.com

G-FORCE Racing Gear
gforce.com

Impact Racing
ximpactusa.com

K1 Race Gear
k1racegear.com

Pyrotect Safety Gear
pyrotect.com

Racechick
racechick.com

RaceQuip
racequip.com

Sampson Racing Communications
sampsonracing.com

Stroud Safety
stroudsafety.com

Turn 2 Racing Communications
turn2rc.com

JUST COUNT THE NUMEROUS WAYS THAT VEHICLE SAFETY PRODUCT DEVELOPMENT IS PROTECTING TODAY'S RACE CAR DRIVERS.

By Mike Magda

In today's motorsports arena, there are few components on a race vehicle that haven't undergone a critical safety review. Comprehensive rulebooks are a testament to this reality. A generation ago, there were suggestions for safety equipment. Now there are detailed mandates that are strictly enforced.

Serious accidents used to be shrouded in secret internal investigations. Now motorsports safety research facilities have access to 'black box' data recorders that are installed in many types of race cars. Constructive safety conferences are held around the world to share innovative ideas and evaluate test results on new equipment.

Accidents, however, still happen, and a death on the track is a tragic reminder of the dangerous speeds modern horsepower and chassis designs can deliver. So there's an eye constantly focused on building even safer vehicles.

"I think we're always looking for ways to improve product," said Fred Bickford of ButlerBuilt, a manufacturer of racing seats and other safety equipment based in Concord, North Carolina.

Seat and roll-cage design is one example

SAFER ALL AROUND

where components have worked hand-in-hand to drastically improve driver safety in the past two decades. Researchers learned that confining the driver greatly increases survival upon impact.

"We really want to cocoon the driver into the seat," added Bickford. "The less movement there is, the better off they'll be in an accident."

DRIVER COMFORT AND SAFETY

Full containment around the ribs and head is crucial, and so are the seat dimensions. A large seat might seem more comfortable than a smaller, tight-fitting version. Some drivers think the safety harness will hold them in place. Belts, however, are for impact. The seat should hold drivers tight enough so they can direct all their energy into driving.

"If you're coming to the kink or going through the carousel and you're loose in the seat, you put your elbow up so that you are centered and you put your left leg out to hold your position," explained Gayle Gaborsky of Speed Seat Factory, Delafield, Wisconsin. "All of that is mental and physical fatigue."

Racing seats are generally manufactured from either steel, aluminum, fiberglass, carbon fiber or other composite material. There are numerous configurations to fit modified street cars all the way up to scratch-built race cars. Some sim racers even get high-dollar racing seats to enhance the experience.

"Recently, we found a composite matrix fiber-reinforced polymer that allows us to build very strong, yet lightweight and affordable seats. This discovery led to us to launching five new seats within the last year," explained Patrick Utt of RaceQuip, Riverview, Florida.

Rules may mandate a specific material and construction design, such as implementing side head restraints, which are often called 'halos.' Rules can also apply to the halos, such as making sure the driver has a proper sightline. Once the rules are

Full-containment seats enhance safety by keeping drivers in the optimum position at all times. "The less movement there is, the better off they'll be in an accident," explained our source at ButlerBuilt.

understood, the important decision factor is the fit. Seat manufacturers have detailed instructions on measuring the driver's body and applying those numbers to the seat order.

"When racers follow the measurement guide, then everything on the seat is made to fit their body," said Bickford, noting some minor supports like lumbar can be added later to improve the fit.

But many of the top drivers get a fully customized seat with a pour kit; that is, a bag of liquid molding material is placed into the existing seat or compartment area, and the driver sits on the bag until the solution solidifies and reveals a perfect mold of the driver's physique.

"RECENTLY, WE FOUND A COMPOSITE MATRIX FIBER-REINFORCED POLYMER THAT ALLOWS US TO BUILD VERY STRONG, YET LIGHTWEIGHT AND AFFORDABLE SEATS."

"You can pour a kit to fill voids," said Bickford. "Some people have different arches in their back and things of that nature."

Most drivers in top-tier racing circles have custom seats molded for them.

"Everything is specific to car and driver," said Gaborsky. "That's the beauty of this safety feature because we position you. The pedals have to be in the correct position because everything is part of the equation."

For endurance racing, special inserts are made for each driver in that seat. That's the type of class racing where the fatigue factor becomes a serious safety issue. The materials that Speed Seat uses meet all sanctioning body requirements. For drivers with multiple cars, Speed Seat can scan the first seat and make identical reproductions as needed. Most like the same seat position, but others like to have a choice.

"If we poured him three times, he can sit different each time. He could be a little more upright or a little more laid back," she continued. "You get a seat that you absolutely love, and if you have multiple cars, then you just get a replica of that seat and it's identical."

Two-inch seat belts have replaced three-inch in most series. "With modern textiles... we can meet the absolute, most stringent standards with two-inch restraints," said our source at Impact Racing.

Improper installation remains a significant problem with belts, noted our source from RaceQuip. The rollbar attachment on the left is correct, the other one isn't.

BUCKLE UP

Advancements in materials have led to significant changes in the safety harness market.

"Most of the changes come from advances in materials or manufacturing techniques," said Utt. "One example is that a number of years ago we transitioned away from nylon webbing for seatbelts and window nets and started using a softer, more durable polyester webbing."

"Of all the things that we've dealt with in the last 10 years, restraints have probably changed more than any of them," said Ben O'Connor Jr. of Impact Racing, Indianapolis, Indiana. "Which is pretty wild, when you consider just how simple the restraint concept is, yet, how complex it can be in terms of all the little details."

One of the more significant trends is the move to two-inch-wide belts. The industry standard had long been three-inch, which is basically a carryover from what the military was using in the 1950s. The materials available then required a three-inch-wide belt to withstand the loads of an impact.

"With modern textiles, it's just not necessary. We can meet the absolute, most stringent standards with two-inch restraints," explained O'Connor. "As a matter of fact, typically the hardware will fail before the webbing does."

"The big change in the industry has been from three-inch to two-inch," agreed Danilo Oliveira of G-FORCE Racing Gear, Acworth, Georgia. "The perception that three-inch is stronger doesn't exist today, because now we have stronger materials. European racers took to it earlier than the US. You probably see it more often in Formula 1, sports cars, road racing, and Indy cars. The three-inch is probably more popular with dirt tracks and drag racers."

The move to two-inch belts was somewhat encouraged by drivers who find that width works better with their HANS devices. At one time, drivers were tucking their three-inch belts under to achieve a better fit. Then the FIA conducted tests with the two-inch belts and found some safety advantages.

"From a biomechanical viewpoint in terms of safety, it is generally accepted and understood that a two-inch restraint is safer than a three-inch—especially in the area of

WORLD OF OUTLAWS SPRINT CAR SERIES MANDATES FIRE SUPPRESSION SYSTEMS

The World of Outlaws NOS Energy Drink Sprint Car Series will require competitors to use on-board fire suppression systems in 2023 and beyond in an initiative that Series Technical Director Tom Devitt called a few years in the making.

"We've been talking about this idea for a few years and figured it was time to do it. We are one of the only major racing organizations in the country that doesn't mandate [fire suppression systems], and we felt we had to make it right because the sprint car is like no other animal on the planet," Devitt said. "I presented this during an owners' meeting at the 2021 Knoxville Nationals with all our platinum [full-time touring] teams. Everybody was very much in favor of it.

"We also talked to our other drivers and chassis builders, and got input from fire suppression manufacturers," he continued. "We like to start early with changes like this because it affects sprint car racing across the country, not just World of Outlaws."

Series officials are working with the SFI Foundation to develop new fire suppression specifications for sprint cars.

The World of Outlaws NOS Energy Drink Sprint Car Series is one of the last major racing series to not require fire suppression systems. They'll be mandatory for 2023 and beyond.

Currently, the two standards (17.1 and 17.2) do not cover vehicles that use methanol as fuel, so officials are in the final stages of developing a brand-new 17.3 standard. Called the "Single Seat Open Wheel Front Engine On-Board Fire Suppression System," the specification has already been drafted by SFI, which expects to finalize the process following research and development. The official rules and approved systems are expected to be released in May.

"We're looking at the size of the bottle, where it will be placed, how many nozzles will be needed, what type of suppression material will be used to put the fire out," Devitt said. "All of this is going through the SFI, which is doing all the testing with input from manufacturers." *—Laura Pitts*

Most sanctioning bodies now require fire-suppression systems. However, for those that do not there is still a push to require installed systems, such as this one from Lifeline USA, instead of less-effective handheld extinguishers.

"WE REALLY WANT TO COCOON THE DRIVER INTO THE SEAT."

the hips," said O'Connor. "The hips are the largest load-carrying capacity for the body, and with two-inch belts you can get really tight without bunching up."

Adjusters have also changed in recent years. They've been easier to tighten and loosen in addition to losing weight. "Most of the weight of a harness comes from the buckle and adjusters," noted Oliveira. "There's a trend toward aluminum."

Enhanced seat-belt materials have improved window nets, as well. "With window nets, there really isn't much else you do," said Oliveira. "We have better fabrics than five years ago at the same cost."

The biggest mistake racers make with regards to the safety harness is the installation. "Every time we walk through a pit area, we see seat belts improperly installed," said Utt. "A standard SFI instruction sheet is provided with each belt set sold by every manufacturer, yet many racers do not look at their installation angles and belt threading through attachment hardware."

SLOWING DOWN

Advanced materials have also improved parachutes for drag racers. Nylon continues to be a popular choice for many classes.

CARBON SAFETY TECHNOLOGIES

PURPOSE-BUILT SPRINT CAR/MIDGET FIRE SUPPRESSION SYSTEM

- 5 lbs. of 4Fire Universal.
- DOT3AL cylinder/bottle.
- One AM Block, has both automatic thermal bulb activation at 175 degrees F and manual activation with a pull lanyard, and push-lock fittings for easy tubing connection.
- Three nozzles with push-lock fitting.
- One T push-lock fitting.
- 10 feet of aluminum.

For more info: *carbonsafetytechnologies.com*

DESIGN ENGINEERING, INC.

SENSOR AND CONNECTOR COVERS

- Protect sensors plugs and wire connectors from heat, moisture, and dirt.
- Aluminized insulation that reflects heat and acts as a thermal barrier for sensitive wire connections and sensors.
- Simple to install with a split top.
- Can be nested to fully cover connectors near engine manifolds, turbos, and their heat sources.

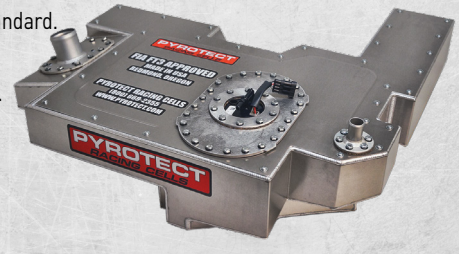
For more info: *designengineering.com*

PYROTECT RACING CELLS

POLARIS RZR RS1 UTV FUEL CELL

- Capacity: 12 gallons.
- Designed to fit stock location.
- Fully TIG welded aluminum container .080 standard.
- Durable ballistic nylon/urethane bladder.
- Utilizes stock fuel pump sending unit module.
- FIA FT3 homologation.
- Includes 1-inch vent check valve.
- 2 1/4 remote fill with roll-over check valve.

For more info: *pyrotect.com*



RACEQUIP

6-POINT ALL 2-INCH FIA-RATED HARNESS SET

- Two-inch lap belt with pull-up adjusters.
- Two-inch shoulder belt accommodates HANS/FHR device.
- Shoulders and crotch can be changed to wrap or bolt in.
- Certified to FIA 8853-2016 specifications.
- Mono filament woven for increased strength and smoother edges.
- Dual direction magnesium alloy cam buckle.
- Six snap ends and six #700050 eyebolts included.

For more info: *racequip.com*

SAFECRAFT

LT MODEL

- Uses 3M Novec 1230 Fire Protection Fluid.
- Manual pull-cable activation.
- Available with aluminum or stainless steel tubing.
- The "gold standard" of the industry.
- With its wide variety of activation and mounting options, it can be easily integrated in all vehicle designs.
- The 10-pound system comes with all fittings, tubing, and nozzles needed for installation along with mounts and brackets.

For more info: *safecraft.com*

THERMO TEC

ALUMINIZED HEAT BARRIER

- Woven silica with flexible aluminized finish.
- Capable of withstanding radiant temperatures up to 2,000 degrees F.
- Fabric side can handle temperatures up to 1,000 degrees F.
- Can be installed using standard rivets with a backup washer or weather strip adhesive.
- The use of clamps or straps such as Thermo Tec's Snap Strap can be used to hold the blanket in place for manifolds or exhaust systems.
- This product can be cut to fit.

For more info: *thermotec.com*

"MOST OF THE CHANGES COME FROM ADVANCES IN MATERIALS OR MANUFACTURING TECHNIQUES."

However, faster and heavier cars have prompted chute suppliers to explore other options.

"Nylon chutes have a limitation. They can literally burst apart," said O'Connor. "Our latest chute for the fuel and alcohol ranks is a Vectran fabric that we found a few years ago that gives a longer lifespan. Fuel teams could get several passes out of nylon before they need a patch or replacement. Now they're getting almost a season out of the new ones. It's a bit more expensive on the front end, but long term it saves them money."

As mentioned earlier, every component of a race car has undergone some type of safety scrutiny. Rear-view mirror design and location can be controlled by sanctioning bodies. Minimum tubing standards for rollcage construction can also mandate that the padding be certified by FIA or SFI.

Steering wheels are even factoring into the safety equation. "We were the first to revolutionize NASCAR with a new steering wheel that absorbs load under impact," explained Max Papis of Max Papis Inc., Mooresville, North Carolina. "We did a study of impact testing to understand the deformation factor of the steering wheel itself, and we created structures that under the heavy impact will protect the driver. The technology that we learned from the stock-car steering wheel has been implemented in all products that we make. We're slowly educating the masses that the steering wheel is a safety item."

The new safety features, such as seats and harnesses, can be applied universally throughout motorsports. Many racing classes have specific requirements for other equipment. One safety item catching on with road racers is the rain light for the rear of the vehicle. They're required to emit a certain

brightness to help drivers see vehicles that are obscured by water spray from the tires. Speaking of tires, many open wheel classes require tethers to keep the wheel-tire combo from detaching and rolling into the grandstands or pit areas.

Parts containment is another safety area for some cars. Drag racers have steel or titanium bellhousings to keep clutch and flywheel pieces inside in the event of an explosion. Supercharged cars have restraints to keep the blowers tied to the engine if there's a backfire or explosion.

STAY COOL

Perhaps the single most terrifying scenario for any race car driver is fire. Many will say that vehicle construction and the latest seat and safety harness technology will protect them from trauma to the body in most collisions and rollovers, even if the accident is so severe that they have to be extracted from the vehicle by track safety crews.

"OF ALL THE THINGS THAT WE'VE DEALT WITH IN THE LAST 10 YEARS, RESTRAINTS HAVE PROBABLY CHANGED MORE THAN ANY OF THEM."

The frontline defense for fire is a fire-suppression system that uses chemicals or foam to extinguish the flames. Pro Mod racer Craig Sullivan had a spark-plug failure on a new car that was making its first test pass last spring. That failure led to methanol being forced out of the cylinder at high pressure, resulting in an under-hood fire.

ADVANCEMENTS IN FUEL-CELL TECHNOLOGY

Fuel-cell development is one dimension of race car safety where new materials are being introduced to improve the product.

"The new ATL bladder is constructed of an all new, very pliable, low mass, yet extremely strong Kevlar reinforced elastomer," said Dave Dack of Aero Tec Laboratories (ATL), Ramsey, New Jersey. "It has been thoroughly tested and has qualified to SFI's stringent 32.1 standard."

"We have developed a new fuel bladder material that holds up better to the methanol-laced fuels that are more commonly being used today," added Steve Russell of Pyrotect Racing Cells, Redmond, Oregon. "We haven't released it officially. We've been developing with teams running the new coatings. But that's the wave of the future with more methanol fuels being used in more types of racing."

The new ATL bladder and fuel cell will be used in all NASCAR Next Gen cars that were introduced in the 2022 season. CAD-designed robotic cutting patterns were developed to achieve precise tolerances required for consistent manufacturing.

"This was especially important to satisfy NASCAR's vision for an even playing field with no teams having an unfair advantage," explained Dack. "Bladder capacities, weights, etc. remain extremely consistent from bladder to bladder."

The Next Gen bladders also feature removable internal collector compartments that have secure attachments, explosive-resisting safety foam baffling, and a lightweight inner billet nut ring to accommodate team-supplied fill plates.

Stock cars run on gasoline, but there has been increased participation in classes that allow methanol, especially sprint cars, tractor pulling, and drag racing.

"Gasoline and methanol have completely different chemical backgrounds," Russell explained. "They tend to react differently, and we have to use different materials to withstand them. Take an IndyCar fuel cell: Gasoline of any kind will ruin the bladder. And alcohol in a gasoline bladder will ruin the bladder. To have one that will withstand both, to some levels, is really difficult. We've

Fuel cells for UTVs often have unusual shapes to take advantage of limited space. "It's difficult to put larger volumes of fuel in these vehicles. So, you do have to get creative," explained our source at Pyrotect.

"I smelled carbon fiber burning and shut the car down 200 feet into the run," he recalled. "Then I saw smoke coming out of the hood by the blower and realized it's on fire."

Sullivan pulled the pin on the Stroud Safety fire-suppression system that Larry Jeffers installed when he built car. While coasting at the top of the track, the flames continued, and he pulled the pin on the second system.

"I immediately stopped the car, and the flames were out, so I got out of the car," explained Sullivan. "The flames erupted again, but the safety crew got there and put them out right away."

The Stroud system on Sullivan's wildly

been working on coating formulations to enhance the alcohol resistance, since we're finding more fuels being laced with methanol at higher concentrates."

The market for fuel cells continues to expand, especially in off-road and powersports. UTVs can present a unique packaging challenge for racers trying to increase fuel capacity.

"It's a growing market with very tight quarters, and it's difficult to put larger volumes of fuel in these vehicles. So, you do have to get creative," explained Russell, noting that driveshafts and wiring harnesses often want to share the same space as a fuel cell. "We put a tube through the fuel cell for these items. Then there are the filler tubes, vents, sending units, pickups. Usually it's very tight, so we have to get very creative on how to handle that."

The future for even more improvement in fuel cell development is quite optimistic. These suppliers are often involved in other markets, including military operations, where fuel containment is critical.

"ATL is extremely active in defense and aerospace markets," Dack told us. "Much of this specialized technology and unique materials developed for unmanned aircraft and military vehicles and vessels have been adapted to racing markets."

—Mike Magda

colorful 1949 Mercury included two 10-pound bottles of suppressant, which were required by the rules. Front-end repairs and a new windshield were all that was required to get the car back on the track.

Besides meeting FIA and SFI requirements for a fire-suppression system, manufacturers also have to follow EPA regulations. Early systems used Halon until it was banned in the 1990s after scientists discovered that it contributed to the depletion of the ozone layer.

"FROM A BIOMECHANICAL VIEWPOINT IN TERMS OF SAFETY, IT IS GENERALLY ACCEPTED AND UNDERSTOOD THAT A TWO-INCH RESTRAINT IS SAFER THAN A THREE-INCH—ESPECIALLY IN THE AREA OF THE HIPS."

"Right now we're coming out with a new system. We're just waiting on approval," said John Gentry of the Oklahoma City, Oklahoma-based Stroud Safety. "We used to use a suppressant called FE36. Now the EPA is banning that, and we're forced to find another solution."

SFI tests on the new system were being conducted. The new suppressant, Novec 1230 from 3M, itself isn't being tested, but rather the new chemical has to work with Stroud's engineering design that includes the nozzles and other equipment on the system.

"Our kits come with three nozzles: a 60-degree, a 120 and a 360," explained Gentry. "Usually, two go in the engine bay and one in the driver's compartment."

The systems come with either a five- or 10-pound bottle. Some sanctioning bodies require two systems, and some racers look

Nylon chutes are prone to bursting, noted our source at Impact Racing. The company's new Vectran fabric chute is said to last nearly a season, instead of the usual few passes of nylon chutes.

to save weight with the smallest system.

Another popular suppressant is AFFF, which stands for aqueous film forming foam. Whereas Novec is a gas that absorbs the heat of combustion to stop a fire, AFFF is discharged as a foam that covers the area of the spray patterns to snuff out the flames. AFFF is non-corrosive and environmentally friendly.

"The foam is water-based," explained Brandon Marshall of Lifeline USA, Dublin, Virginia, a company that offers both types of suppressants depending on racer needs and budget. "We want to know what they're doing with the vehicle and what their sanctioning body said. We typically give options, like a good, better, best."

An entry-level system might be a $400 foam system followed by a $700 Novec system. More expensive systems might require electronic or thermal automatic deployment. And some sanctioning bodies require 20-pound systems, which would be two 10-pound bottles.

"For our Novec systems, typically those will run five nozzles, and on our foam systems we'll run eight nozzles," said Marshall.

More sanctioning bodies are expected to require fire suppression systems. The World of Outlaws NOS Energy Drink Sprint Cars will have them in place in 2023, and the off-road market is moving in that direction as well.

"That's a big market. We have an off-the-shelf system, but typically those cars need something specific," said Marshall, noting that many teams currently just bolt fire extinguishers to their rig's rollbar. "But it's usually a handheld, powder-based type of extinguisher that you'd have in your kitchen or pit box. The problem is all those vibrations are channeled through the chassis, and it's packing the powder into a rock in the bottom of the extinguisher. That's what will happen to these guys racing out in the desert for 200 miles." PRI

SOURCES

ATL
atlinc.com

ButlerBuilt
butlerbuilt.net

Carbon Safety Technologies
carbonsafetytechnologies.com

Design Engineering, Inc.
designengineering.com

G-FORCE Racing Gear
gforce.com

Impact Racing
ximpactusa.com

Lifeline USA
lifeline-fire.com

Max Papis Inc.
maxpapisinc.com

Pyrotect Racing Cells
pyrotect.com

RaceQuip
racequip.com

Safecraft
safecraft.com

Speed Seat Factory
speedseatfactory.com

Stroud Safety
stroudsafety.com

Thermo Tec
thermotec.com

World of Outlaws
worldofoutlaws.com

YELLOW CRUSH

Drag racer Jeff Lutz brought two 1957 Chevys to last year's PRI Trade Show—a roller that would become his next race car, and the crumpled remains of his famous yellow car. He brought the wreck as a stark example of how proper safety construction and equipment can save a driver's life—in this case, his own.

By Jim Koscs

PRI Trade Show attendees got to see up-close the 1957 Chevy that "went end-over-end and side-over-side" after hitting a bump at about 160 mph during a race last year. But the car also likely saved driver Jeff Lutz's life, he explained, as its roof sustained minimal crush, and the cabin remained virtually intact.

In early February, viewers of "Street Outlaws" on Discovery Channel finally saw the footage of the horrendous crash that sent Jeff Lutz to the hospital in May 2021, fortunately with just bumps and bruises. The crumpled and torn yellow 1957 Chevy, which Lutz had built with his son, Jeffrey Jr., looked like it had been used for target practice on a mortar range; the crash that sent the car tumbling at a race in Okemah, Oklahoma, seemed nearly as destructive.

Lutz, who spoke with PRI shortly after the "Street Outlaws" episode aired, said that it was the worst smashup he'd ever been involved in. He is well known in the street-car drag racing world for his "Mad Max" 1969 Camaro that a few years ago won *Hot Rod* magazine's Drag Week. The competition requires racers to drive their race cars from track to track, going 1,000 miles over five days. Lutz set a record for a street-legal car with a 5.852-second quarter-mile run at 250.27 mph.

At the 2021 PRI Trade Show, the wrecked '57 Chevy was displayed in the Stainless Works booth alongside the new '57 roller Lutz had built by DMC Racing in Halifax, Massachusetts. He and his son completed the car in their Lutz Race Cars shop in Callery, Pennsylvania.

Recalling the crash, Lutz explained that the Chevy had hit a bump at about 160 mph and gone instantly out of control, flipping and rolling to a stop seconds later. He said he had released the chute but acknowledged that even then he knew it was for naught.

"There was nothing I could do at that point," he explained. "The car went end-over-end and side-over-side. I was just along for the ride."

Lutz was life-flighted to a hospital. "I didn't know what was going on for a couple of days," he said. "I was bruised up around the neck pretty badly. I had neck trauma from the HANS device, but I might have broken my neck without it."

Before long, Lutz was racing again, driving a 2004 Pontiac GTO built by DMC Racing while the new '57 Chevy was under construction.

At the PRI Show, the wrecked '57 stood as an example of the safety he said Lutz Race Cars builds into all its cars. He also wanted it to be a stark reminder that racers need to take safety seriously.

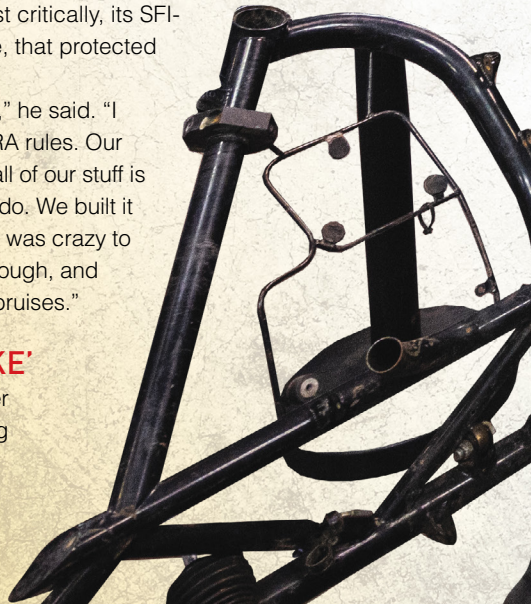
PHOTOGRAPHIC PROOF

The photos of Lutz's wrecked Chevy tell the story: Safety saves drivers. Note the minimal crush of the roof, and that the cabin remained intact. Lutz's car retained only its quarter panels and roof skin from an original '57 Chevy. It was the car's by-the-book race car construction, and, most critically, its SFI-certified chassis and cage, that protected him.

"The cage saved my life," he said. "I mirror all my safety on NHRA rules. Our chassis certifications and all of our stuff is up to date. That's what we do. We built it well, and it saved my life. It was crazy to see the carnage it went through, and all I had were bumps and bruises."

'SAFETY IS NO JOKE'

Lutz pointed out his other safety equipment, including



a carbon fiber seat, the harness and helmet from RaceQuip, and a Simpson fire suit. Having spent much of January racing and filming for "Street Outlaws" in South Texas, he saw firsthand the consequences of a crash for an ill-prepared driver.

"There was a guy there who never wore all his safety equipment," he recalled. "He wasn't wearing gloves or even a face shield. He crashed, caught fire and got burned on his hands and eyes. His wife was in the next lane. She hit the parked cars and was still in the hospital."

Lutz's message to other racers: "Do it by the book. Safety is no joke." PRI

Fabricator and racer Jeff Lutz told us his vehicle's by-the-book race car construction, and, most critically, its SFI-certified chassis and cage, protected him from more serious injury. "It was crazy to see the carnage it went through," he said of the '57 Chevy, "and all I had were bumps and bruises."

Jeff Lutz brought the remnants of his prized yellow 1957 Chevy, which sustained point-of-no-return damage during a "Street Outlaws" race in Okemah, Oklahoma, in May, to the PRI Trade Show to illustrate the importance of proper safety equipment in motorsports.

FIRST RESPONDERS

SPECIALIZED TOOLS, DATA ANALYSIS, AND CONTINUAL EDUCATION HAVE CHANGED THE WAY ON-TRACK INCIDENTS ARE HANDLED IN TOP-TIER SERIES IN RECENT YEARS. THAT APPROACH IS STARTING TO MAKE ITS WAY INTO GRASSROOTS RACING.

By Bradley Iger

Photo courtesy of World of Outlaws

From the combustible fluids involved to the sheer physics at play, there's no question that racing is an inherently dangerous endeavor. It's an element of motorsports that we tend to romanticize in certain contexts and compartmentalize in others, but at the end of the day, on-track safety will always be crucial to the sport's well-being.

Although real-world experience has often been the impetus (and cost) for these improvements, racing is now far safer than it was even a decade or two ago, and it only takes a moment of brief reflection to realize just how far we've come from "the old days."

"Back in the early 1980s, first responders like me were often wearing shorts and t-shirts at local tracks," recalled Jay Masur of Med-Star Dirt Track Rescue, Brandon, South Dakota. "At that time nobody knew any better. I remember that at one of the races at Huset's Speedway there was an incident that caused a bad fire and some serious burn injuries. The very next week I was in my first fire suit. Most of the improvements we've seen in track safety have come as a result of evolving the equipment and procedures in response to incidents that have occurred."

"THE WAY WE DO SAFETY WITH SIDE-BY-SIDE RACES MIGHT BE DIFFERENT THAN HOW WE'D APPROACH A SIMILAR SITUATION WITH SPRINT CARS."

Safety teams in racing not only benefit from the knowledge and experience of those who came before them, but also contemporary technologies that have allowed them to create procedures and equipment that are purpose-built for the unique requirements of auto racing. And as is often the case with motorsports' trickle-down effect, elements of strategies that originated in the upper tiers are now beginning to find their way into grassroots racing.

A TARGETED APPROACH

"These first responders often come from paramedic backgrounds, but they also need to be mechanically inclined," said Jeff Horton of WH Engineering, Zionsville, Indiana. Formerly the director of engineering for IndyCar, Horton said that on-track incidents often come with challenges that are unique to racing.

"When you get to a scene, it's not always straightforward—there may be debris in the way or broken parts of the car that need to be cut off. But ultimately you are treating a driver who's potentially injured, so the biggest thing that comes with assembling a safety team is establishing a coordinated response. Each member of the team has a specific job that they're tasked with. When a team of first responders arrives at a scene in a series like IndyCar and NASCAR, one may go to the driver while another handles flammable fluids leaks, and the others address any potential obstacles they're facing for driver extraction. It's become much more scientific," he explained.

Jason Smith of USAC in Speedway, Indiana, said that the approach is often not

Track safety procedures are more effective now than ever, largely because of lessons learned from real-world incidents. Improvements tend to trickle down from the top tier to grassroots series, officials noted.

Track first responders ideally have a mechanical background and paramedic experience. In addition, proper training is essential for understanding how to handle specific types of race cars. Photo courtesy of World of Outlaws.

only motorsports-specific, but also potentially class-specific. "It's not like we just go to the local fire department and say, 'Hey, we need six guys to come help out at this event.' When there are different types of car designs with different types of fuel involved running on different types of tracks, you need people who are trained in how to approach those different scenarios. The way we do safety with side-by-side races might be different than how we'd approach a similar situation with sprint cars."

He added that ensuring that rescue teams are familiar with the configuration of a given race car can have a big impact on response efforts. "A race car has different characteristics and concerns than a street car, so they need to know things like where the fuel shut-off is and what they have to look out for, so they don't accidentally grab a hot component or something like that."

As such, the training programs for track first responders tend to be tailored toward the particular circumstances of a given racing discipline. "Every single official that we have on track at an event has been through the Short Track Incident Response Program," said Tyler Backman of World of Outlaws, Concord, North Carolina.

"It's an SFI-certified course, and they're required to run through it every two years," he continued. "One of the big elements that is covered is how to properly extricate a driver from a car. The containment seats are much safer than what we used to use, but they're also more difficult to get people out of, so the program shows these trainees the correct technique to get someone out of a car while minimizing the risk of further injury. Another big component is fire rescue and how to address different types of fires. We're dealing not only with gasoline, but also alcohol and other types of flammable liquids. How to properly flip a car over is another significant aspect of the program as well. There are a lot of variables involved in on-track incidents, and we want to make sure our first responders are ready for them."

The eight-hour first responder training program put on by Med-Star Dirt Track Rescue involves race-day strategies that are put into action long before the green flag drops. "Pre-race training is an important element," Masur said. "For instance, the proper placement of equipment and vehicles, and the verification that the vehicles are stocked and in proper working order." Along with fire training and extrication methods, Med-Star also looks at how to neutralize potential hazards that can further encumber rescue efforts.

"Working with race cars comes with some additional considerations," he added. "But there are some pretty simple things that can be done to improve safety, like using dish soap on tubing where you're cutting to prevent spark hazards and save the blade. When cutting the car apart, there needs to be another person with a dry chemical by the motor during that process. The last thing we want is for a spark to ignite some fuel on the ground and create a bigger mess than we already have."

THE RIGHT TOOLS FOR THE JOB

Horton said that upper-level series tend to have not only in-house training, but also equipment that's been built specifically for the materials involved in a given racing series. "They're using trucks that are designed for their race series, and specific tools that are matched to the car designs and the materials used in those cars. Those folks are trained to use those tools. They can't be fumbling around when they get to the car in a scenario where seconds matter. The situation might be a bit different at the

A detailed emergency plan is vital for handling on-track situations efficiently. These plans specify ambulance services, helicopter landing zones, and other essential elements.

lower levels because of the funding involved, but the fundamental concepts are the same."

The need for specialized tools used in those series often relates to the materials used in those race cars as well, materials that may become more common in grassroots series in the future. "There was an IndyCar incident where a piece of suspension punched through the carbon tub and subsequently pierced the driver's left leg, but first responders weren't able to see what was actually pinning the driver in the car, so they initially struggled with the problem," Horton recalled. "After that we had a desperate need to prevent that situation from happening ever again, so we worked with Holmatro to develop a new tool that would allow us to sheer the side of the cockpit off to get access to the underside of the tub. It was ultimately just a matter of getting a tool with the proper saw blade to cut through carbon fiber, and now all of the trucks in the series carry that tool."

"THE BIGGEST THING THAT COMES WITH ASSEMBLING A SAFETY TEAM IS ESTABLISHING A COORDINATED RESPONSE."

Meanwhile, Smith noted that it's important for first responders to be prepared for any contingency that might occur during the process of extracting a driver from a vehicle after an incident. "All of our safety directors have cutter tools like the Jaws of Life or

Improvements in containment seats and other safety gear have made race cars more secure, but they also create difficulties getting drivers out of cars. Focused training and practice are required to offset this obstacle.

"THERE ARE A LOT OF VARIABLES INVOLVED IN ON-TRACK INCIDENTS, AND WE WANT TO MAKE SURE OUR FIRST RESPONDERS ARE READY FOR THEM."

spreaders, or both. Cutters are useful to cut a door or a frame, and spreaders come in handy if something is preventing access to the driver and it needs to be moved out of the way to get them extracted. They typically go through two days of training, if not more, to learn how to properly use those tools."

But Masur said that while first responders at the grassroots level need to be familiar with certain extraction tools, the equipment doesn't necessarily have to be exotic. "We're not talking about $20,000 or $30,000 tools here. A track can put together a system that will allow it to address virtually everything that can happen for less than $1,000. That can be equipment as common as Sawzalls and impact wrenches, things typically used to take apart a car under normal circumstances. Once the body is off of a car, you're basically just dealing with tubing."

EVOLVING STRATEGIES

Decades of racing has provided organizers and first responders with a wealth of information and experience to draw upon in order to improve their safety programs, but even today, incident response continues to evolve based on what's being learned on the race track.

"These days when we get to an accident, we know how to properly approach it," said Backman. "Part of that simply comes down to preparedness. For instance, we have emergency plans for all of the different race tracks we go to. Going into it, we know who the ambulance service is, who the fire service is, we've got an established helicopter landing zone, etc. All of that is figured out prior to us getting there. The emergency plan for our bigger events is nine pages long, and I think that level of organization makes a difference. You hope you never have to activate a plan like that, but you also don't want to be left scrambling in case you do."

With continual improvements in safety being the core goal, the ability to share that experience and knowledge with not only first responder staff but also the racing community at large is an invaluable resource. "Ideally the training is continuous," said Horton.

"And by an odd twist of fate, COVID-19 has actually helped folks share the latest information on the subject," he continued. "The International Council of Motorsport Sciences is an organization with the primary goal of spreading safety knowledge. In the past I've done talks on my safety research from IndyCar's point of view, while officials from NASCAR would come and present their findings as well. Traditionally, that's been something we've done live at PRI shows, but over the past two years we've been doing these seminars virtually, and it has really opened up our audience. ICMS is a worldwide organization, and now instead of just a handful of people coming from Europe and Australia to attend in person, we have all sorts of folks from many different countries

Continued on page 73

SCRIBNER PLASTICS

BLUNT IMPACT ABSORPTION SYSTEM

- Hollow molded modules from specialized proprietary polymer.
- Multiple modules anchored and tethered in place.
- Modules will temporarily deform and partially collapse to absorb impact.
- Can be configured either 36- or 54-inch heights.
- Systems from 12 feet to unlimited length.

For more info: *scribnerplastics.com*

SUMMIT RACING

ENGINE DIAPERS

- Keep oil off the race track in the event of engine failure.
- Manufactured from tough, high-tensile webbing.
- Absorbent pad holds up to 10 quarts of oil.
- Wraps around oil pan and straps to header and water pump bolts.
- NHRA-accepted for competition use.
- Universal fit, available in 22-inch and 24-inch length.

For more info: *summitracing.com*

HOW AND WHERE THESE SAFETY PRODUCTS DID THEIR JOBS

When Austin Hill's No. 16 NASCAR truck was hit from behind on October 2, 2021, at Talladega Speedway, the vehicle turned into Zane Smith's truck, pushing both into the outside wall of Turn 3 on lap 58. This sparked a multi-car wreck appropriately known as "The Big One," which ultimately involved 21 racers and eliminated eight from competition. Just 20 laps later, Grant Enfinger would be bumped by Sheldon Creed and hit Stewart Griesen, taking out an additional six drivers from the race, which Tate Fogleman would win.

Fluid spills are one of the most common on-track safety hazards. Safety-Kleen's Oil Absorbent product plays a key role in removing these dangers and allowing races to continue with minimal delay.

For both wrecks, the Alabama track deployed its safety team to check for injury and hazards, then tackle surface cleanup, where Safety-Kleen's Oil Absorbent product was instrumental.

"As we know at big superspeedways, 'The Big One' is almost always a factor and can affect upwards of as many as 20 cars, as it did in the 2021 crash at Talladega. The Safety-Kleen Oil Absorbent was used to clean the track that day so that the 80,000 fans could enjoy the balance of the race," said Drew Patey of Safety-Kleen, Port Orange, Florida. "Oval tracks require slick tires. Any liquid on the track can cause

Effective track surface prep enhances safety by making tires bond to the track more effectively. "I'm the last line of defense before a driver makes a run," explained our source at Mass Traction.

spin-outs or skids and damage the race car. Our oil absorbent spreaders are sprayed on the water and oil on a surface, then vacuumed up and properly disposed."

Similarly, a strategically placed track barrier system by Scribner Plastics prevented injury at All American Speedway, the 1/3-mile paved oval in Roseville, California.

"During a NASCAR weekly race in 2019, a racer got a throttle stuck, and the car hit the on-off wall at full speed. Fortunately, we had a Scribner Plastics barrier installed, and the driver was unhurt," said Bill McAnally, the promoter of the track. "The car was totaled. We had to cut off the roof to get the driver out to be safe. But the plastic barrier definitely saved them from serious health concerns. It truly got us to trust and believe in the barriers."

"The reality is, many tracks were made 40, 50, even 60 years ago, and we're carrying much higher speeds today," said Chris Scribner of Scribner Plastics, Rancho Cordova, California. "Many tracks use tractor tires to cover exposed concrete, but the problem is they roll if not fastened. Or, in the case of a multi-car pile-up, the first car might move the barrier, leaving the wall exposed. Our Link Barrier system links together with a nut and a bolt, and in this particular application, there were pins we ran through to hook them together. Then a ratchet strap

Even a simple on-off wall can be a serious danger in the right circumstances. Scribner Plastics' barrier system proved instrumental in preventing serious injury at California's All American Speedway.

goes through the pin, and it straps to the actual wall itself, so it doesn't move. That barrier takes the blunt impact from a vehicle and absorbs it."

As opposed to manufactured products, Mass Traction in Wellington, Florida, provides track safety with a host of preparation services.

"I'm a one-person operation that serves many of the drag strips on the East Coast, from West Palm Beach, Florida, all the way to the upper peninsula of Michigan," said Brandon Mass. "I'll re-do a track surface, lay down fresh rubber, then will choose track glue depending on factors like dust, cloud cover, and temperature. We're essentially painting a rubber surface to make the tires bond to the track, which is huge for safety. I'm the last line of defense before a driver makes a run.

"Outside of prep, I try to point my clients in the right direction for track safety since, unfortunately, it often takes an accident to open eyes up," Mass continued. "I show them where they might improve. For example, I still see guardrails—which have caused damage and even death. That's troubling."

Mass Traction will travel to 48 events this year. "I supply every facility with an overview of what they can do to be safer and run better events. The more information you give, the better, in my experience," Mass said.
—Laura Pitts

Continued from page 70

who can now get access to these talks online and apply that knowledge to their own racing series. The information is getting out to a much broader audience now, which is really cool."

ICMS seminars coincide with the PRI Trade Show schedule with one day dedicated specifically to on-track safety. The organization provides other seminars throughout the rest of the year as well.

"Anybody can provide proper race rescue if they put the time into it to learn the skills," said Masur. "There are a few places where we've done training with them and then come back later only to discover that they were doing the same old thing, but what we've seen with the vast majority of the people that we've trained is that they're picking up their game year by year. Track safety is one of those things where you don't know what you don't know, and these improvements aren't necessarily expensive to implement. But the eight hours that we put into training people is just the beginning. You've got to do your own training on a regular basis to keep those skills sharp. Like anything else, if you don't practice this stuff, you'll lose it." PRI

SOURCES

Mass Traction
masstraction.com

Med-Star Dirt Track Rescue
facebook.com/MedstarDirtTrackRescueTeam/

Safety-Kleen
safety-kleen.com

Scribner Plastics
scribnerplastics.com

Summit Racing
summitracing.com

USAC
usacracing.com

WH Engineering

World of Outlaws
worldofoutlaws.com

STRATEGIC SUCCESS

Modifieds remain one of the most popular and competitive segments in motorsports. With teams constantly looking for an edge on the track, sanctioning bodies and tech officials have been tasked with keeping costs in check and maintaining safety standards and performance parity while also staying vigilant over those seeking to exploit any gray areas of the rulebook.

By Bradley Iger

The spirit of competition has always fostered innovative thinking, and that's led to countless advancements in performance, durability, and safety over the years. But as a racing format becomes more refined (and often more complex) as the associated technologies mature, other factors often start to take on greater importance as a result. Ignoring them can put the health of the discipline in jeopardy.

Modified racing serves as an excellent example. The cars are seemingly simple and rule sets are similarly straightforward, factors that have played a significant role in its ongoing success. But with such close competition, racers are always on the lookout for anything that might shave a tenth or two off of a lap time, and that's turned rule set

design and technical inspections into a sport of its own.

"The modifieds have been relatively basic race cars for a long time now, but as things evolve with suspension combinations and platform setups, the modified has kind of become a beast of its own," said Greg Felton, the director of technical inspection for the Tri-Track Open Modified Series, Seekonk, Massachusetts. "We've tried to create some simple rules to make some of the high-dollar things that you might want to do less attractive from a competitive standpoint."

Maintaining performance parity and a high level of safety will always be top priorities in modified racing, but in recent years, another component has led to increasing importance. "We've always been pretty strict on safety," said Darlo Mulder, tech director for the United States Modified Touring Series, Webster City, Iowa. "When you're teching a premier class, most of the drivers have been around the sport long enough that they understand the dangers and they take safety seriously. We see more concerns in that area in the lower divisions. The bigger issue is with everyone looking for the performance edge. We often have to decide whether this is an area we're going to let them go into, or are we going to stop this before it gets out of hand. It's an ongoing battle, and it really comes down to containing costs so that one team doesn't have an inherent advantage over another because they can outspend them."

SEEKING THE NEXT BIG THING

Bill Doucette of the Modified Racing Series in Canaan, New Hampshire, said

As technology evolves, officials often must decide when and how to discourage modified competitors from spending their way to the winner's circle. "It's an ongoing battle," noted one sanctioning body source, "and it really comes down to containing costs so that one team doesn't have an inherent advantage over another because they can outspend them."

that more often than not, setup trends in modified racing come down to "monkey see, monkey do" behavior within the field. It's rare that unconventional tactics result in a clear competitive advantage.

"An issue came to light a couple of years ago with coil binding," Doucette explained. "Basically, that's increasing the wheel loads by limiting suspension travel, so the car becomes very rigid—almost like a go-kart. All of the wheel load is going into the tire and theoretically increasing grip. Racers were spending a lot of money chasing that, but that kind of setup can actually reduce grip in some situations because of the lack of compliance. We watched how other competitive series were handling it, and we saw how they were basically chasing their tails trying to get these guys to stop coil binding. Sometimes trying to chase something and make rules around it ends up costing people money, so after a conversation with one of our chassis guys we decided to see if it would just play itself out. And it did."

With horsepower levels already exceeding the amount of available grip in most series, competitors have shifted more of their focus toward chassis tuning to find additional performance potential. "We have specs on where all of the mounting points are supposed to be, but every year we seem to find people who are fudging on that," said Bill Engelstad, tech director for the WISSOTA series, Saint Cloud, Minnesota. "There were some instances where the companies that were re-popping the front stubs were moving things around from the stock locations. On these modifieds they're trying to get the front crossmember and everything else as close to the ground as they can without digging in, so they'll try to fudge on some of these measurements to change geometry and lower the center of gravity. We cracked down on that, and guys had to send cars back to have them fixed. Our approach is that if something isn't legal, we're not going to make it legal because someone got caught with it. If you don't do that, it's just going to get out of hand sooner rather than later."

Mulder cited weight placement as another area of increasing scrutiny. "They're trying to put weight in different areas, and it can be a huge advantage, so we have a lot of rules on that. But it's also a safety issue. Since there are minimum weights that these cars need to adhere to, the teams often need to add weight, but it has to be added to the frame or the chassis—they can't put it anywhere else. We had racers putting lead weights on suspension parts and rotating parts, and that's a problem. A lot of folks like to put it inside the left rear to help plant that left rear tire and give the car more bite off of the corners. But this is an area that's constantly being inspected because we once had an issue where a racer put wheel weights inside his left rear wheel, and during the race the left rear tire blew. When that happened, it shot these lead pellets all over the place, hitting people in the grandstands. It was a bad deal. So there's a safety element of it that we have to regulate, and we have to be particularly vigilant because of the potential performance advantage it offers."

KEEPING PACE

With such a wide array of different tactics at play, organizers have devised strategies of their own to detect problems without making tech inspections a lengthier process than they already are. "I've put together a pretty vast selection of tools to test all of this different stuff that we need to check at the race track," Mulder explained. "I travel from race track to race track with a full-sized GMC pickup that's just packed full of tools. It takes a lot of equipment to be able to tech all of it."

But Felton noted that some inspection methods are more straightforward than others. "I have a very simple system to check for coil bind," he said. "We roll the two front tires onto two 3/4-inch pieces of plastic. Two guys who weigh 185 pounds each then get on the front bumper, and they have to be able to make the chassis touch the ground. That pretty much eliminates the issue. With no ride height rule, the lowest the guys can run the left front corner of the car is about an inch and a quarter to an inch and a half. The money in coil binding is in the shocks, and the goal here is to implement some simple strategies that make those expensive things go away."

Engelstad said that as more technology infiltrates into modified racing, it's no longer the realm of the backyard builder, and with that comes greater challenges for tech officials. "Who would have thought that we would have modifieds in wind tunnels and on pull-down rigs to figure out what's going on with them? Aerodynamics have turned out to be much more important to these dirt cars than we previously thought, so we're looking for bodies that have been mounted on the

car crooked and things like that. A lot of little things can turn out to be a big thing."

LEVELING THE PLAYING FIELD

Felton emphasized that the most effective way to keep the racing fair is to be consistent. But he also likes to throw a few surprises in here and there to keep folks honest and streamline the inspection process. "It wouldn't really be feasible to do every single check on every car at every race because of the sheer amount of time it would take to do that. So there are a few checks that are routine, but I always try to add two or three things in at every race that I won't do for the rest of the year. That way the racers never really know what I'm going to do and when I'm going to do it. It keeps them on their toes. I was a racer too, so they know what I know."

In other situations, new rules must be implemented in order to prevent a situation where the entire field needs to upgrade their cars in order to stay competitive. "Teams are allowed to run either a pull bar or a lift arm—it's the traction device for the rearend," said Mulder. "Modifieds don't have much of a tire, but they've got a lot of horsepower, so traction is always a huge concern for these teams. A few years ago, a racer took his pull bar and made it into a two-piece system, essentially a cantilever. The way the rule was written it didn't outright say that he couldn't

The relative simplicity of modifieds is a big part of their popularity. But it also makes for tight competition and plenty of rule-bending, which is challenging for officials to monitor and enforce.

Setup trends in modified racing are often a result of racers mimicking each other in an effort to find what works best. With power output far exceeding grip, much of the focus is now on chassis tuning.

do that, but it wasn't what we wanted to see, either. It proved to be a huge advantage, and he went on a winning spree. We had to change the rules to be more specific about what we want for this traction device. The gray areas can shift directions for a series, and we didn't want to force everyone else to have to adopt that system."

Sometimes the changes are less dramatic, though, and rules need to be updated in order to prevent an incremental trend from getting out of hand. "We were finding that cars were 10 to 12 inches wider at the bottom than they were at the top," said Engelstad. "About five years ago we implemented a maximum car width rule, and we've had to add to it over the past couple of seasons because we weren't specific enough. People were taking the bottom of the left-hand quarter panel and pushing it underneath the car so they could push the bottom of the right-hand quarter panel out further to create more downforce."

Looking down the road, the prospect of additional technology making its way into modified racing may pose an even greater challenge for tech officials. "I would say in the next five to 10 years we're going to start seeing some engine combinations moving over to fuel injection," said Doucette. "That's something we're starting to look at more closely and get prepared for, but it's going to be tough. Suddenly you're into engines that

Effective rules enforcement is largely a matter of discouraging rule-bending by varying what's checked. As such, tech inspectors often switch up what they look at from race to race to keep competitors on their toes.

have computer control, and that means your tech officials need to understand how to work with ECUs and devise a way to monitor them."

Communication is key regardless of where things are headed, said Mulder. "It's crucial that the tracks, promoters, and tech officials are all on the same page, so we have a private Facebook group that all of our series' tech officials are members of. That allows us to get something out to everybody fairly quickly and share pictures to help illustrate any concerns."

Felton told us that it's important not to conflate consistency with complacency. "Do the right thing and do things consistently, but don't just do the same things in tech all of the time because teams will quickly get used to that. If they know what to expect, they can just focus somewhere else to look for an advantage. A lot of it has to do with each specific event because there are a lot of outside factors that go into the strategy. The important thing is to keep them guessing." PRI

SOURCES

Modified Racing Series
themodifiedracingseries.com

Tri-Track Open Modified Series
tritrackmodifieds.com

United States Modified Touring Series (USMTS)
usmts.com

WISSOTA
wissota.org

BUSINESS PROFILE

LASALLE ENGINE & CHASSIS

Faced with the loss of its largest industrial customer, this engine building and machine shop in South Central Pennsylvania restructured and re-invented itself as a multi-faceted operation that now serves up race-winning powerplants for competitors throughout the region and beyond.

By Dana Ford

For those who have never passed through Breezewood, Pennsylvania, it's a small town that can best be described as a strip of businesses designed to cater to travelers who stumble upon this strange convergence of Interstate 70, US Highway 30, and the Pennsylvania Turnpike. Once a sparkling little city of lights dubbed the "City of Hotels," the town is now more known for its decaying remnants of that former glory than anything, as more and more travelers these days are inclined to just pass through without stopping.

Tucked into this once bustling little town is LaSalle Engine & Chassis, home to one of the premier dirt track engine builders in the area. The building itself is humble, a former bank building Chuck LaSalle has transformed into an engine building operation. The resourcefulness of this group comes through when shop manager Luke Nesbitt points out with pride how the bulletproof glass from the bank drive-through has been repurposed for the engine dyno room window.

LaSalle did not start out with the goal of becoming an engine builder. Instead, the inspiration that became LaSalle Engine & Chassis came about in 1987. LaSalle, a dirt track racer at the time, was competing in a big race and lost oil pressure in his engine. This experience motivated him to build his own engines and try to make a go of machining and building engines for others.

Photo courtesy of Ryan Roberts Photography

The success of LaSalle Engine & Chassis stems largely from its staff, which has 165 years of combined experience. "They have a good crew," said racer Drake Troutman. "They've proven themselves every weekend." Seen here, from left to right, are Luke Nesbitt, Andrew McGinnes, Paul Shandor, Chuck LaSalle, Eugene Kaminsky, Richard LaSalle, and Doug McGinnes.

The business started as a two-man shop next to his home and steadily grew until it moved into the 7,800-square-foot former bank building. By then, the company was using top-notch equipment to do all block prep and head reconditioning. In 2014, LaSalle added balancing and crank grinding services, with engine dyno service coming onboard in 2016. In 2021, LaSalle upgraded equipment with a new CWT crankshaft balancing machine and a reconditioned Berco crankshaft grinding machine.

By 2016, the business had reached its peak of 20 employees, and its primary focus had settled on industrial engines, with only a handful of racing engines being built in the shop. It was at that peak of success that a major challenge to the company's existence occurred. It lost its largest industrial customer, causing it to restructure and redefine the business in order to survive. The loss of business did result in reductions in staffing, but numerous strategies were employed to remain afloat and establish new customers. LaSalle invested in more advertising to spread word of his services, purchased new equipment, upgraded existing equipment, and retrained the remaining workforce to focus on the needs of his customers. To strengthen the business, it evolved from the original mix of 98% industrial engine product sales in 2015, to a more balanced 30% heavy- and mid-truck engines; 25% industrial and farm engines; 25% passenger, classic, and muscle car engines; and 20% racing engines.

EXPERIENCE MATTERS

The LaSalle team currently consists of eight employees who possess more than 165 years of combined overall machine shop and engine rebuilding experience, with 115 of those years happening right in the LaSalle shop. LaSalle cited the commitment of these employees to producing quality engines, and as a result, a lack of turnover. Leading the team are Nesbitt, the shop manager who has a degree in machine tool technology, and head machinist Paul Shandor, a journeyman machinist.

All employees are trained on the job for the specific machines used in the shop.

"EVERYBODY IS SURPRISED TO FIND WE'RE FRIENDS WITH OTHER ENGINE BUILDERS."

During LaSalle's industrial-focused days, it achieved ISO-certified status. Even though there's no longer a need for the certification, it still utilizes the ISO-documented processes to ensure its customers receive the highest quality products and services possible.

LaSalle's customer base is mostly within a 200-mile radius, but some of its racing engines have shipped as far away as Tennessee, Minnesota, and Indiana, with its industrial engines shipping all over the United States and also to other countries.

In addition to engine-building services, LaSalle also sells methanol; is an East Coast warehouse distributor for Champion Oils; and is a dealer for VP Racing Fuels, Outerwears Performance Products, Randy's Racing Filters, and Klotz Synthetic Lubricants.

All of this is a source of pride for LaSalle, who explained, "I'm very proud of my shop and my guys. We are not engine assemblers; we are engine builders. We can make stuff; we can make valve seats. We can make stuff fit. An engine assembler is someone who buys stuff from the suppliers and puts it together in their garage. We can actually grind cranks; we can do our stuff here. We take engines from scratch and build them up."

That ability to "make stuff" comes in handy considering the diversity of engines the shop builds. The oldest engine that went through the shop was a single-cylinder, 9-horsepower 1903 Waukesha. Other recent unique builds include engines for a 1931 Studebaker and 1928 Cadillac, along with two 1947 flatheads that were in the shop when this interview occurred.

As LaSalle noted, he and his team will work on a variety of engines, including those for golf carts, jet skis, and boats. This characteristic is something that makes LaSalle Engine & Chassis a bit different as far as most engine builders go. It allows customers to bring in their engines and parts to see if those parts can be used to build a

quality engine. The answer is not always yes, but the team will look at what the customer has and give honest advice.

That honest approach is what brought Larry "Pork" Sell to LaSalle as an early customer. According to Sell, "I've known Chuck for years, and when he went into business, I thought I'd try him because I knew him. I've had no complaints since I started getting him to do my engines. We won three championships in the first four years that we had his engines. We've had very little trouble with anything, and if we did [have trouble] he took care of it immediately without any added charges. I started racing in 1982 at Jennerstown and raced against him and his brother. I've known him ever since. He's been nothing but honest with me. My sponsor told Chuck he wanted the best he could build, but it had to be legal."

Sell's sponsor is one LaSalle recalled well. He explained, "Larry's car is sponsored by a business owned by a pastor who stressed, 'I want a good engine, but it has to be legal.' He didn't want to be embarrassed as a pastor and a businessman by being disqualified for an illegal engine. Even more so, it would be embarrassing to me as an engine builder if the only way I could win was by cheating."

LaSalle Engine & Chassis has built a reputation for quality work, honest dealings, and close personal attention. The shop routinely tackles anything from 100-year-old antiques to modern racing V8s. Here, shop foreman Luke Nesbitt and Doug McGinnes check engine specs.

DIRT TRACK DOMINATION

LaSalle's passion for the world of dirt track racing is obvious after stepping through the doors of the LaSalle shop, with all the pictures on the walls of his winning customers. But he quickly added, "I like anything that goes fast or makes a lot of noise."

The LaSalle crew prides itself on being able to handle all aspects of engine building, including grinding cranks and making valve seats. Here, Chuck LaSalle sets up a crank balancing machine.

To explain the logistics of this customer base, the old real estate adage of "location, location, location" applies to LaSalle's dirt track customers. He explained that a large part of the passion and emphasis on dirt track racing is due to about a dozen dirt racing tracks within a two-hour tow of the shop and a number of others not too much further. Due to this proximity to local tracks, LaSalle builds engines for hobby cruisers, street stocks, semi-lates, limited lates, super lates, and modifieds.

On top of that, South Central Pennsylvania is also a hot spot for sprint car racing. For that style of car, LaSalle builds a "house engine" for the 305 sprints, an engine program Austin Reed runs. Since 305 sprints are popular throughout the country, LaSalle has customers as far away as Oklahoma, Minnesota, Indiana, and New York. One of its more recognizable customers, Jones Performance, whose parts are featured on the "Trick My Truck" TV show, uses a LaSalle engine in its sprint car, driven by Roman and Vivian Jones. With LaSalle power, Vivian was able to win in her fourth time out in the car.

Success is not unusual for cars using LaSalle engines. He reported that in 2021, "our engines won 63 races and five track championships." Even with the reduced racing schedules in 2020 due to COVID-19, LaSalle engines still earned more than 50 wins. "We have a lot of good customers, a lot of good guys."

Even though LaSalle has a well-balanced customer base, he quickly clarified that the business doesn't just build dirt track engines, as it also has customers who participate in drag racing and tractor pulling, along with customers who focus on restorations. LaSalle also proudly noted that his team built five engines for vehicles that crossed the auction block at the famed Barrett-Jackson car auctions.

HELPING OTHERS

Outstanding service after the sale for each and every customer is a hallmark of LaSalle's success, which is evident in the dirt racing program. During the racing season, Doug McGinnes, who assembles most of the racing engines, will attend events at the local dirt track for quick repairs.

"EVERY ONE OF MY EMPLOYEES HAS A SPECIAL TALENT, AND IT'S A COMBINATION OF ALL OF THEM."

To stay informed, LaSalle and his team keep up with the latest technology through magazines, webinars, and related events, including attending the annual PRI Trade Show. LaSalle reported that the team constantly talks with their customers and their parts and equipment suppliers, and, of course, listens to what is going on at the track. Once they have received input from those sources, they incorporate the best ideas into the engine building process and then move on to testing in the dyno room. Finally, drivers running their house engines provide feedback, which is then used to enhance the performance of all of the builds.

Although some businesses may seem detached and lack personal attention, LaSalle has found the opposite to be true for his company's success. "We are not competitors with other engine builders," he said. "We want to be friends and work together. That's how you become successful. Everybody is surprised to find we're friends with other engine builders. Yeah, we help each other. It's not about me against you, we're friends. We call back and forth and help each other when we can; not working against each other. That's how I was raised and that's how I do business.

"When you make true friends, that's priceless," he continued. "Money can't buy friendships. I cherish my friends and the people I work with more than anything. Our shop manager, Luke Nesbitt, is an example of that. He's an amazing person. Always thinking, not about one thing in particular, but he thinks about all kinds of engines; how to get more horsepower, how to get that old tractor engine fixed when we cannot find the parts we need. That's what made this business. It's not me. It's my guys. It's everybody here. Every one of my employees has a special talent, and it's a combination of all of them. It's not one person. Everybody here has something to contribute. My guys are all open-minded and smart. I wouldn't know what to do without them. I love them."

The feeling of friendship and family that is felt within LaSalle's staff and is spread through its suppliers and customer base is reflected in one of its newer customers, Drake Troutman. It's hard to imagine Drake as a veteran racer, as he is only 16 years old and just got his driver's permit.

"They don't cut any corners," Troutman said. "They're the type that only puts out the best. Chuck won't do a motor unless it's going to be 100%. If someone doesn't want to go to 100%, then he won't do that motor for them. That's the kind of people they are.

"They hopped onboard with me not long after I started racing, which was when I was 11 years old back in 2016. I haven't switched since. Their engines are the

only thing I run. They're like another set of grandparents to me, great people, church-going people. They won't cheat you out of anything. I feel like they're really out for what's best for the customers."

As a result of running LaSalle engines, Troutman won 55 races in the past five years and multiple championships, including three track titles and the 2021 Renegades of Dirt Modified Tour championship. "I'm trying to step up to the late model series right now," he added.

Troutman credits LaSalle, Nesbitt, and the entire team for their engine building expertise. "They have a good crew up there," he said. "They're small and local, but they've proven themselves every weekend. They have a lot of 305 engines out there. As an engine builder, Chuck's as good as anyone out there. Chuck's the type who wants the best. If someone comes in and wants to cut corners, he won't do it [the job] because he doesn't want it out there with his name on it. He doesn't need a ton of people, but the people he does have, he wants good people who will go all out with their motors and with their program. They're a class act. Chuck cares about everyone who works for them. It's awesome to see how much their business has grown in just the last four or five years since I've been with them. One of them is always out there at the track to help."

LaSalle's engines are proven winners, which attracts a loyal clientele of racers who compete at the many dirt tracks within a few hours' drive of the shop.

All of these factors—the skill to build its own parts, its high level of service, doing what it takes to keep the business up to date and viable, a commitment to excellence and honesty, and treating everyone like family—adds up to the successful business that is LaSalle Engine & Chassis. PRI

EFI EVOLUTION

By David Bellm

ELECTRONIC FUEL INJECTION IS MORE POPULAR THAN EVER, AND MANUFACTURERS ARE POURING VALUABLE RESOURCES INTO DEVELOPING NEW PRODUCTS WITH MORE VERSATILITY, GREATER POWER POTENTIAL, AND ADDED CONVENIENCE.

It was once thought of as the enemy—the end of racing, hot rodding, and the freedom to modify cars at will. Now, a few decades later, electronic fuel injection (EFI) is seen as one of the great liberators of the performance world, a technology that allows unprecedented reliability, precision, and consistency.

And from what we can tell, it's really just getting started. The far-reaching products that EFI manufacturers are developing continue to push this technology to levels few racers could even imagine not that long ago.

To get a handle on these developments, we reached out to some of the leading suppliers in the EFI market. They gave us the lowdown on the trends, products, and expectations that will affect motorsports in the months and years to come.

THE PUSH FOR POWER

One of the biggest factors driving the EFI market is the proliferation of very high horsepower engines. As power output climbs, EFI manufacturers are forced to keep pace. The resulting EFI systems facilitate even greater power, resulting in a self-perpetuating cycle of escalating output.

"We've been seeing insane growth in horsepower numbers," said Mike Wahl of FiTech Fuel Injection, Riverside, California. "Four-hundred horsepower isn't a lot anymore, when cars are putting down 800 or 1,000 horsepower to the rear tires now. So we're having to make our fuel injection systems grow to accommodate people—bigger injectors, more robust computers, and just more technology."

Although big horsepower numbers are still very much within reach of carbureted engines, there are many things that can go wrong when an engine is boosted, tuned, and tweaked to its absolute limits. Many racers find that a traditional carb setup isn't up to the demands of this unyielding environment.

"NEW ENGINE TECHNOLOGY HAS PUSHED FUEL DEMANDS EVER HIGHER WITH INCREASED POWER."

"Horsepower numbers are getting so high that the precision that comes with fuel injection is becoming almost a necessity," said Evan Perkins of Holley Performance Products, Bowling Green, Kentucky. "In the realm of 3,000-plus horsepower, running lean, even for a split second, or having any point in the powerband that's not controlled is a major problem."

But with outrageous power levels becoming the norm these days, injector manufacturers are encountering unique challenges that must be taken into consideration throughout the design process. Among these new challenges is the proliferation of specialized fuels.

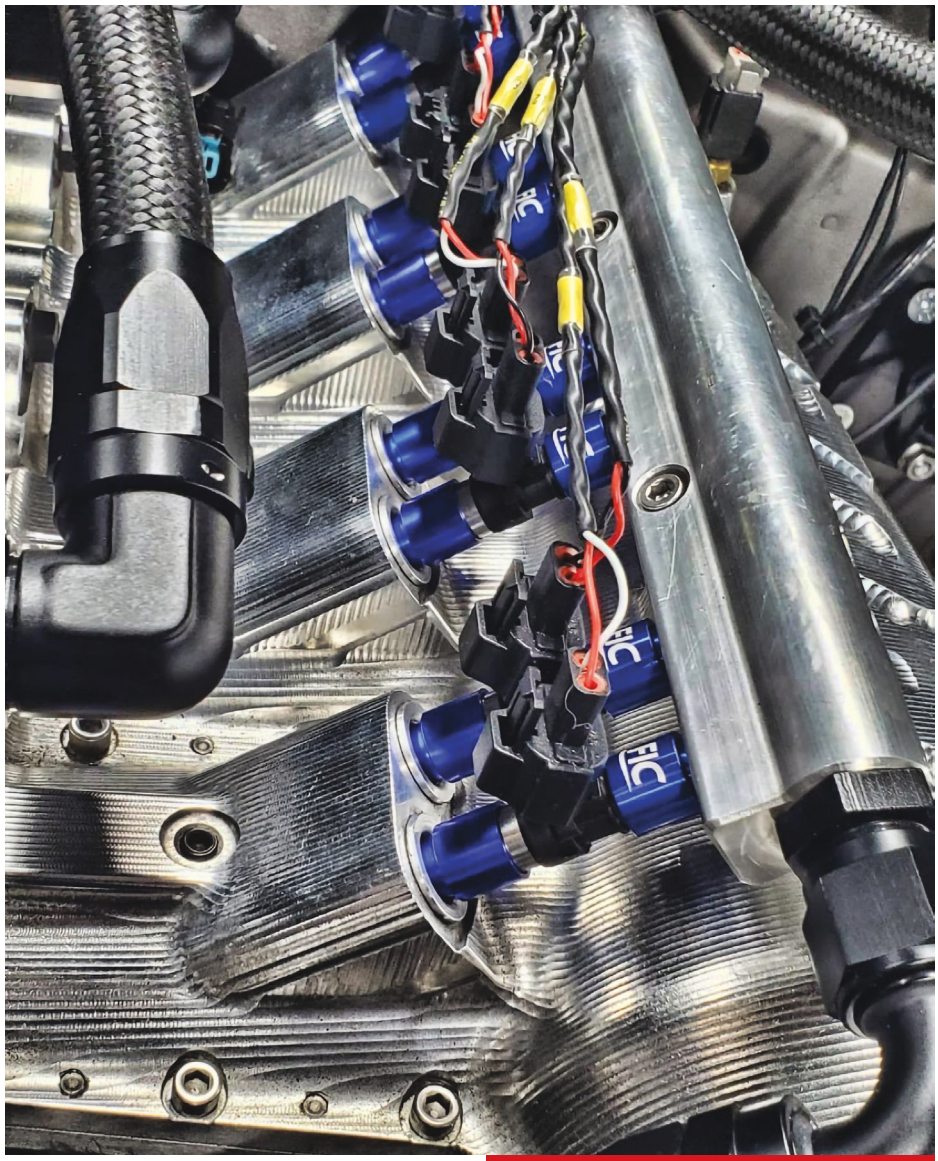
"Normal race gas has definitely declined in popularity," observed Tim Jilg of Fuel Injector Clinic, Hobe Sound, Florida. "Right now, it seems like E85 is king, as far as all-around race fuel. When people move past that it's typically to methanol. So we look to materials that are compatible with harsher fuels like M5 or Q16. Anything with nitromethane or an oxygenation chemical in it can be a little rough on some of the current larger fuel injectors."

Making the choice of materials for injectors even more difficult is the fact that materials with the best chemical resistance sometimes can impede essential functions of the injector. "The injector coil is basically an electromagnet," explained Jilg. "It has to grab the valve and pull it up. But a lot of the materials that are resistant to chemicals in certain racing fuels don't respond to magnetism as well as something that would have some more iron in it. To make the valves operate the way they do, they have a little bit more iron in their material, and because of that, they are susceptible to corrosion."

According to Jilg, most EFI injectors are manufactured by Bosch regardless of who builds the rest of the system. But some EFI manufacturers are now starting to build their own injectors, as the demand for ever-higher flow rates dictates more specialized designs and materials.

Along with the EFI system itself, the quest for greater power is pushing the limits of the rest of the fuel system. Adding to the challenge of moving more fuel on high-horsepower EFI applications, fuel system manufacturers often have less space to use within the tight confines of late-model cars.

"New engine technology has pushed fuel demands ever higher with increased power," said Rob Scharfenberg of Fuelab, Collinsville, Illinois. "This has placed greater demand on finding higher flow rates and improved performance with smaller and smaller package sizes. We've responded by expanding our line for higher-flow-rate fuel pumps, and we are offering new



configurations that allow higher-performing systems in tight spaces, like fuel modules in modern vehicles."

DRIVING IT HOME

Now that the ability to coax thousands of horsepower from a relatively small displacement V8 is pretty routine, racers are looking to have that kind of power in cars that can readily be driven on the street. "People can make so much power so easily and reliably that everybody's goals have gone up tremendously," observed Jilg. "Nowadays it's not uncommon for us to talk to customers who want to put a ProCharger on their car, make 1,000 horsepower, drive it every day, and then go to the track on the weekend and beat on it."

Supporting today's ultra-high-horsepower engines requires a sometimes-tricky balance of flow rate, fuel compatibility, and drivability in EFI systems, noted our source at Fuel Injector Clinic.

For extreme dual-purpose cars, EFI systems are increasingly designed to support high-horsepower race applications while maintaining acceptable low-speed drivability for street use. "What we see a lot of these days is staged injection," explained Jilg. "There will be two or three

"PEOPLE CAN MAKE SO MUCH POWER SO EASILY AND RELIABLY THAT EVERYBODY'S GOALS HAVE GONE UP TREMENDOUSLY."

sets of injectors—smaller primaries for street manners, and then after a certain indicator, the ECU will activate the secondary set of injectors for wide-open throttle."

Along with that, the increasing popularity of high-horsepower dual-purpose cars is also driving injector development, too. According to our sources, giant injectors that can flow massive amounts of fuel and still remain streetable are somewhat of a holy grail for EFI manufacturers.

"That big, 3,000cc injector that will idle nicely, that's kind of like the golden egg right now," noted Jilg. "We do not have anything to confirm 100% yet, but we are working on an injector like that. We have been developing it for well over a year now, and we have made a lot of progress. We are hoping to have an announcement about it maybe later this year."

While high-horsepower drag cars make up a large portion of the dual-purpose cars being built, pro-touring-style builds continue to gain popularity. Essentially vintage cars with advanced, modern drivetrains and suspensions, these machines are being put into competition more often these days. Naturally, EFI manufacturers are responding with appropriate products.

"I'm really seeing an increase in autocross," observed Wahl. "For those applications, we're seeing more port injection versus throttle-body injection, and guys who are using power adders because they want a snappier response. We're developing systems that can support that."

NEW USERS, CHALLENGES

As EFI is increasingly seen as a mainstream, necessary product by many racers, our sources said that what

constitutes the "typical" EFI user is gradually shifting. "We're seeing a lot more people moving to EFI who were traditionally hardcore carburetor guys before," noted Perkins. "I think that's a little bit of a monkey-see-monkey-do phenomenon: This guy set a record, and he's running fuel injection."

To further entice the traditional carburetor crowd, FiTech will soon introduce its new Nemesis system. Built on a 4500-flange Dominator-style throttle body, the new system runs 12 injectors and can support up to 1,600 horsepower. "The guys with the high horsepower, they're often on a very well-built carburetor that they're constantly having to work on," said Wahl. "Our 4500 system will be able to learn, pick up, and go. Our goal is to try to get rid of carburetors, period."

And as more racers migrate to EFI systems, the knowledge level of users has shifted somewhat too, according to our sources. While EFI on race cars was once largely the domain of specialized tuners and engine builders, it's now being adopted by less technically inclined users. This continues to put demands on manufacturers who have to support these products.

"When you get fuel injection right, it's awesome," said Wahl. "But it exposes every problem on the motor that a carburetor would cover up. When we first developed our systems, one of our co-founders said, 'Now we're going to have to teach the whole world EFI.' We constantly face that challenge."

This shift in expertise level is also creating greater demand for systems that are easier to install and set up, so users can consistently get good results with minimum fuss. "Convenience has gotten more important," noted Perkins of Holley. "Professional race car builders are not going to have a problem building custom wiring harnesses—that's their bread and butter. But the average guy isn't going to invest the time to become an automotive electrician and computer tuner to be able to build these sorts of things."

For that reason, "our Terminator X systems for LS, LT, Coyote, and Gen III Hemi have been huge," continued Perkins. "They're plug-and-play solutions. Racers just order the Terminator X that matches the year, make, and model engine they have. So the idea of having to buy a universal computer, or build a wiring harness, or order a complex series of sensors and pigtails and plugs and then put it all together is out the window."

EFI users increasingly expect systems to be easy to install and set up. Holley's Terminator X line is designed to fit specific make and model cars, with plug-and-play simplicity.

Manufacturers are also taking note of other aspects that often prove difficult or time-consuming when converting a car to EFI, such as setting up the requisite dual-line return-style fuel system. "We've worked really hard to do year-make-model-specific fuel modules," explained Perkins. "If somebody is doing an EFI swap, all they have to do is drop their tank, knock the sender out of it, and drop our unit in. It has a combo fuel pump and sender. Their stock tank goes back up into the car, and all of a sudden it's an EFI-capable fuel system."

A number of manufacturers also offer kits that speed the installation of more efficient brushless fuel pumps. "Our latest offering is the 496xx Series in-tank brushless fuel pumps," said Scharfenberg of Fuelab. "Like other standard in-tank pumps, these new

> "THAT BIG, 3,000CC INJECTOR THAT WILL IDLE NICELY, THAT'S KIND OF LIKE THE GOLDEN EGG RIGHT NOW."

fuel pumps fit into modern fuel tank modules. We have kits that include everything needed to install the system, including the controller, sealed bulkhead for passing wiring into the fuel tank, and supplied terminal sets."

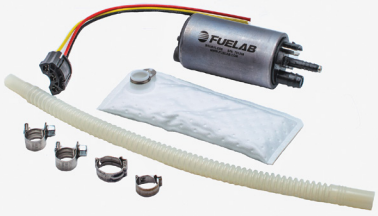
NEW ENGINES, OLD ENGINES

Ultimately, the market for EFI systems is largely driven by engine platforms. The 460-pound gorilla of the V8 racing world is still the LS motor, which can be found in everything from Camaros to Caterhams.

That said, some EFI manufacturers we spoke to are starting to notice a shift away from the LS to the newer LT design, due largely to increasing prices being charged for the steadily dwindling supply of used LS engines. To facilitate moving to the LT, FiTech is introducing new EFI systems to make it a more viable engine platform for racers.

"The LT motor is going to be the next booming motor as far as a Chevy platform for our systems," said Wahl. "The LT motors are designed to be direct injection, but we've developed a kit to convert them to a port-injection system. It's going to be out in 2022, by mid-year."

Regardless of which engine platform is being used, late-model engines are a huge portion of the EFI market. Accordingly,



Fuelab's 496xx-series in-tank brushless fuel pumps fit into modern fuel tank modules, and are offered as a complete kit to speed installation.

Kinsler Fuel Injection in Troy, Michigan, has developed its own drive-by-wire throttle actuator for use on a wide range of the company's throttle bodies, including units designed for Honda, Toyota, Porsche, and the gamut of American V8s.

When used with a compatible ECU, Kinsler's actuator can facilitate such features as traction control, launch control, shift rev-matching, rev limiter, and pit-lane speed limit. Somewhat recently, Kinsler also introduced billet 4150- and 4500-flange throttle bodies with available drive-by-wire, which is a purpose-built unit for the racing industry.

But while much of the EFI market has always been rooted in late-model performance cars, our sources also report rising interest in certain classic V8s. "There definitely is a little bit of a resurgence of big block Chevy stuff," said Perkins. "I see why it's more popular than it was maybe five or six years ago. The LS architecture is somewhat limited in how big you can build it. Even with modern machining and manufacturing, you're never going to build a 700-cubic-inch LS engine."

"I see guys wanting big block Chevys back again," added Wahl. "So we developed a big block Ultra Ram system, and we give them a sheetmetal intake for a big block Chevy. That gives them that LS throttle body, so big block Chevy guys can get some of the luxuries of an LS motor."

Wahl also noted that FiTech is looking to expand beyond its largely GM-focused product line to offer EFI products for Ford Coyote and Gen III Hemi. Although no specific products or plans were mentioned for these engine platforms, the company appears ready to begin developing systems for them.

GOOD TIMES, BAD TIMES

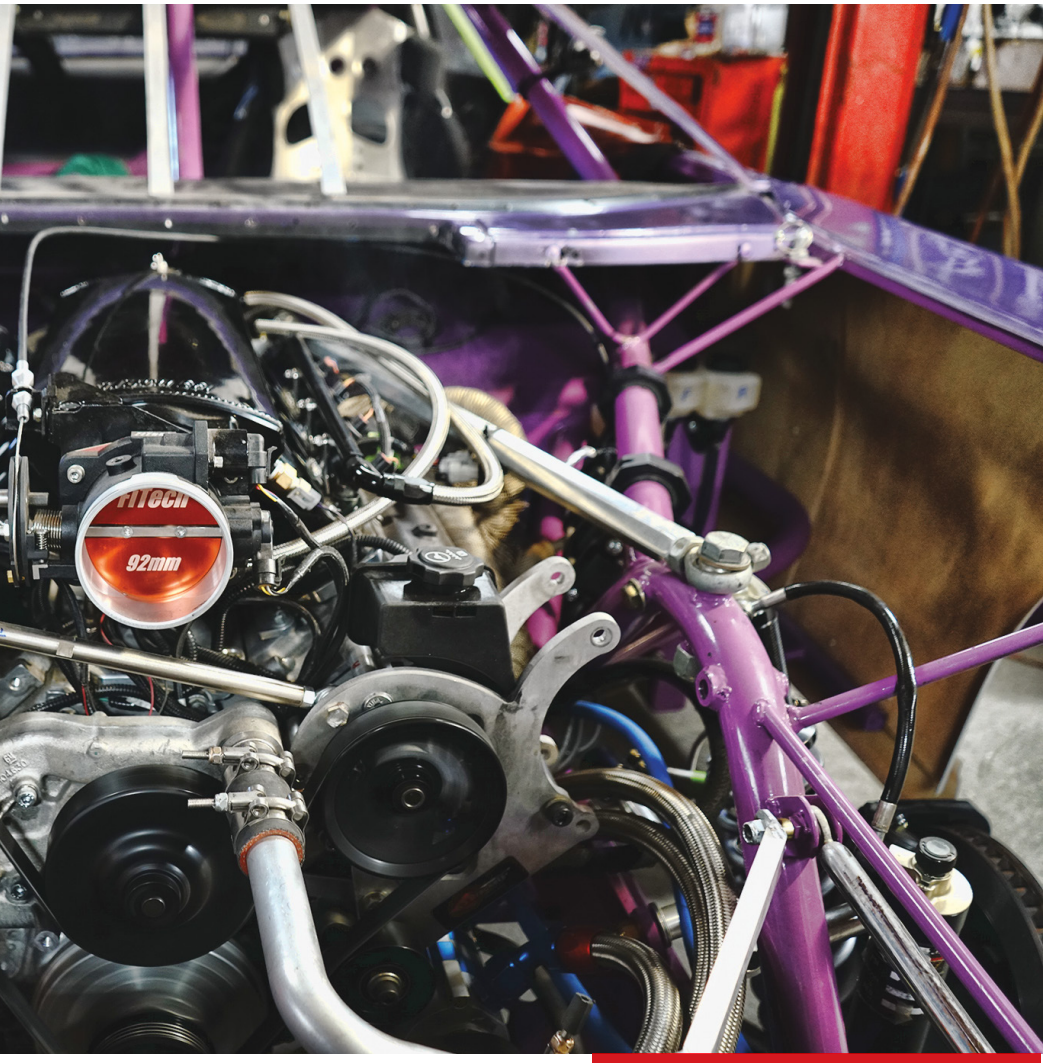
The EFI manufacturers we spoke to all reported that demand is extremely strong right now. Several companies stated that they set all-time sales records in 2021. And the current level of development underscores the strength of the EFI market overall. Further evidence of the segment's health is the influx of companies looking to get into the market.

"More and more people are starting to come to us to build EFI throttle bodies for them," said Joe Hilerio of BLP Racing Products, Orlando, Florida. "At the same time, we're working on a retail version of our own throttle body. It will probably be out by summer this year. What I'd like to do is to

"WHEN YOU GET FUEL INJECTION RIGHT, IT'S AWESOME. BUT IT EXPOSES EVERY PROBLEM ON THE MOTOR THAT A CARBURETOR WOULD COVER UP."

team up with someone on the electronics side and make a kit for it."

But while the EFI market thrives, many manufacturers are struggling with the same supply-chain bottlenecks that plague the rest of the performance aftermarket as this is



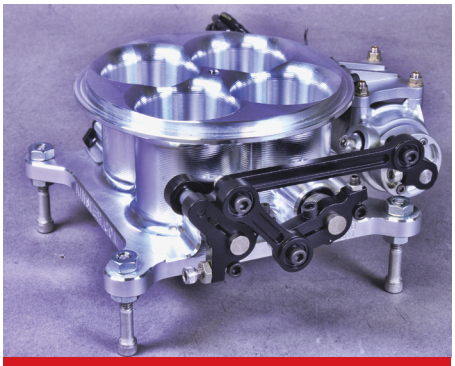
The Chevrolet LT engine is steadily gaining popularity. To help facilitate its use in racing, FiTech is introducing a kit that converts the LT to a port-injection system.

being written. These issues, however, aren't affecting all EFI component manufacturers equally. "We've been very fortunate that the raw materials for fuel injectors weren't hit hard," explained Jilg. "We've been able to weather this fine."

Other EFI suppliers haven't been so fortunate. "I've had to really load up on raw materials," said Hilerio. "We have to tie up a lot of cash flow just to have enough material in here. I just received some quotes, and they're 25–26 weeks for delivery. And they may call on the 26th week and say it's going to be another six to eight weeks."

Along with issues sourcing materials, many companies throughout the performance aftermarket have been struggling to hire enough employees to keep up with increased product demand. Nonetheless, the EFI manufacturers we spoke to for the most part have been able to continue developing and improving their existing products, even while introducing new ones.

"We just revamped our whole product line," observed Wahl of FiTech. "We introduced a new ECU design last year for our throttle bodies. We took the relays off the throttle body itself and made them into a fuse box. It makes our product more robust so it



Kinsler Fuel Injection has developed a purpose-built drive-by-wire throttle actuator that works with many of the company's throttle bodies, including its 4150- and 4500-flange units.

will last longer. That's carrying into our new line of products."

"We're always developing new firmware," said Perkins of Holley. "We're on version six for the Dominator. Last year we added some advanced traction control; we added torque converter lockup control, as well as a whole bunch of other stuff for dedicated racers.

"So even though we've already sold customers their computers," Perkins continued, "we're still working on the back end, talking to our motorsports team, redeveloping the software, trying to make it better and more expansive. And we will never stop doing that." PRI

SOURCES

BLP Racing Products
blp.com

FiTech Fuel Injection
fitechefi.com

Fuel Injector Clinic
fuelinjectorclinic.com

Fuelab
fuelab.com

Holley Performance Products
holley.com

Kinsler Fuel Injection
kinsler.com

QUALITY
PRECISION
RELIABILITY

ARBOR VALVE SPRING TESTER

VALVE SEAT FORCE TESTER

PROUDLY MADE IN THE USA

PROFESSIONAL-GRADE ENGINE TOOLS

Headquartered in the USA, with a full ISO 9001:2015 registered manufacturing facility, ***we are the company chosen by teams and champions in all forms of motorsports***, worldwide, as their preferred scale, engine tools and chassis set-up partner.

intercompracing.com
+1 763-476-2531 Worldwide

Intercomp®
advanced weighing technology . . . by any measure

MEMBER CHECK-IN

HOOSIER RACING TIRE

This iconic brand that dates back to the 1950s plans to expand its footprint in motorsports, both domestically and abroad.

By Jim Donnelly

The official company logo is still the immortal stylized "H," printed in purple, the color borrowed from founder Bob Newton's race car when he established Hoosier Racing Tire in 1957. While the neo-gothic purple H remains intact, Hoosier has otherwise retooled its corporate branding for easier recognition and has recently rejoined PRI as a Founding Member.

The Hoosier brand is one of the most iconic in North American motorsports. For countless race fans, it evokes an image of a non-wing sprint car firing a barrage of clods at the wall of some loose-dirt Indiana bullring. Even though German tire giant Continental AG took ownership of Hoosier Racing Tire in 2016, much of the Hoosier production takes place at an expanded manufacturing facility in Plymouth, Indiana, where tires for oval competition, both on dirt and asphalt, are the firm's enduring core products.

But that base is steadily broadening. With global reach in the tire market amassed during its 150-year history, Continental's overarching endeavor is presenting Hoosier purple to the wider world, both for competition and street applications, and not always originating from the tire's namesake home. Issue one, however, remains stabilizing tire supplies, as tracks, teams, and organizers continue dealing with pandemic-related shortages.

"The supply chain, at least to our knowledge, is pretty drained on every level," Hoosier Racing Tire President and CEO Joerg Burfien explained to PRI in January 2022. "It's at our warehouse, at the distributor level, the dealer level, and even the race teams themselves have been hoarding tires. This fact will force us to produce at a higher level just to fill back what was consumed last year.

"On top of that, we're still seeing a very high demand," Burfien said. "Compared to 2019, which was the last normal year for us, we're still experiencing shortages. Everybody believes it will blow over and we will manage—and here, we have managed—but we've also told people to change tire rules, run tires longer. By the time summer is here, we should be able to make all these tires, even though we're seeing demand way above our manufacturing capacity. We will have to cut some series short, and we're actively communicating that."

Hoosier Racing Tire President and CEO Joerg Burfien

Hoosier Racing Tire's iconic purple "H" is based on the shade of purple on company founder Bob Newton's race car in 1957. Hoosier Racing Tire has since been purchased by Continental (in 2016), which provided additional resources and a global reach to the motorsports tire manufacturer.

The first remedy Hoosier Racing Tire has pursued is simply keeping its customers apprised about the state of the competition tire market and how it's likely to evolve. Part of the solution has involved streamlining Hoosier production in Plymouth to concentrate on core, demand-driven tire sizes and compounds. "We changed some tire specifications and eliminated some others to extend tire life," Burfien said. "We've taken out some complexity through fewer tire choices, which should make the supply situation a little more relaxed, but I'm not sure how much further we can take it. Everybody thinks that on February 1, the situation will be back to normal, but it can't be, because all the warehouses are still basically empty. We are shipping, though, and we've introduced a weekend shift now at Plymouth, and we expect we will have a record year of production in 2022, but we fear that it may not be enough."

Burfien stressed that even before the pandemic, demand for Hoosier tires was on an upswing, a reality that exacerbated

Addressing the tire shortage in motorsports, Hoosier Racing Tire President Joerg Burfien reported streamlined tire production in the company's Plymouth, Indiana, manufacturing facility to concentrate on core, demand-driven tire sizes and compounds. He noted that even before the pandemic, demand for Hoosier tires was already on the rise.

the shortages further. "Demand wasn't as far down as we anticipated, about 10–15% below 2019 levels, and we were expecting to be down much more than that. People still have time and money. They build cars, and they want to race. That's a good problem to have from a business standpoint, but not so good from the standpoint of customer satisfaction."

Hoosier was steadily expanding its presence across a growing range of racing disciplines when Continental acquired the firm. Drag race, road course, pro street, and karting rubber occupy Hoosier's product portfolio. In coming months, the breadth of Continental's marketing and technological reach will open new markets for Hoosier that don't necessarily wind their way through Indiana, Burfien predicted.

"We will never forget our heritage and core market; it's by far our biggest segment, and we will continue to maintain and develop that," he said. "We are looking closely at the ATV and UTV market, and with the help of our mother company, we are also looking seriously into the semi-street or dual-purpose tires, UTG 200 or even UTG 80 or 100 tires," referring to the US-mandated Uniform Tire Quality Grade that measures tread wear. "We have just a joint product with Conti, the ExtremeContact Force, a UTG 200 racing tire, that was introduced last summer. It was developed by Hoosier, it's sold by Hoosier, but it's built by Conti in Germany.

"We're looking to make the Hoosier brand available outside the US, because we were pretty much a nobody in Europe," Burfien said. "We have a Hoosier sales team in Europe now. If we want to expand Hoosier into China, Conti already has thousands of people in Beijing and Shanghai. Our tractor pulling tires will be coming out of Malaysia now—they're too big for us to make in Plymouth, so that's something that we could have never looked at without the Conti footprint. We're also looking at recreational vehicle and endurance tires, from Thailand or APAC, although Hoosier-branded race products will be out of Plymouth for the next couple of years, for sure." PRI

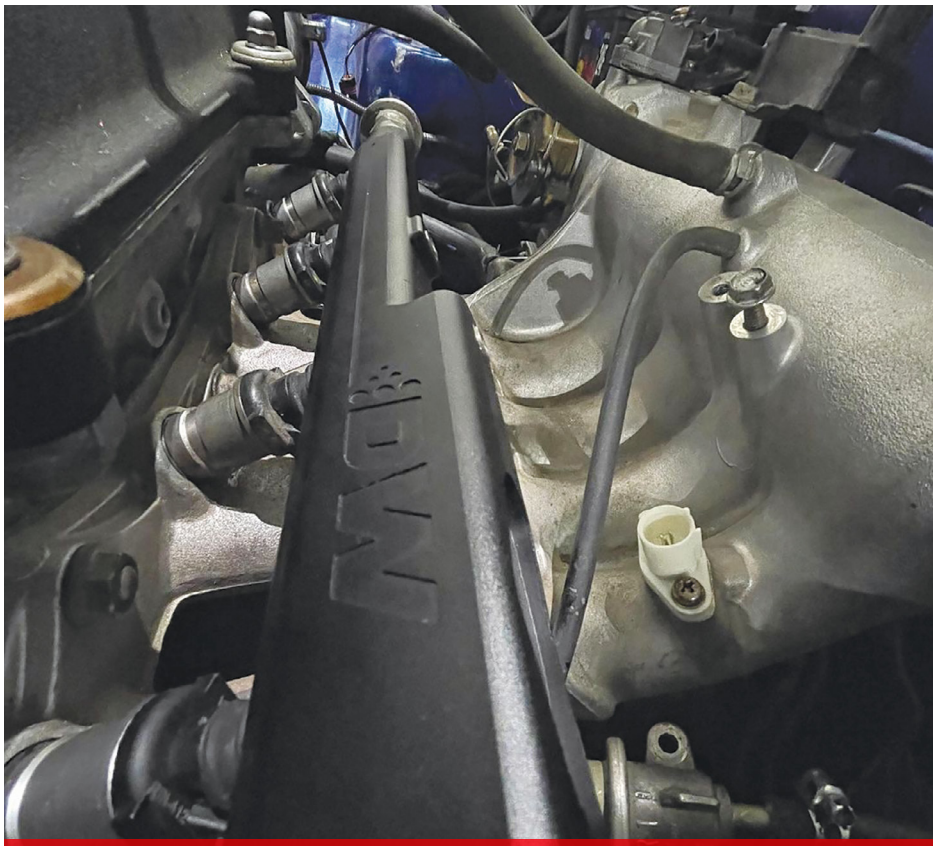
"WE WILL NEVER FORGET OUR HERITAGE AND CORE MARKET; IT'S BY FAR OUR BIGGEST SEGMENT, AND WE WILL CONTINUE TO MAINTAIN AND DEVELOP THAT."

CONVERTING FROM PUMP GAS TO E85

Consider these important factors before moving to E85, including how to care for your fuel system after the fact.

By David Deatsch

There are many options to choose from beyond standard pump gas when fueling a high-performance engine, including 93-octane pump gas, ethanol blends, methanol, and myriad race gas options. Like every other decision made when building a race car, each option has advantages and disadvantages, and the build team decides what will work best given the project budget and objectives. One option that has skyrocketed in popularity over the last decade is E85, a blend of 15% gasoline and 85% ethanol. This article will give a basic overview of the advantages and disadvantages of E85, guidelines for components and tuning, and some best practice suggestions for E85 fuel system maintenance.



When building a proper E85 fuel system, it's important to select an injector size that meets the flow requirements while maintaining a 90% or lower duty cycle.

WHY CHOOSE E85?

The performance advantage of E85 versus pump gas lies in its octane rating and its cooling effect on the intake charge. True E85 has an octane rating of 105. The RON component of the R+M/2 octane rating is particularly high, meaning E85 is resistant to knock, which allows increased timing advance and boost pressure. In addition, the ethanol component of E85 extracts heat from the intake charge as it transitions from a liquid to a vapor phase. This cooling effect creates a dense, oxygen-rich intake charge that increases combustion energy. There are also two significant practical advantages with E85 from the pump: affordability and convenience. Pump E85 is easy to find at many retail filling stations throughout the Midwest, and with a bit of searching can be found throughout most of the US. If there is a need for a search, it is worth the effort because pump E85 is a performance bargain. At a current national average of $3.09 per gallon at the pump, E85 costs less than even the cheapest low octane gasoline.

DOES E85 HAVE ANY DISADVANTAGES?

One of the most significant issues when using pump E85 is that the concentration of ethanol can vary significantly. The term "E85" can be a misnomer because the standards organization ASTM International allows fuels with ethanol concentrations as low as 51% to carry the E85 label. Inconsistent fuel properties can have catastrophic effects on a tuned performance engine. Another point to consider is the hygroscopic nature of ethanol. Ethanol readily pulls moisture from the air, so E85 may be "watered down" if not transported and stored correctly by

While most OE and aftermarket pressure regulators are compatible with E85, beware of those with brass sealing valves that can be susceptible to corrosion. The optimal choice is a regulator with stainless internals and a fiber-reinforced Viton diaphragm.

the fuel retailer. Water can also accumulate in a vehicle's fuel tank if left at a low fuel level for an extended period, especially in a humid environment. It's also important to remember that ethanol has high corrosivity and low lubricity, which together can lead to premature wear of fuel system and engine components. Lastly, the energy density of E85 is significantly less than standard gasoline. This means fuel economy will be reduced, and injectors and the fuel pump might need an upgrade (more on this below).

PUMP E85 VS. E85 RACE FUEL

The rise in popularity of E85 has taken place at the pump and through traditional race fuel manufacturers like VP Racing, Sunoco, Ignite, and others. As mentioned, two disadvantages of pump E85 are the inconsistency in ethanol concentration and the risk of water in the fuel. However, both are essentially non-issues for racers going the E85 race fuel route. E85 race fuels have an 85% ethanol concentration every time. However, this quality and consistency come at a high price. E85 race fuels typically cost $8–$12 per gallon and can be challenging to find, transport, and store. This makes the allure of easily accessible pump E85 at the cost of $3 per gallon hard to pass up.

BUILDING AN E85 COMPATIBLE FUEL SYSTEM

Building a proper E85 fuel system will take advantage of all the performance benefits of pump E85 while mitigating the risks. Flow capacity, material compatibility, tuning, and maintenance are the biggest considerations.

FUEL SYSTEM CAPACITY

The lower energy density of E85 requires 30–40% increased flow from the fuel system to maintain proper lambda. Usually, fuel injectors and fuel pumps—and occasionally fuel lines—need to be upgraded to increase flow. Selecting an injector size that meets the flow requirements while maintaining a 90% or lower duty cycle is recommended. It is also recommended to have 10–20% headroom on the fuel pump. Technical support from a quality fuel systems manufacturer or retailer, or a consult with an engine tuner, should help in choosing the right components.

GENERAL MATERIAL COMPATIBILITY

The high corrosivity, low lubricity, and hygroscopic nature of E85 can wreak havoc on an ill-equipped fuel system since what works for gasoline does not necessarily work for E85. Materials to avoid are PVC, nitrile, natural rubber, urethane, non-anodized aluminum, zinc, brass, and any untreated ferrous metals. In general, OE fuel systems in vehicles manufactured before 2001 were not engineered for compatibility with any concentration of ethanol in the fuel. Therefore, the entire fuel system should be evaluated and upgraded.

FUEL INJECTORS

Most modern fuel injectors, such as the Bosch EV14, have stainless steel internals and withstand harsh corrosive environments. When it comes to O-rings, Viton O-rings are the best choice for use with E85 since the compatibility of nitrile is debatable. Lastly, the addition of a serviceable inlet filter is recommended for all injectors in a fuel system using E85. This filter will serve as the last line of defense against clogging with fuel system residue.

FUEL PUMPS

Brushless fuel pumps are the most durable choice for E85 use, but note that quality brushed pumps with carbon commutators can be very durable. It is essential to avoid pumps with copper commutators. For in-tank pumps, composite turbine impellers are much more durable than positive displacement gerotors such as those found in Walbro 255-style pumps.

FUEL FILTERS

Most OE fuel filters are paper or cellulose and are acceptable for use with low ethanol concentrations. However, as the ethanol concentration increases, these filter materials become susceptible to breaking down. In E85, the breaking down of paper and cellulose filters can cause flow restrictions, starving an engine of the fuel it needs. Stainless steel mesh filters are the tried-and-true safe bet. No variation in filter pore size is required to accommodate E85. There is a common misconception that a 40-micron filter should be used instead of a 10-micron. This idea is to prevent filter

THE ADDITION OF A SERVICEABLE INLET FILTER IS RECOMMENDED FOR ALL INJECTORS IN A FUEL SYSTEM USING E85. THIS FILTER WILL SERVE AS THE LAST LINE OF DEFENSE AGAINST CLOGGING WITH FUEL SYSTEM RESIDUE.

clogging because E85 can dissolve solids that gasoline cannot. However, this is a bad idea. All port fuel injectors require 10-micron filtration for proper protection. If concerned with clogging filters, the correct course of action is to increase the filter size (capacity), not filter pore size.

PRESSURE REGULATORS

Most OE and aftermarket pressure regulators are compatible with E85. However, some aftermarket regulators have brass sealing valves that are susceptible to corrosion. This corrosion can result in poor sealing and loss of pressure at key-off. The best option is a regulator with stainless internals and a fiber-reinforced Viton diaphragm.

FUEL LINES

OE fuel lines are often left intact when upgrading fuel systems for increased flow of gasoline. However, special consideration should be taken when converting to E85. The rule of thumb is to replace all OE rubber and leave OE hard lines intact. This is primarily a safe bet on vehicles manufactured after 2001. It is recommended to use CPE synthetic rubber line for concentrations up to 85% and a PTFE (Teflon) line for concentrations above 85%. Some customers prefer PTFE regardless of the ethanol concentration. There is no harm in that, but PTFE is more expensive and challenging to assemble.

TUNING FOR E85

After building an E85 fuel system, it's time for tuning. With E85, a tuner will be able to add timing advance and increase boost pressure, which will significantly increase an engine's power. The tuner will also need to adjust for the 30–40% increase in fuel volume needed by E85. This is where the bigger injectors and pump suggested earlier will pay off. There is nothing more frustrating than running out of fuel on the dyno, falling short of the anticipated power level. Cold starts on E85, especially in the winter months, can be problematic, so be sure the tuner adjusts cold start tables.

Developing a flex-fuel tune makes life with ethanol much easier. A flex-fuel tune is only possible if an ethanol content sensor is incorporated into the fuel system to communicate with the ECU. Once set up and tuned, the engine will be able to adjust to varying concentrations of ethanol in the fuel, just like an OE flex-fuel vehicle. Without flex fuel, a tuner can only calibrate for a specific concentration of ethanol, requiring the racer to be very particular about the fuel used. This can be critical when using pump E85, as the exact ethanol concentration can vary significantly according to brand, class, season, and region. A flex-fuel tune will also allow the use of regular unleaded pump gasoline when an E85 pump cannot be found, or if the vehicle is going to be stored for an extended period. Also, when putting the car into storage in the offseason, it isn't necessary to flush or pickle the fuel system; just run a tank of regular gasoline before storage.

While it is recommended to use CPE synthetic rubber line for ethanol concentrations up to 85% and a PTFE (Teflon) line for concentrations above 85%, some customers prefer PTFE regardless of the ethanol concentration.

MAINTAINING E85 FUEL SYSTEMS

Success with E85 fuel systems lies with the proper component choices and following established best practices for storage and maintenance. Vehicles stored with E85 in the fuel system can develop corroded pump commutators, stuck injectors, and clogged fuel filters. Best practices are to flush the fuel system with gasoline and fuel stabilizer before storage. This will help ensure the fuel system will perform adequately before the next race. If the vehicle has been stored for more than a year with E85 in the fuel system, it is suggested to inspect the fuel tank, change the fuel filter, service the injectors, and test the fuel pump. Although time-consuming and somewhat costly, performing these checks are better than risking fuel starvation and damaging a high-dollar performance engine.

It is also best practice to increase the frequency of routine fuel system maintenance when using E85. Ethanol will lift contaminants from fuel system components that gasoline would have left untouched. This "cleaning" of the fuel system by E85 can load up fuel filters quickly, especially upon initial conversion from gasoline to E85. Check the filter frequently to avoid restricting flow and possibly contaminating the fuel injectors. Lastly, many E85 users will pull their injectors and send them out for flow testing during the offseason. This may be overkill for a regularly driven vehicle, but for a race car or occasional driver, which is stored with E85, it can be cheap insurance given the engine damage that could occur if injectors are clogged. PRI

David Deatsch is the founder and president of DeatschWerks, a manufacturer of high-performance injectors, pumps, and other fuel systems components based in Oklahoma City, Oklahoma. Deatsch has maintained the company's technical lead since its inception in 2004 and has vast experience in E85-specific product development, component durability testing, and fuel system conversions. Current project vehicles for DW include a flex-fuel 750whp CTS-V, an E85 450whp Subaru 2.5RS, and an E85 drift project SR20 s13.

ROBINS SINCE 1983

Exactly

Signature brand

Designing & Manufacturing Patented Technologies

US 7.726.819B | US 2018/0074467A1

WE THE ROBINS

SG 5 | SG 7 Smart | SG 8 Smart | SG8 XL Smart

SEAT & GUIDE MACHINES

Simple - Smart !

Introducing New and most advanced R&D by Robins - machine valve seats the Rubi-Smart way

ROBINS 'Smart Control' Simple-Manual-Auto-Reliable-Tuff

	SG 5	SG7 -SMART	SG8 -Smart	SG8 XL-Smart
• Cylinder Head Size (in Roll Fixture)	23 x 10 x 5" (585 x 254 x 127)	32 x 10 x 5" (815 x 254 x 127)	40 x 12 x 6" (1015 x 254 x 150)	47 x 15 x 10" (1200 x 380 x 254)
• Spindle Tilt	±10 Degrees	±15 Degrees		
• Spindle Stroke	5.750" (146 mm)	6.750" (172 mm)	8.500" (216 mm)	
• Spindle Speed	80 - 500 RPM	35 - 500 RPM		
• Roundness	Achieve < 0.0002" (5 microns) after plateau honing valve seats			
• Concentricity	0.0002" (5 microns) ... Honed Guides			
• Surface Finish	< 0.4 Ra µm			
• Micro Fine Feed	No	Yes		
• Spring Free Adaptors	Yes			
• Constant Varying Speed cVs	Optional		Yes	

Extreme-Precision Valve Grinding Machines...

Robins Other Revolutionary Products "one-touch auto cycle"

Simple - Smart !

ROBINS SINCE 1983 Plug 'N'Play ....brief history since 1983

* Robin Chera & his company have been manufacturing premium machinery, related tooling & serving USA and World's Engine Re-building Industry since its inception in 1983 thru top renowned brands and machinery manufacturers.
- Served "Peterson / Kansas Instruments" from 1983-2003 (Portable Boring Bars PK447, 777-S, 944-S and Honing heads)
- Serving "Rottler Manufacturing" since 2002 (Seat Guide and Valve Refacers) (Invented unique hole to hole modular fully automated seat & guide machining systems and many new design concepts and patents.)
- Serving Goodson, since 1998 (Seat Guide Tooling).
- Serving Sunnen U.S.A. since 2001(Seat Guide Tooling)
- Served DCM-Tech, RMC, Winona Van Norman, Guspro, K-Line, Serve-Equip, Kwik-Way (Seat Guide tooling / machines).
- Served AMC-Schou Denmark, Berco, AZ-spa, Comec, Serdi SRL, Peg-Rossi Cramer (Seat Guide tooling / machines).

WE THE ROBINS SINCE 1983 Exactly

Signature brand

Designing & Manufacturing Patented Technologies

US 7.726.819B | US 2018/0074467A1

vncnc7@gmail.com

www.RobinsMachines.com

Simple - Smart !

Enquiries from Canada and outside USA --contact Factory directly. "Robins" ware house distributors within U.S.A. please contact:

EASTERN U.S.A

MEC

MEC CNC

Anthony Usher (949) 800-7176

anthony@meccnc.com | www.meccnc.com

STATES COVERED

AL, CT, DE, FL, GA, IL, IN, IA, KY, ME, MD, MA, MI, MN, MO, MS, NE, NH, NJ, NY, NC, ND, SD, SC, OH, PA, RI, TN, VT, WV, VA, WI

WESTERN U.S.A

Hopper

HOPPER EQUIPMENT & SUPPLY INC.

Jeff Murchison (909) 226-9922

Jeff@HopperShop.com | www.HopperShop.com

STATES COVERED

AK, AZ, AR, CA, CO, HI, ID, KS, LA, MT, NM, NV, OK, OR, TX, UT, WA, WY

March,2022

ADVOCACY CORNER

Tracking legal, legislative, and regulatory developments impacting the racing and performance industry.

Edited by Laura Pitts

PRI's Washington, DC-based advocacy team works continuously to protect race tracks, sanctioning bodies, and motorsports businesses around the nation. This month, we are tracking several initiatives, including ways you can support the federal RPM Act, as well as a California short track, plus an update on Japanese tariffs, lawmakers combating counterfeit goods, and a bill to support manufacturers in the Golden State.

SIX (EASY) WAYS YOU CAN SUPPORT THE RPM ACT

PRI continues to work closely with key lawmakers in Congress, PRI Members, and the racing community at large to enact the Recognizing the Protection of Motorsports Act (RPM Act), H.R. 3281 and S. 2736. The RPM Act clarifies that it is legal to make emissions-related changes to convert a street vehicle into a dedicated race car under the Clean Air Act (CAA). The bill would also confirm that producing, marketing, and installing racing equipment on track vehicles does not violate the CAA.

The RPM Act enjoys strong bipartisan support in the 2021–2022 session of Congress, thanks to unprecedented grassroots advocacy by the motorsports parts industry and targeted outreach to lawmakers through Congressional site visits and meetings. However, it is imperative that we continue to keep pressure on lawmakers to pass the bill before the Congressional session ends on January 3, 2023.

"Congress is responsive when there is a sustained drumbeat of support for an issue. In order to pass the RPM Act into law, it is important that PRI Members and the racing community overwhelm lawmakers with calls and letters that reinforce that they must pass the RPM Act," said Eric Snyder, PRI's Director of Congressional Affairs.

Here are the ways you can support the RPM Act:

1) Call or send a letter to your lawmakers at: saveourracecars.com. A letter has already been drafted. It takes less than a minute to send it to all three of your federal lawmakers.

2) Sign a letter to your lawmakers on company letterhead. Email Snyder at erics@sema.org for a template and more information.

3) Post about the RPM Act on your company's social media accounts or pass out a flyer at your business events using the toolkit of digital assets at sites.sema.org/rpmtools.

4) Learn more about PRI's Political Action Committee (Performance Racing PAC) at performanceracing.com/pac. Performance Racing PAC allows PRI Members to support the lawmakers that stand up for racing in Washington.

5) Share a video (youtu.be/-V5tqQrWvL4) with your friends to educate them about how a bill, like the RPM Act, actually becomes law.

6) If you have a connection to a member of Congress or their staff, contact erics@sema.org to see how we can leverage this relationship to benefit the industry.

For more information, contact Snyder at erics@sema.org.

U.S., JAPAN ANNOUNCE UPDATE ON STEEL AND ALUMINUM TARIFFS

As an update to January's Advocacy Corner column, U.S. and Japanese officials have agreed to a tariff-rate quota deal to end the 25% tariff on steel imports from Japan. These tariffs have been imposed since 2018 under Section 232 of the Trade Expansion Act of 1962 on national security grounds.

Beginning April 1, the 25% tariffs will be suspended on up to 1.25 million metric tons per year of steel imports from Japan.

In 2019, the U.S. had imported 1.1 million metric tons of steel from Japan. This was significantly less than the 1.7 million tons imported in 2017 before the tariffs were imposed.

"This is likely to make it more attractive to import steel from Japan. But it's important to note the tariffs are only suspended on up to 1.25 million metric tons per year of imported steel," Snyder said.

In addition, the new agreement does not cover aluminum imports, which are still subject to 10% tariffs.

Separately, the U.S. and the European Union have agreed to a quota system for ending the steel and aluminum tariffs in 2022. As of early March, negotiations were underway to end the metal tariff disputes between the U.S. and the United Kingdom.

HOUSE PASSES ACT DESIGNED TO COMBAT COUNTERFEITING

The PRI and SEMA-supported "INFORM Consumers Act," H.R. 5502, has passed the U.S. House of Representatives as part of the "America Creating Opportunities for Manufacturing, Pre-Eminence in Technology, and Economic Strength Act of 2022" (America COMPETES Act), H.R. 4521. The INFORM Consumers Act is designed to protect Americans from criminals who sell counterfeit and stolen goods through online marketplaces and would require high-volume third-party sellers to disclose the full name of the seller or company, its business address and its contact information, among other requirements.

The U.S. Senate did not include the INFORM Consumers language in its version of the COMPETES Act. As the House and Senate seek to reconcile the differences in the two bills, PRI and SEMA are advocating for passage of the INFORM Consumers Act. These efforts are in coordination with the Buy Safe America Coalition, a group of retailers, consumer groups, manufacturers, intellectual property advocates, and law enforcement officials who support efforts at all levels of government to protect consumers and communities from the sale of counterfeit and stolen goods.

"We are alarmed by the danger posed to unsuspecting consumers when they purchase what they believe to be legitimate auto parts and equipment," said Daniel Ingber, SEMA's Vice President of Government & Legal Affairs. "The reality is that major sources of counterfeit products are Internet consumer purchases that arrive in the United States via postal and overnight carriers. We are confident that, by passing commonsense legislation like the INFORM Consumers Act, we can stop these bad actors from selling dangerous counterfeit automotive parts and equipment to unsuspecting consumers."

In recent years there's been a rise in the sale of counterfeit automotive parts on online marketplaces, posing a threat to the safety of U.S. consumers. The coronavirus pandemic has exacerbated the issue, as traffic toward e-commerce has grown and current regulatory standards fail to hold third-party marketplaces accountable.

A recent study published by the Buy Safe America Coalition found that illegitimate imports entering the U.S. cost domestic retailers nearly $54.1 billion in sales annually. Additionally, over 39,000 jobs in wholesaling and 280,000 retail jobs—paying over $13.6 billion in wages and benefits to workers—were found to be lost due to counterfeit production.

The U.S. House-passed America COMPETES Act is the counterpart to the U.S. Senate-passed "United States Innovation and Competition Act of 2021" (USICA), S. 1260, which did not include the INFORM Consumers Act. The House and Senate are expected to conference the two bills and reconcile their differences. PRI will advocate for inclusion of the INFORM Consumers Act in the final consensus bill produced by the two houses.

For additional information, contact Eric Snyder at erics@sema.org.

CA BILL ERASES SALES TAX ON MOST EQUIPMENT PURCHASES

California Assembly Member Tim Grayson (D-Concord) has introduced PRI- and SEMA-supported legislation (AB 1951), which would create the California Manufacturing Attraction and Development Exemption (CA MADE). The CA MADE exemption would eliminate the sales tax on most manufacturing equipment purchases.

If it's enacted, California would join 38 other states with full exemptions on manufacturing equipment from sales and use tax. The CA MADE exemption would change the current, narrowly applied exemption, and focus on improving cost competitiveness to spur investment in California. Accounting for both local and state taxes, California's ranks among the highest tax rates in the country.

"AB 1951 WILL ALLOW BUSINESSES TO INVEST IN THE LATEST MANUFACTURING TECHNOLOGY, INNOVATE FASTER, AND EXPAND THEIR MARKET SHARE."

"AB 1951 will allow businesses to invest in the latest manufacturing technology, innovate faster, and expand their market share," said Christian Robinson, Director, State Government Affairs & SEMA PAC.

PRI Members and the racing industry are encouraged to register their support for the bill by visiting https://p2a.co/Cgf1U1H. For more information, contact Robinson at christianr@sema.org.

YOUR SUPPORT CAN HELP SAVE CALISTOGA (CA) SPEEDWAY

Officials have announced the City of Calistoga is preparing to purchase the Napa County Fairgrounds in Napa County, California, a move that would re-open the famed half-mile dirt oval Calistoga Speedway, best known for the annual "Louie Vermeil Classic."

The City Council has unanimously agreed to develop a proposal to purchase the entire fairground property, including the dirt race track plus a golf course, RV lot, and several buildings.

Calistoga Speedway, operated by the Hunt Family and HMC Promotions, first opened in 1938. Its "Louie Vermeil Classic" honors Calistoga resident and longtime racing enthusiast Louie Vermeil. The track has not hosted the event since 2018.

"Calistoga Speedway is one of the only half-mile dirt tracks in California, and it's been silent for years. Instead of competing at their local track, racers are often forced to visit other cities and states, and that has a negative impact on the local economy," Robinson said.

For more information about how you can support this initiative, contact Robinson at christianr@sema.org.

AZ INTRODUCES PROPOSAL URGING CONGRESS TO PASS RPM ACT

Arizona's legislature has introduced a PRI- and SEMA-supported memorial (H.C.M. 2001) urging the U.S. Congress to pass the Recognizing the Protection of Motorsports (RPM) Act (H.R. 3281 and S. 2736). A memorial is a document presented to a legislative body and contains a petition or a representation of facts.

In short, Arizona lawmakers are urging Congress to pass the RPM Act, which guarantees the right to modify street cars, trucks, and motorcycles into dedicated race vehicles and safeguards the industry's right to offer parts that enable racers to compete.

Arizona race enthusiasts are encouraged to voice their support for the memorial by contacting lawmakers at https://p2a.co/hc8EZhP. PRI

INDUSTRY NEWS

NHRA CHANGES RULES TO ALLOW FASTER STREET-LEGAL VEHICLES

The National Hot Rod Association (NHRA) has announced changes to its Street Legal program designed to expand the range of vehicles for participants while acknowledging their enhanced on-track performance.

Modifications to the Street Legal program will allow racers with 2014 and newer OEM model-year production cars to run as quick as 9.00-seconds and/or 150-mph (5.65-eighth mile). In addition, racers with 2008–2013 OEM model-year cars will still be permitted to run as quickly as 10.00-seconds and/or 135-mph (6.40-eighth mile).

Unaltered OEM-installed antilock brakes, OEM airbag functions, OEM stock frame/unibody construction, including OEM floors and firewall, as well as all other OEM safety-related systems must be functioning as per manufacturer's specifications. Tires used may be other than OEM, but they must be DOT-approved. Convertibles quicker than 13.49 (8.25) and T-tops quicker than 11.49 (7.35) must meet Summit Racing Series roll-bar and roll-cage requirements. An NHRA Level 6 license is required for drivers running quicker than 10.00 (6.39) or faster than 135 mph. A level 7 competition license is also available to racers whose elapse times are above 10.00/6.40.

NHRA also will recognize racers at an NHRA Member Track for their on-track performance with unique Street Legal decals.

"We continue to see manufacturers make faster vehicles available right off the showroom floor while increasing features that couldn't be overlooked anymore," said Matt DeYoung, track manager at Tucson (AZ) Dragway. "NHRA along with the help and input of NHRA Member Tracks across the country have worked to improve and grow the experience and sustainability of this program for our Street Legal customers. We believe our racers will embrace these changes, and it will grow our grudge racing and Street Legal Program while helping prevent faster OEM cars [from] taking to the streets."

The Street Legal category is reserved for foreign and domestic OEM production-type automobiles and trucks. While the use of aftermarket parts is accepted, all vehicles must be street driven, and drivers must carry state-issued proof of registration and valid insurance information. All vehicles must also display a valid license plate(s).

Vehicles participating in the Street Legal events must be able to pass all state highway safety requirements for the state in which the vehicle is registered, and retain all OEM safety features.

JEGS ACQUIRED BY PRIVATE EQUITY FIRM

Greenbriar Equity Group, a middle-market private equity firm, has acquired a majority position in JEGS Automotive, the national retailer and distributor of high-performance aftermarket auto parts and accessories based in Delaware, Ohio.

JEGS, founded in 1960 by the Coughlin family, offers more than two million product SKUs from over 800 vendors through its website and fulfillment center. The Coughlin family will retain minority ownership.

BORGWARNER TO ACQUIRE SANTROLL AUTOMOTIVE COMPONENTS

BorgWarner in Auburn Hills, Michigan, will acquire Santroll Automotive Components, a carve-out of Santroll Electric Auto and Santroll Automotive Components' eMotor business in Tianjin, China.

The acquisition is expected to strengthen BorgWarner's vertical integration, scale, and portfolio breadth in light vehicle e-motors while increasing market speed, according to a company statement.

TENNECO TO BE ACQUIRED BY APOLLO FUNDS

Apollo Funds, a private asset management company based in New York, New York, has entered an agreement to acquire Lake Forest, Illinois-based Tenneco.

The transaction is valued at approximately $7.1 billion. When completed, Tenneco will become private and shares will no longer trade on the New York Stock Exchange.

Tenneco is the parent company of DRiV, which includes more than 30 aftermarket brands covering shocks and struts, steering and suspension, braking, sealing, engine, emissions, and maintenance.

MAVERICK MOTORSPORTS PURCHASES STAACK'S MOTORSPORTS

Maverick Motorsports, the provider of powersports and side-by-side equipment and accessories in Missoula, Montana, has purchased Staack's Motorsports in Butte, Montana. Maverick Motorsports is co-owned by Brent Gyuricza and Guy Sharp.

Staack's, which also offers powersports and side-by-side equipment and accessories, has been owned and operated by Ed Staack and his son Brian Staack for over 50 years.

CARY REDMAN JOINS RACE WINNING BRANDS

Race Winning Brands (RWB), the multifaceted manufacturer of high-performance engine components, has appointed Cary Redman as vice president of sales–automotive. He is based out of RWB's Mentor, Ohio, headquarters.

Redman has over 25 years of experience in the performance manufacturing and retail sectors and has worked in sales leadership roles with Holley Performance Products, Mr. Gasket Co., and Edelbrock.

GARMONG DEVELOPMENT ANNOUNCES BROWNSBURG RACEWAY PROJECT

Garmong Development has launched development of "The Commerce Park at Brownsburg Raceway," which is a new 47-acre project to serve motorsports businesses and manufacturers focused on

research and development.

Located adjacent to the NHRA-owned Lucas Oil Indianapolis Raceway Park, the project is led by Deb Cook, town manager of the Town of Brownsburg (IN). The commerce park is expected to create more than $100 million in new economic development and capital investments.

ALAN GOW REAPPOINTED PRESIDENT OF THE FIA TOURING CAR COMMISSION


Alan Gow

International motorsports governing body the Fédération Internationale de l'Automobile (FIA), based in Paris, France, recently announced that Alan Gow has been reappointed as president of the FIA Touring Car Commission and the World Endurance Commission.

With his role extended through 2023, Gow enters his 13th year as president of the FIA Touring Car Commission, the body that oversees FIA-sanctioned touring car competitions. He also retains his position as a member of the World Endurance Commission, which he has held since 2018; that role will also extend through 2023.

AP RACING ANNOUNCES NEW CHARLOTTE OFFICE

AP Racing—the manufacturer of race brakes and clutches based in Coventry, UK—will open an office in Charlotte, North Carolina. The new AP Racing North America Corporation (APRNA) will support the company's US- and Canada-based customers. The office will work alongside the company's US distributor Essex Parts Services, which will remain the exclusive North American distributor.

INDYCAR RACE DIRECTOR NOVAK NAMED AS FIA JUDGE

Kyle Novak, race director for the NTT IndyCar Series and Indy Lights presented by Cooper Tires, was elected by the FIA General Assembly as one of 36 judges to serve on the FIA Courts. Novak, an attorney, is the only IndyCar representative among the FIA judges.

EXTREME E REVEALS FIRST HYDROGEN OFF-ROAD RACING CHAMPIONSHIP

Extreme E, the all-electric off-road series, will launch an off-road hydrogen championship in 2024. The first-of-its-kind series—Extreme H—will race on the exact dates and locations as the Extreme E series.

The Extreme H car will retain the same powertrain and chassis used in Extreme E. The key differentiating factor in Extreme H will be that a hydrogen fuel cell will replace the battery as the principal energy source.

JOE KOSISKI NAMED 46TH RPM PROMOTER OF THE YEAR

Racing Promotion Monthly (RPM) has announced Joe Kosiski of I-80 Speedway in Greenwood, Nebraska, as the 46th annual Auto Racing Promoter of the Year (ARPY). He was honored during the 49th annual RPM@ Daytona Workshops in Daytona, Florida.

Kosiski, who purchased the NASCAR Home Track dirt oval with his brother Steve in 2004, announced that 2022 will be the last year the pair will promote the facility.

SPEEDWAY MOTORSPORTS PROMOTES LEADERSHIP AT NSS, CMS


Matt Greci

Concord, North Carolina-based Speedway Motorsports has announced veteran executive Matt Greci as vice president of events and operations at Nashville Superspeedway in Wilson County, Tennessee. Additionally, Charlotte Motor Speedway's Doug Cremer and Garrett Carter have been named vice president of events and guest services and vice president of operations, respectively, at "America's Home for Racing" in Concord, North Carolina.

TRANS AM SERIES ANNOUNCES NEW LEADERSHIP FOR DRIVER ORIENTATION PROGRAM

The Trans Am Series presented by Pirelli has announced Ernie Becker will lead its Driver Orientation Program. Becker replaces Terry Earwood, who announced his retirement and has managed the program since its inception.

LIVE FAST MOTORSPORTS NAMES NEW CEO

Live Fast Motorsports recently announced that former general manager Jessica McLeod has been appointed as the company's new CEO. In her new role, McLeod will be working with the company's team owners, Matt Tifft and her husband B.J. McLeod.

Live Fast Motorsports is a single-car Ford Mustang team based in Mooresville, North Carolina, that competes in the No. 78 car piloted by B.J. McLeod in the NASCAR Cup Series.

MARK CARTER JOINS MAVTV MOTORSPORTS NETWORK

MAVTV Motorsports Network, the Corona, California-based TV network owned by Lucas Oil Products, has appointed Mark Carter as director of sales and marketing. In this role, Carter will be responsible for MAVTV's brand strategy and advancing its platform to larger and more engaged audiences, the company said.

NEW PROMOTERS FOR TERRE HAUTE ACTION TRACK

Officials with the Terre Haute Action Track have announced that Scott Ronk and Bernie Stuebgen will serve as co-promoters of the half-mile dirt track in Terre Haute, Indiana. Ronk owns Chalk Stix and Schroeder Torsion Bars, and Stuebgen owns Indy Race Parts.

For all the latest motorsports industry news, visit primag.com/industrynews.

RACE SHOP

E3

e3lithium.com

E3 recently introduced a new line of lithium phosphate motorsports batteries featuring the SuperLite 1200 and SuperLite 1600. Performance benefits include 80% lighter weight, three times longer life, and faster charging than traditional batteries. They also have an IP 66 Environmental Rating and are pressure washer friendly. These batteries also can be mounted in any position.

Contact: 904-567-5994

HOLLEY

holley.com

The Holley EFI CAN Input/Output Module can be added to Holley EFI HP, Dominator, Terminator X, and Terminator X Max EFI installation. This CAN module will add eight inputs and eight outputs to the system, which can be used to control additional accessories, or provide critical sensor inputs.

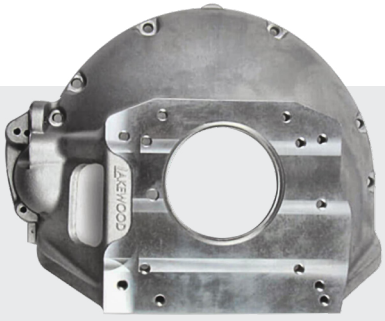
Contact: 866-464-6553

K1 RACEGEAR

k1racegear.com

The K1 Challenger SFI 3.3/5 Nomex shoe is designed to meet the rigorous demands of the motorsports industry. It's constructed of high-end suede for durability and features soft knit Nomex inner lining for comfort and fire protection, an internal comfort shoelace system, pressure sensitive molded soles for shock absorption and maximum grip, and laser cut ventilation holes.

Contact: 760-268-0710



LAKEWOOD INDUSTRIES

holley.com/brands/lakewood

Lakewood cast aluminum bellhousings connect big block Mopar engines to Mopar three-speed, Mopar four-speed, or Ford style TKX/TKO transmissions. They are designed as a compact, lightweight option for transmission swaps or upgrades. And, they can be used with either a 130- or 143-tooth flywheel and a 10.5- or 11-inch clutch.

Contact: 866-464-6553

MAZAK

mazakusa.com

Mazak's SYNCREX models feature seven-, eight-, and nine-axis configurations and are optimized for high production of small parts. These Swiss-type machines use a collet plus single-motor ball spline drive for precision accuracy and reduced material waste. A 10,000-rpm spindle and a variable vibrating system ensure stable and repeatable performance.

Contact: 859-342-1700

NITROUS SUPPLY

nitroussupply.com

Carbon fiber N2O bottle packages from Nitrous Supply are made for serious racers. One features the upgrade "Super Flow" bottle valve, and the other features the unique "PowerValve" developed by Nitrous Supply. The "Super Flow" valve has several enhancements, including a 45-degree valve/outlet flow path for better sealing and an AN-8 male safety port. More flow can be obtained from the "PowerValve," which has a .500-inch orifice and feeds off of a large 5/8-inch siphon tube.

Contact: 714-373-1986

SUMMIT RACING
summitracing.com

These crankshaft pulley spacers are designed to fix overheating, loss of power steering, and charging problems, which can occur when an aftermarket harmonic damper is added to a small block Ford and the crankshaft pulley doesn't line up with the other pulleys. The CNC-machined aluminum spacers come in .350-, .875-, and .950-inch thicknesses to dial in belt alignment with various accessory drive setups.

Contact: 800-230-3030

S&W PERFORMANCE GROUP
swracecars.com

The 3/16-inch-thick aluminum butterfly steering wheels from S&W Performance Group are 7 inches deep by 8 inches wide with four mounting holes. Each wheel is formed and tumbled to provide a uniform surface and smooth edges. The durable 3D printed plastic grips are offered in blue, black, red, orange, or gray.

Contact: 800-523-3353

PERFORMANCE INDUSTRY REPS

PERFORMANCE INDUSTRY REPS

READ PRI'S MISSION STATEMENT AT
PERFORMANCERACING.COM/MISSION
AND SEND US YOUR FEEDBACK.

AD INDEX

SOCIAL STATUS

A closer look at racing and performance industry members' winning strategies on Facebook, Instagram, YouTube, Twitter, and more.

Years ago, Thomas Patsis built 330 mph race cars. Now he uses race car and engine parts and other resources to build trophies, awards, sculptures, and other types of metal art through his business Cold Hard Art.

Along the way, Patsis has amassed hundreds of thousands of followers across his Instagram, Facebook, Twitter, LinkedIn, Pinterest, and YouTube channels. That got us wondering, among other things, how exactly he gets creative on his social media platforms, and what tips he can offer other motorsports businesses.

Facebook and Instagram are his strongest platforms "mostly because my art is clearly a visual thing. But Pinterest is also very useful because it's open to showing individual photos in the search engine. When people do a Cold Hard Art or Thomas Patsis search, it brings up every single individual photo of my art. Every other social platform just shows that I have an account, but it doesn't show all of the photos from your account. Only Pinterest does that," Patsis explained.

"As an artist, it's very important to get all those photos with my art out there, which also leads to every photo having a Cold Hard Art logo front and center if the photo simply gets copied and pasted with no link back to my media accounts," Patsis added.

When it comes to posting creative content that's also still relevant to his business, Patsis has that covered. "I joke that I'm in the arts and entertainment business," he told us. "I sell my art, but I like to entertain as well with my social media. I like to keep that fun balance each week to keep people on their toes."

Some of Patsis' motivation comes from the movies he watches while working. One idea was to recreate movie scenes by inserting Nitro, the Indy Fuel hockey team mascot. Additionally, "I also grab a few ideas from others, like Rob Dyrdek, for example. He always puts his hands out for photos or something goofy in the photo with others, so I snagged that.

"And just like everything you see in a movie, there's a reason for everything you see in the shot; I think of the background or what logos you see," he added.

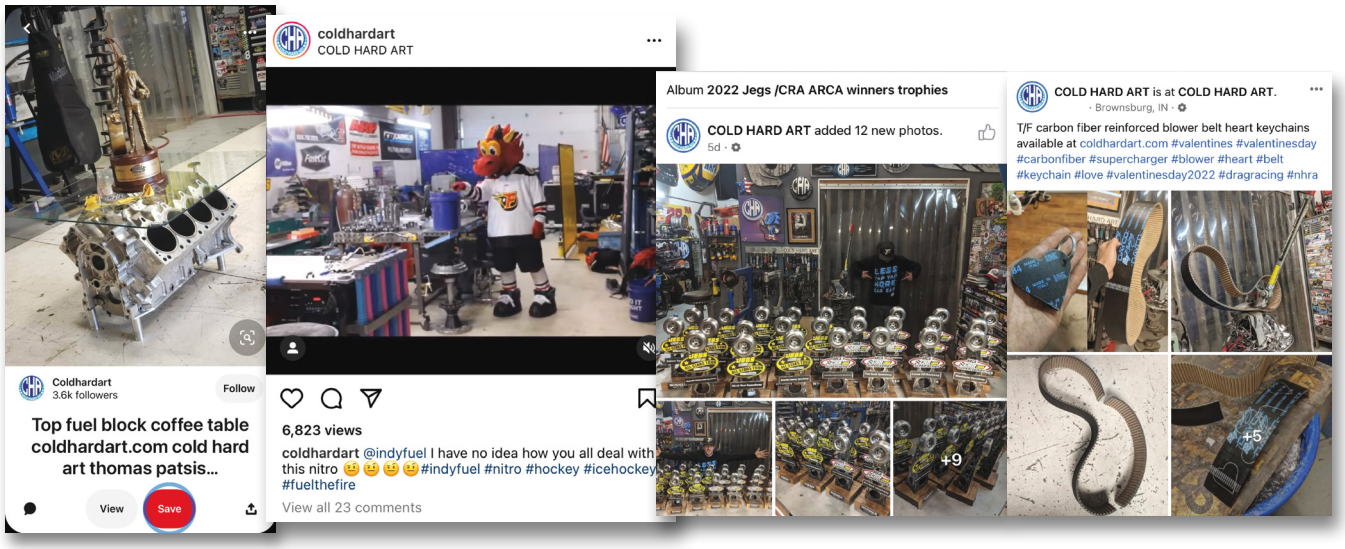
But even the coolest content won't matter much if it doesn't have an audience. So, how did Patsis grow his following? Using social media to promote his art since 2008 has helped, as he joined several platforms in their earlier stages, and has stuck with them. "Plus, I work with some big events in racing, and the drivers and companies work together on tagging and hashtags, which also helps."

Furthermore, "I just have fun making stuff for the right people, or making unique enough art that it gets people to stop and say, 'Look at that piece of art!' and then they share it to their social media," Patsis told us.

"I've learned all the strategies and styles that catch people's eye," he continued. "It's all about patience and time. Nothing happens overnight."

What tips does he offer from his years of social media experience? "Use ultra-clear, crisp photos; post maybe two times a day at strategic times (research this on the Internet because all days are different); and use proper hashtags. Also, because you can post temporary Stories, I like to use those for random fun things to share. But I keep my page focused on what I'm truly trying to get out there—my art.

"Honestly, it's 2022, so if you're not social media savvy by now but want to promote your business online, you have a lot of learning to do," Patsis added. "Not being online with your product…well, simply put, if you have the best product in the world but no one sees or hears about it, how will you sell it?" PRI



TopLine
Automotive Engineering, Inc.
Chicago, USA

TRUSTED QUALITY AND PRECISION SINCE 1973!

For decades, TopLine has been manufacturing and supplying O.E. spec engine parts for import cars. *It's our niche*. Along with Hylift Johnson, manufacturer of the Highest Quality Valve Lifters on the market, these brands have consistantly proven that —
WE ARE COMMITED TO YOUR SUCCESS.

HYLIFT JOHNSON LIFTERS
A Division of Topline Automotive

AMERICAN MADE FOR 70+ YEARS AND GOING STRONG!

DEPENDABLE • RELIABLE • TRUSTED • DEPENDABLE • RELIABLE •

CALL OR VISIT US ONLINE
TO SEE HOW TOPLINE CAN HELP
WITH YOUR NEXT BUILD.

800-441-1400 | TOPLINEAUTO.COM

WIN WITH ROTTLER

H85AX

FAST, ACCURATE AND EASY TO OPERATE

DOLLAR FOR DOLLAR, THE MOST PRODUCTIVE HONE ON THE MARKET

SEE A DEMONSTRATION ON YOUTUBE "ENGINE PERFORMANCE EXPO – CYLINDER HONING AND SURFACE FINISH CONSIDERATIONS"

ENGINE PERFORMANCE EXPO

REGISTER NOW FOR THE MINI-SERIES WITH WEEKLY SEMINARS

BE PART OF THE ACTION!!!

ENGINEPERFORMANCEEXPO.COM

ROTTLER

WWW.ROTTLERMFG.COM