

VOLUME 36, NUMBER 5 MAY 2021

PRI

PERFORMANCE RACING INDUSTRY MAGAZINE

SPECIAL REPORT

We track where the smart money is going in purses and payouts

EXCLUSIVE Q&A

How Senator Mark Maynard became a champion for motorsports

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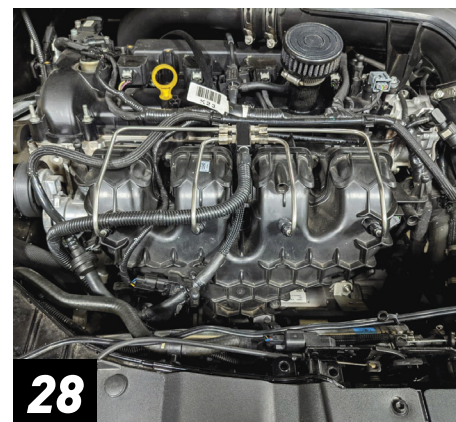
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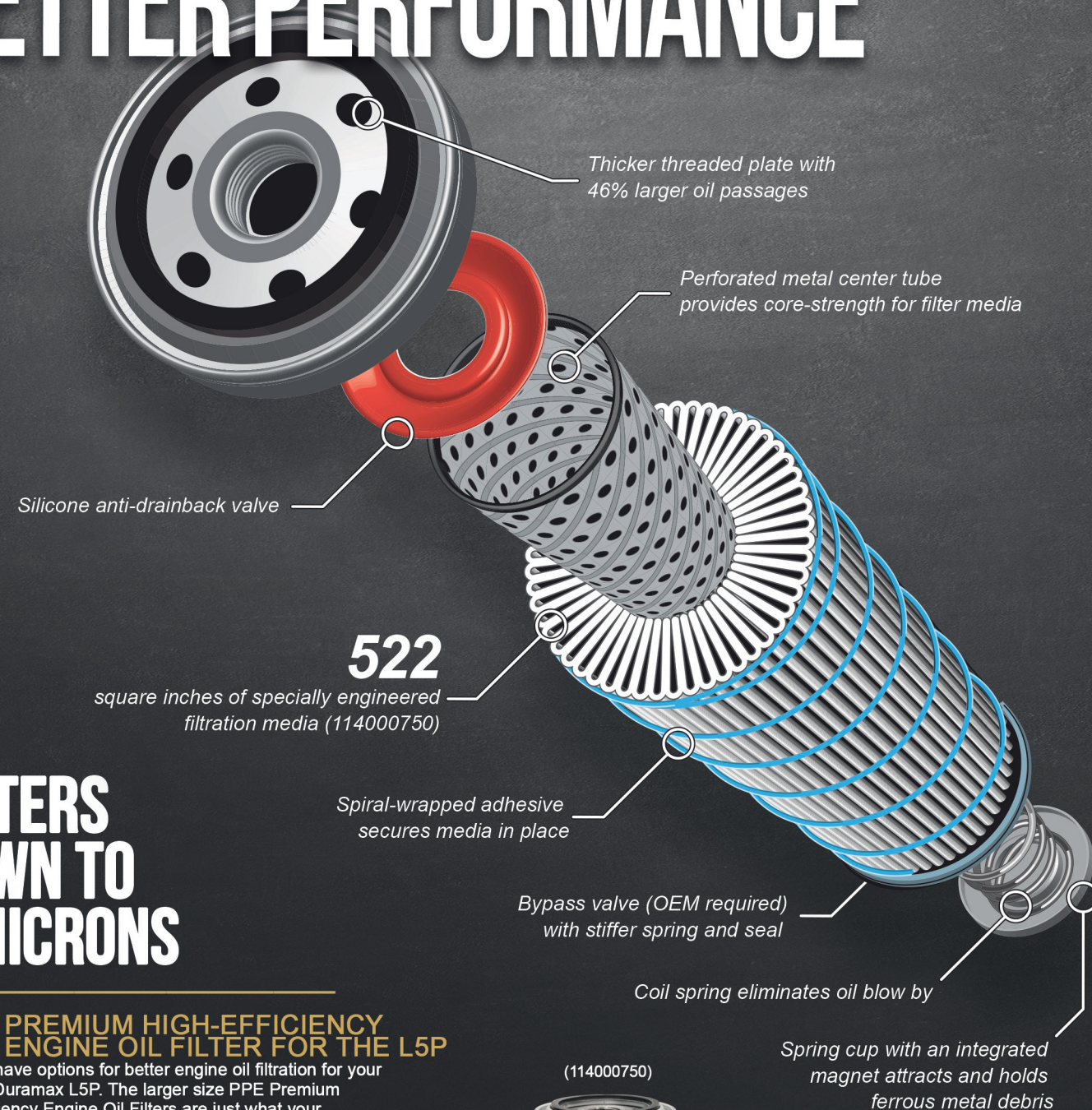
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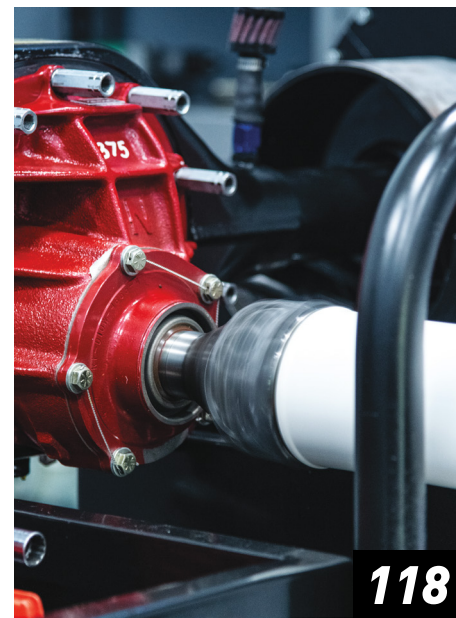
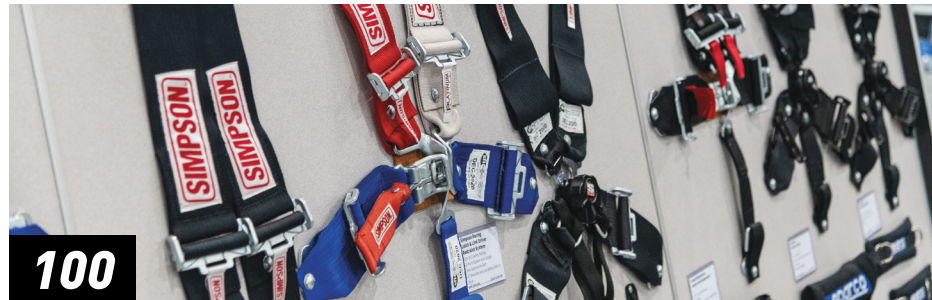
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FROM THE PRESIDENT

As we speak, the motorsports industry is being recreated in real-time. Monster no-prep races are drawing record crowds and car counts; NASCAR is running on dirt; and new business-to-consumer distribution models are being established with great efficacy. And it's all happening faster than a Top Fuel dragster firing down a 1,000-foot straightaway.

Here at PRI, we're evolving, too. Last month I shared with you the three big initiatives that will pace the racing industry into the future: the PRI Trade Show's return to Indianapolis on December 9–11, 2021; the launch of PRI Membership to unite all racers; and the PRI Road Tour headed to a race track near you this summer.

That said, we have more updates—significant ones—to share once again. Here we go...

PRI SHOW UPDATE

As this issue goes to print, the men's NCAA Basketball Tournament Final Four will have just concluded, which means the city of Indianapolis has successfully pulled off the largest sporting event in the US in over a year. This was accomplished with substantial and diverse crowds, and all were kept safe. The PRI team has remained closely aligned with these activities, giving us a great opportunity to monitor the health and safety strategies that made it all possible.

Area hotels, restaurants and transportation systems served the NCAA crowd magnificently, and the Visit Indy team took whatever steps were necessary in order to keep guests happy and safe. Hoosier Hospitality at its finest.

Building on these positive developments, the NFL has expanded its schedule and promised full stadiums when the 2021 season kicks off in fall. Naturally, that includes Lucas Oil Stadium, which plays a key role in PRI's expanded footprint when the Trade Show comes to town.

In addition, Indianapolis is in the midst of several hotel expansion projects, along with completely new construction, guaranteeing you a great place to stay during the PRI Show. Closer to the racing industry, this

month's Indianapolis 500 is on track for a full 250,000 spectators—truly American's Race!

In fact, the entire live events world is watching Indianapolis. The city is set to host several significant trade shows this summer that will pave the way for continued success and lead to a thriving PRI Show in December. We can't wait to see you there.

PRI MEMBERSHIP UPDATE

PRI has now officially launched a first-of-its-kind membership for the racing industry. With a limited offering to PRI Show exhibitors in mid-March, the program is now fully available to businesses throughout motorsports. What's more, by mid-July our PRI Individual Membership will be open to every single member of the racing community—racers, fans, and all supporters of this lifestyle we care so much about. Racing industry folks can learn more about PRI Membership at performanceracing.com/membership.

You may be wondering why an organized membership program for the racing industry is so important...and why now. The answer is simple: Threats to our industry are real, and growing. This is not hype or conjecture. We are seeing government agencies impacting the operation of race tracks, expanding their enforcement of federal clean air regulations, and penalizing companies with huge fines for making and selling race parts that end up on street cars. These actions have forced some companies to halt production of race parts to avoid potential risk, while others have shuttered operations altogether.

PRI Membership is the first and best chance for this industry to truly band together as a community. Through organization, education and advocacy, we're in a position of strength to help defend racing and safeguard our future. As we build up our war chest and lobby our elected representatives, the term "strength in numbers" has never been more relevant. Or critical.

So, if you make your living in motorsports, I hope you'll give this opportunity to join PRI Membership serious consideration.

Until next month, I wish you and your family well. And I hope your race car takes you to victory lane! **PRI**



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FROM THE EDITOR

Two things I think while eagerly awaiting this month's 105th running of the Indianapolis 500 presented by Gainbridge...

1) I THINK WE COULD USE MANY MORE

Mark Maynards in the halls of government. For starters, the West Virginia state senator is a total gearhead—he races ATVs, he collects muscle cars, he helped found the Appalachian Ridge Runners Off Road Club, and for several years in the mid-2000s he crewed on Jim Head's NHRA Nitro Funny Car team. But he also walks the walk, using his platform to propose and push legislation designed to promote, build, and protect motorsports throughout the region. In fact, just a few months ago he introduced the West Virginia Motorsports Entertainment Complex Investment Act, a bill that calls for incentives to help bring a motorsports facility “that is designed to qualify as an official motor speedway or racetrack” to the Mountain State. So clearly he's the real deal. But there's much more to his story, as we learned during an exclusive and wide-ranging conversation with Sen. Maynard that begins on page 40. In it, you'll discover why he's so opposed to over-regulation, why he readily gives out his personal cell phone number—and encourages his constituents to use it, and why his “first love is the rumble of an internal combustion engine.”

2) I THINK THERE'S NO ONE-SIZE-FITS-ALL

formula for determining purse size or payout structure in auto racing. At least that's one of the takeaways from our Special Report in this month's issue of PRI Magazine. While the factors that help determine prize money are relatively consistent from one event to the next—front and back gate, sponsor money, possibly concession revenues—the calculations by promoters, track owners, and series officials on how to distribute winnings are often more nuanced, and frequently misunderstood. The topic itself is largely taboo. After all, at a young age many of us learned not to speak openly about our finances. I, for one, wouldn't even tell my elementary schoolmates how much I



DAN SCHECHNER
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was pulling down in allowance each week. Granted, it wasn't that much, and certainly not by today's standards when you factor in cost-of-living increases, inflation, and other expenses. But the idea was pretty simple: my money, my business. And for decades that had been the philosophy of many race track operators across the country. As a result, purse determinations were typically kept close to the vest. Times are changing, though, and we're finding that more and more officials are now willing to speak openly about matters that, until fairly recently had been mostly closed-door affairs. And that brings us back to our report, which begins on page 52 and offers some very candid feedback and commentary on how funds are distributed through the field, the critical role sportsman classes and bracket programs play, how rulebooks factor in, and a whole lot more from some of the best and brightest in the industry. Speaking of which, big-time thanks go to Brian Carter of World Racing Group, Bill Bader Jr. of Summit Motorsports Park, Wayne Delmonte of Lebanon Valley Dragway, Brett Deyo, with the Short Track Super Series, Shawn Miller of Inside Line Promotions, James Sawyer from Volusia Speedway Park, and Darin Short with the Bandits Outlaw Sprint Series for sharing your stories with us. **PRI**

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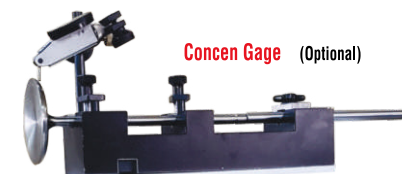
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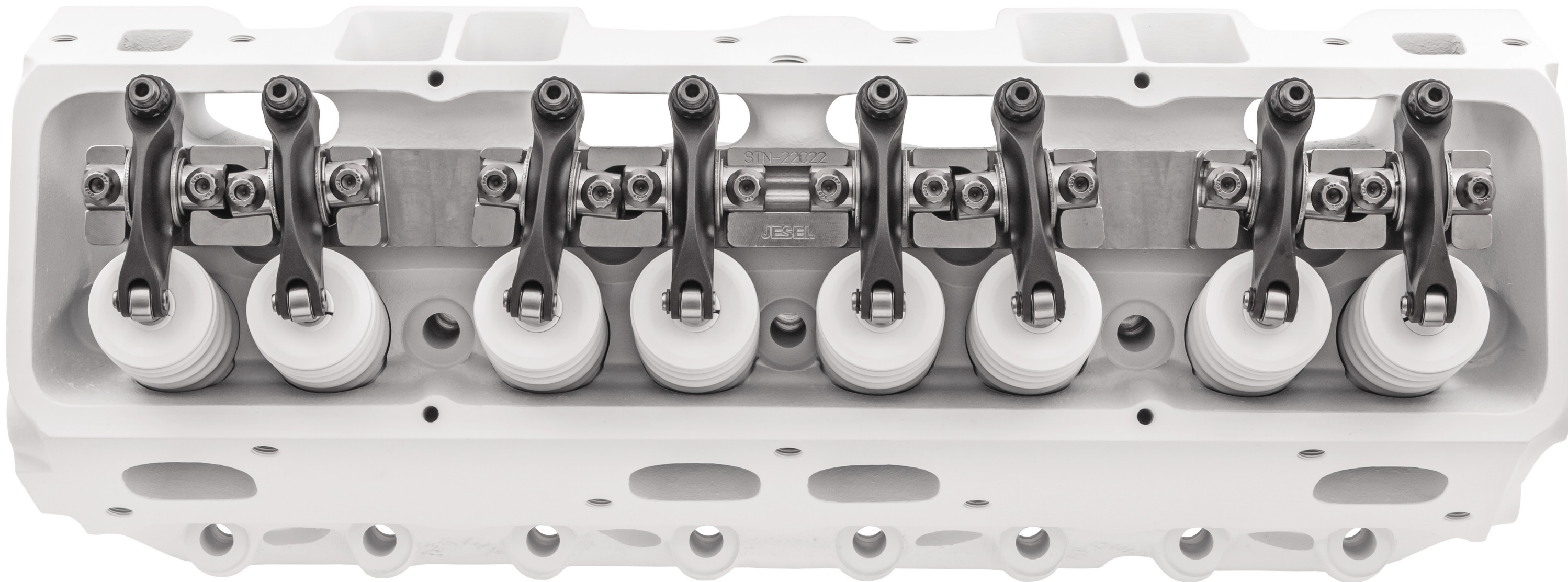
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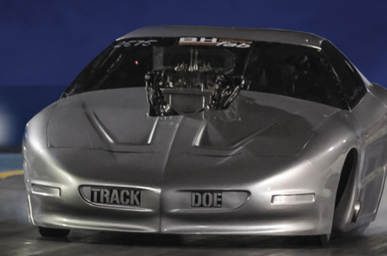
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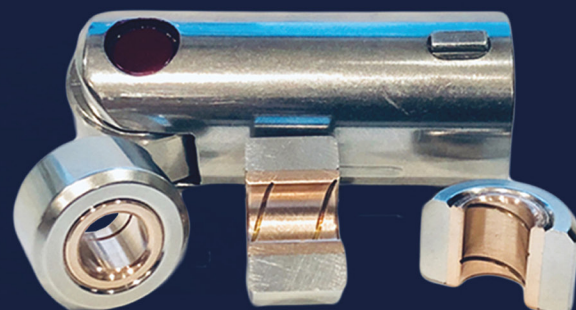
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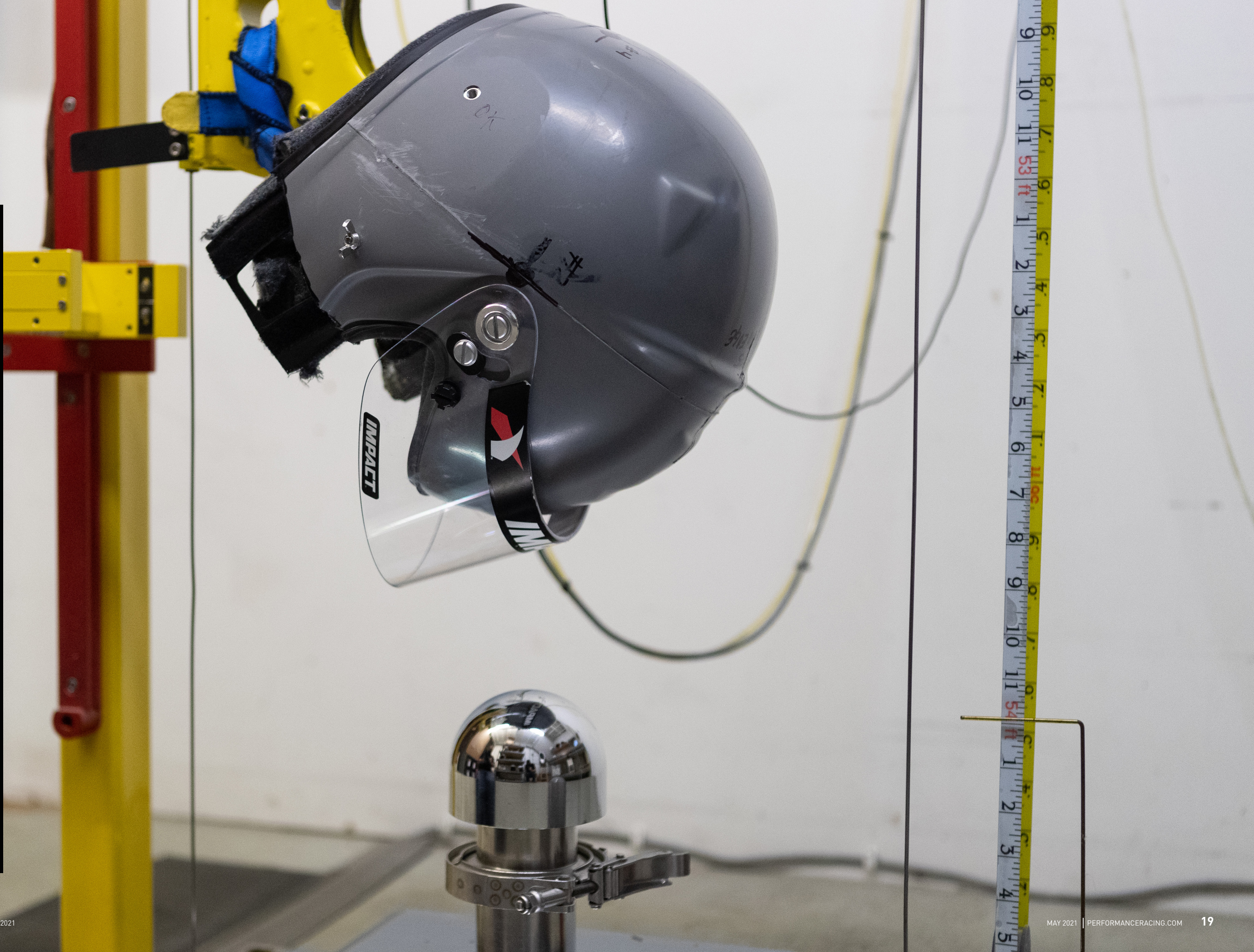
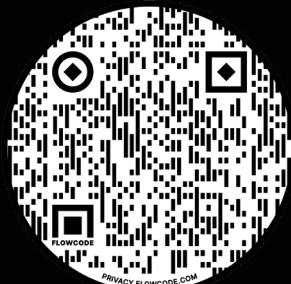


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Since 2002, Indianapolis, Indiana-based Impact Racing has manufactured motorsports safety equipment to the highest industry standards. That includes headgear, which undergoes rigorous R&D and testing procedures—including the helmet-drop process shown here—before it's moved down the assembly line and ultimately packaged for sale. Another source of pride, according to VP of Sales and Marketing Ben O'Connor: "At least 80% of what we do, we manufacture right here on site," he told our PRI Road Tour crew during a recent visit. "But we also use a lot of local Indianapolis-based businesses for some of the components we use in our helmets, suits, and other products as well." For more on how Impact develops its protective gear, including suits, shoes, gloves, and more, scan the QR code below. And, to discover how manufacturers like Impact are leveraging new materials and technologies for better-performing driver safety gear, see our coverage beginning on page 90.





FIRST LOOK: PRI MEMBERSHIP

Businesses may now show their support and commitment to the motorsports industry by joining together under Performance Racing Industry's landmark program.

By Dan Schechner and Jon Shakill

Performance Racing Industry (PRI) has introduced a groundbreaking membership program for motorsports professionals designed to unite the industry behind a number of important efforts—legislative advocacy, business resources, career development, educational opportunities, cost savings, and more. Now available to all businesses throughout the racing and performance industry—and with a separate membership for individuals set to launch in July—PRI's landmark initiative will create a uniform voice that speaks directly and solely to the interests of the racing community.

In joining the movement to build, promote, and protect motorsports, PRI Members will receive a full suite of benefits and services ranging from legal support and counsel to exclusive access to original content and discounts on PRI Trade Show booth space. There's also an opportunity for businesses to become top-tier Founding Members, which represents the highest level of commitment and comes with enhanced amenities and privileges.

There's much more to say about PRI's innovative new Membership program, so we put together the following Q&A to help provide further clarity and detail. It should give you a good idea of why we felt this

was the right time to launch such an ambitious effort—one we hope you'll be inspired to join so that ultimately we can all win...together!

Q: After 35 years as a media and events company, why launch a Membership program now?

A: PRI has established itself over many years as an integral part of the automotive racing marketplace and the go-to Trade Show for motorsports businesses and professionals—as well as the voice of the racing marketplace through its monthly magazine. These two core pillars of PRI give us a unique ability to address a critical need in the market right now. Membership serves as a natural extension and third pillar—to provide the motorsports industry with a centralized community designed to promote, protect, and grow the racing world. This allows us to bring the industry together not only once a year at the Show, and every month through the magazine, but 365 days a year to fight for the interests of racing businesses, racers, and hardcore enthusiasts. We see the need in the market, and also see that we have the ability to unite the industry to ensure the business of racing continues to thrive and grow well into the future.

Q: Who is PRI Membership for?

A: Membership is open to members of the racing community. This includes the businesses that make the industry what it is, like race teams, builders, tracks, sanctioning bodies, race parts resellers, manufacturers of racing equipment and parts, and members of the motorsports media. It also includes the individuals that make up the community—racers, service providers, and enthusiasts who help fuel the passion for motorsports.

Q: What are the overall goals of PRI Membership?

A: By bringing the racing community together, we can combine resources to protect and grow the industry. Through membership, businesses and individuals contribute to ensuring that racing continues and thrives in the United States and internationally. Members support the PRI Washington, DC, office to advocate on behalf of the industry, and come together to give our industry a seat at the table at the local, state, and federal levels. The goal is also to provide benefits to members in the form of discounts, legal best practices, market research, education, a job board and discussion forum, and more services that are being added each month.

Q: How does Membership tie in with the PRI Trade Show?

A: For the businesses that exhibit at the Show, becoming a member provides all the advocacy, community, and benefits that we've been discussing, and also includes a 10% discount on the total cost of booth space for the Show. Non-member businesses can still exhibit at the Show, but miss the 10% discount and all the other benefits associated with helping to protect the racing community. For the special group of Founding Members (more on that below) there will be several different Show-related events that kick off at this year's PRI Show in Indianapolis. For qualified Show attendees, they will also now need to become PRI Individual Members so that we can effectively work to protect racing. Individual Membership is complimentary in 2021, but starting in 2022 a small annual membership fee of \$40 will contribute to this important mission and provide members with a suite of benefits.

Q: What different types of membership are there?

A: So far we've discussed the PRI Business Membership, which is for corporate entities; Founding Membership, which is a special category of highly committed racing businesses; and the Individual Membership for racing professionals and enthusiasts.

PRI BUSINESS MEMBERSHIP

Q: Who is eligible for PRI Business Membership?

A: Like the name suggests, the Business Membership is specifically designed for companies engaged in the business of racing. While many Business Members will be the core of the racing industry, there is also an opportunity for adjacent businesses to join PRI to contribute to the fight to protect racing and enjoy the benefits of membership. The very first companies that were able to join were exhibitors at the PRI Show, as the program was launched in concert with the launch of PRI's Trade Show booth application process. By the time you read this, however, PRI Business Membership will be available to non-exhibiting companies as well.

*THROUGH MEMBERSHIP,
BUSINESSES AND INDIVIDUALS
CONTRIBUTE TO ENSURING THAT
RACING CONTINUES AND THRIVES
IN THE UNITED STATES AND
INTERNATIONALLY.*

Q: What are the benefits for my business, and why should I join?

A: Businesses should join PRI so we can unite as an industry and expand our collective power and voice. This includes unifying sanctioning bodies, manufacturers, distributors, retailers, race tracks, race teams, and businesses that are interested in growing and safeguarding our industry. We've also designed the Membership to provide exclusive benefits to businesses. In addition to advocacy, benefits include legal counsel reports and best practices, a legal support hotline, new programs from PRI Education, market research reports, a PRI jobs board coming soon, and a significant discount of 10% on booth space for exhibiting companies. This is really a win-win-win for the industry, member companies, and PRI as the facilitator.

Q: How does my business become a Member?

A: All you have to do is go to www.performanceracing.com/membership to get more information and sign up. Exhibitors also can become members directly within the Exhibitor Space Rental Application when reserving booth space. You can also email us directly at Membership@performanceracing.com.

PRI FOUNDING MEMBERSHIP

Q: What is PRI's Founding Membership and what does it entail?

A: The Founding Membership was established for a very special category of motorsports businesses interested in boosting their level of commitment to the racing industry at large. Open to businesses across motorsports, this highest tier of membership will secure these companies a place in PRI history for decades to come. This is just the beginning for PRI Membership, and we're working to create a program that lasts far into the future. In addition to this distinction, Founding Members will enjoy all the benefits of Business Membership, as well as exclusive Founders benefits that will be rolled out in the coming months.

Q: What are the benefits of becoming a Founder?

A: Benefits include, but are not limited to: Recognition from PRI within the industry; access to a Founding Members network; inclusion in our annual PRI President's Briefing on the state of motorsports; your corporate name displayed on the Wall of Champions at PRI corporate headquarters; and your company logo displayed on PRI's website. Founders will be recognized for their support and commitment to the racing industry, and for furthering PRI's mission to build, promote, and protect motorsports.

Q: How do I become a Founding Member?

A: You can email us directly at Membership@performanceracing.com and we'll get you signed up.

PRI INDIVIDUAL MEMBERSHIP

Q: When can I become an Individual Member, and how do I sign up?

A: Beginning in July, PRI's Individual Membership will go live along with PRI Show attendee registration. Qualified Show attendees will be able to join directly through the Show registration form, whereas individuals who do not attend the Show can go to www.performanceracing.com/membership to get more information and join later this year. We'll be providing more details for Individual Membership in the coming months. **PRI**

FOUNDING PRINCIPALS

A key component of PRI's first-ever Membership program is a special Founders level, created exclusively for motorsports businesses that wish to show additional support and commitment to the industry. This highest tier of membership includes all the benefits afforded to standard Business Members, as well as a suite of services, privileges, and recognition designed to elevate Founding Members into a separate—and honored—category. The early response to our Founding Membership has been overwhelming, and we're truly humbled by the dedication these companies have shown to the future success of our community.

"Since the beginning, CP-Carrillo has been a part of PRI. Our valued successes are attributed to decades of hard work in racing, good employees, quality products, and great service—and the PRI platform shares that vision! Additionally, the PRI Show is an excellent place to showcase our products and facilitate the relationships we have built with our customers over the many years we have been in business."

—Peter "Snake" Calvert, CP-Carrillo, PRI Founding Member

"If you want to be an industry leader in motorsports then you have to be fully involved with PRI. Becoming a PRI Founding Member was a no brainer for us. As a proud, independently owned, American manufacturer, we support racing, the racing community, and the continual efforts to grow the motorsports industry. We want to see our industry thrive for decades to come."

—Bre Fredritz, Callies Performance Products, PRI Founding Member

For more on PRI's Membership program, visit www.performanceracing.com/membership

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RACE TEAM CONFIDENTIAL

BOEHM RACING—KEVIN BOEHM

COLUMBUS, OHIO

As engineer and driver, this SRO TC America Series road racing competitor remains “very hands-on with the car, both on and off track.”

I compete in the SRO TC America Series with DXDT and CrowdStrike Racing. In 2020, I drove a 2019 HPD turnkey Honda Civic Si in the TCA class and won the Driver and Team Championship, as well as the Rookie of the Year award. For the 2021 season, I have moved up to the TC class and am driving a 2018 HPD turnkey Honda Civic Type R. This car was fully developed in the US, doesn't require much prep to race in the TC America Series, and is fully homologated. This does not allow much room to make changes to the car beyond your typical tweaks to the suspension.

Preparation for the 2021 season started a little before the 2020 season ended, and the first event this year was in the beginning of March at Sonoma Raceway. The 2021 SRO TC America calendar races at some of the best tracks in the US, including Circuit of The Americas, Virginia International Raceway, Road America, Watkins Glen, and Indianapolis Motor Speedway.

At the season opener, I tried to guess a setup on the car to give it a starting point. This car is somewhat related to the car I raced last year, and they share a lot of parts, but they also have a lot of differences. So, I based my setup on last year's experience. The first session on the track at Sonoma wasn't great. It definitely took the whole event to get the car to where it was raceable. Essentially, the car was way too stable. As we went through the weekend, I kept making changes focused on the rear of the car to try and balance the grip. I specifically was trying to make the front have to do a little bit less of the steering. Trying to help the car steer from the rear was the priority for the whole weekend.

That being said, in the first race I was able to finish on the podium—in third place. And then, in Sunday's race of that event, I actually led every lap and won the race. So overall, the weekend was more successful than I expected. However, I didn't get to the perfect setup yet, and still think there's a lot of fine tuning to be done.

The results from Sonoma came from hard work and a bit of luck. I don't expect to be lucky at any of my events, however, so I look forward to working hard for podiums for the rest of the season.

I'm fairly unique in this series because I'm not only the driver, but also the engineer for my car. I'm very hands-on with the car, both on and off track. I think I approach any issues with the race car a bit differently than a lot of my peers.

When you're racing at this level, most teams have a driver in the car whose main goal is to push the car to the limit. And then once that limit is found, he normally describes to the engineer what's holding him back from going faster. The engineer's job is to ask questions for the purpose of translating what the driver is saying into a more technical description of the problem, so they can then start solving it.

The hard part when you have two people doing that is, it's really difficult for the engineer to not have confirmation bias. As an engineer it's easy, based on a few pieces of information from the driver, to get an idea in your head of what the solution might be. And, if you're not careful, you can ask questions that might corner the driver into just agreeing with your opinion. That's a subconscious thing, and something that



engineers might not even know they're doing. So, things getting lost in translation between two people is fairly common.

For me, I'm the same person, so the driver and engineer are both inside my head. Whenever I'm driving and I feel like I've gotten to the limit of the car, I can feel it as a driver, but then also feel it from a very technical mindset, from the engineering side of my brain. I don't have to go back to the garage and have a debrief with another person; I can be doing it live while I'm driving on the track. That is a huge time saver, and it eliminates that possibility of confirmation bias, as well as getting rid of the “lost in translation” problem.

I definitely feel like I've accomplished a lot throughout my career: I've been able to win four SCCA National Championships, and last year managed to win my first professional championship in SRO.

In the future I would really love to make the jump to GT cars, and I would like to do some of the world-famous endurance races like Daytona and Sebring and Road Atlanta, and then even the 24 Hours of Spa and Le Mans. That's the ultimate goal, and I'm willing to put in the work to see if I can make it happen. **PRI**

“I THINK I APPROACH ANY ISSUES WITH THE RACE CAR A BIT DIFFERENTLY THAN A LOT OF MY PEERS.”

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ASK THE EXPERTS

MANUFACTURER'S REPS

Offering a suite of services, these “outside sales forces” can help identify opportunities, move product faster, and manage customer relationships.

By Drew Hardin

A manufacturer's rep can be an invaluable conduit between performance racing manufacturers and the customers who move their parts, from the largest warehouse distributors to the smallest speed shop. Yet there are manufacturers that don't make use of these firms, and others who may want to use them more effectively. We polled several manufacturer's reps—Jessica Chance of Ballard Allen Marketing in Costa Mesa, California; Jim Morehouse of All-Midwest Sales, Strongsville, Ohio; Juan-Jose Rebaza of ASAP Trading, San Diego, California; and Les Rudd of Bob Cook Sales, Germantown, Tennessee—to find out what a rep firm can do for its customers and how to improve those working relationships.

What can a manufacturer's rep do for me?

“Our manufacturers are our customers, and we take care of their customers for them,” said Rudd. “We are their eyes and ears and feet on the street. We take the manufacturer's strategic vision and, of course, their products, and relay those downstream to their customers. We also take all of their challenges, concerns, needs, and complaints back upstream to the manufacturer.”

“We are basically an outside sales force for a manufacturer,” said Chance. “Those are the basics, but we do much more. We work trade shows and car shows on their behalf. We bring them opportunities and manage all the wholesale as well. If someone calls the manufacturer and wants to be a distributor or dealer for them, we call that person, interview them, and make sure our business models fit.”

“Customer relationships are probably among our biggest

Manufacturer's reps serve as the eyes, ears, and feet on the street for their partners. Not only do they act as an outside sales force for suppliers, they can work trade shows and car shows on their behalf, too.



attributes,” said Morehouse. “We have proven, knowledgeable, trusted salespeople out there helping the manufacturers convey their message, and at little to minimal cost to the manufacturer.”

What can a rep do that a racing retailer may not be aware of?

“We can be instrumental at helping at a retail level,” Chance said. “Because of our large customer base, we have knowledge of what's working in the market that a retailer may not. We can go to a retailer and say, ‘You don't have X in your store, but I have 55 customers I sell it to direct. You may be missing the boat.’”

Chance's agency has also helped set up “POPs for huge chains. They say, ‘I have four feet. Can you make this look great?’ I say, ‘Sure, but instead of just looking great, let's put up something that's going to move. Why don't you give me the top numbers that you've sold in two years, I'll give you the top numbers we've done nationally, and I'll put together something that should work for you.’”

“When the racing retailer cannot

THE LATIN AMERICAN CONNECTION

ASAP Trading USA has a different role than other rep companies, explained Juan-Jose Rebaza. “Basically, our job is to bring importers from Latin America and put them in front of US companies that want to sell their products.” Some of Rebaza's clients sell direct to Latin America, while others utilize his firm “as a virtual distributor. They ask us to handle the orders, customer service, and the payments. Instead of 50 accounts, they have one—us. We make it easy for them.”



Juan-Jose Rebaza, ASAP Trading USA

Doing business in Latin America has its own rhythm and pace, Rebaza said. “People in Latin America want that personal touch. Sometimes you need to be willing to be on the phone or in person (before COVID-19) for an hour and a half, speaking about their pets, hobbies, their family, and then they talk business. The more you know them, the more time they want to spend with you and you with them.

“People do business with people they like. If people are buying from you just because you have a good price, you're not building a strong business foundation. I always say, our job is not to sell, we create relationships. As a result of that, we get the sales. Sales is a consequence, not the action. The action is to invest in the relationships.” —Drew Hardin

get what he needs from the manufacturer because he can't get to the right person, he has someone in his backyard, his local rep, who can get him where he needs to be,” said

customer has with a particular manufacturer, or it could be a marketing or merchandising issue. What we do is the very definition of a relationship: a collective effort among parties.”

“BECAUSE OF OUR LARGE CUSTOMER BASE, WE HAVE KNOWLEDGE OF WHAT'S WORKING IN THE MARKET THAT A RETAILER MAY NOT.”

Rudd. “We have contacts with every section of every manufacturer, from the CEO and the sales manager to shipping and warehousing.”

How can a manufacturer form more effective relationships with reps?

“Utilize us for what we are, that connection between the manufacturer and the customer,” said Morehouse. “Nine times out of 10 we end up doing things that aren't related to a particular problem at hand, whether it's an accounting question, a concern that a

“I don't like to take on manufacturers where I'm just a paycheck for them,” said Chance. “I want to be a part of their team. If we all have the same goal, and we have the resources to act on opportunities—marketing budget, for example, and advertising budget—to really market a brand, we can do really well.”

“We are a tool just like a tool in your tool chest,” said Rudd. “We're only as good and as useful as how many times you grab us and use us. And the more you use us, the more we can help you.” **PRI**



Consider a manufacturer's rep as another tool in the proverbial tool chest. One rep explained, “We're only as good and as useful as how many times you grab us and use us. And the more you use us, the more we can help you.” Pictured here is Jeff Bates of Bob Cook Sales assisting a customer.

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TECH UPDATE

UPGRADING THE FUEL SYSTEM

How to determine when your engine has reached its limit and which solutions will yield the desired results for your particular high-performance application.

By Dan Millen

As today's modern, high-powered direct-injection vehicles become more popular, support from the aftermarket is following suit. With that support, however, the OEM fuel systems have become a bottleneck that must be addressed. Certain vehicle fuel systems, such as those in the Ford EcoBoost line of engines, are often already at, or near, their limit at stock power output. This means that even a performance-enhancing calibration can push these engines past their limits.

This, in turn, creates fuel starvation, usually in the form of pressure loss in the high-pressure fuel system. With some of these applications exceeding 3,000 psi of pressure, even the slightest loss can result in a dramatic reduction in the injectors' ability to properly provide the necessary volume and can also result in poor atomization of the fuel. At minimum, this could reduce pre-ignition control, one of the main benefits of direct injection, causing misfires and severe engine damage.



Pictured here is a Ford 2.3-liter EcoBoost engine outfitted with direct-port methanol injection. The addition of fuel from an auxiliary source helps reduce demand on the factory fuel system.

WHEN HAVE I REACHED MY FUEL SYSTEM LIMITS?

Direct injection often suffers from severe misfires in cases where demand outpaces supply. However, almost all modern vehicles can be data-logged using capable diagnostic tools (i.e., performance tuner) to see how much fuel pressure is being requested and how much is actually being delivered.

Since we are talking thousands of pounds of pressure, small differences between these two values are common. Unlike PFI (port fuel injection) systems where a 40–80 psi operating pressure is the norm, and something as little as a 5-psi pressure drop can be detrimental, a direct-injection system can fluctuate wildly even when stock. That being said, we still view anything more than a 10% deviation as a solid sign of insufficient flow. So, if you are requesting 3,000 psi but only see 2,700 psi, you are likely past the limit of the pump's flow capability.

Here, a Ford 2.3-liter EcoBoost engine has been upgraded with a direct-injection fuel pump, providing a direct-fit solution that eliminates the need to monitor and maintain a secondary system.

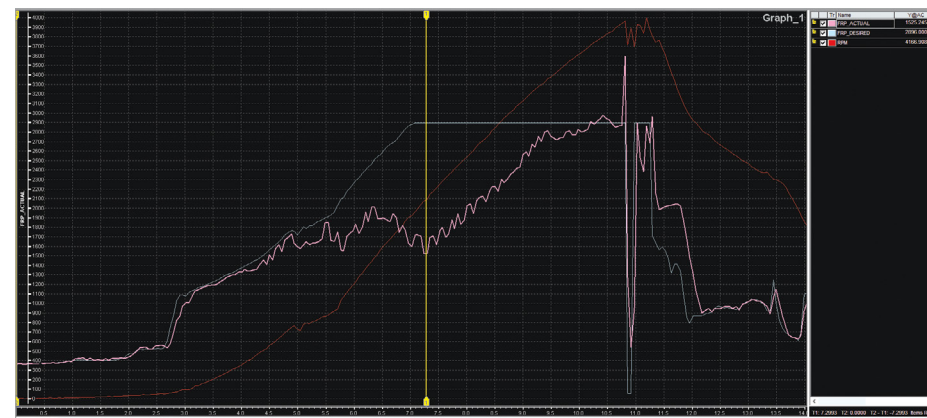


WHAT SOLUTIONS ADDRESS FUEL SYSTEM LIMITS?

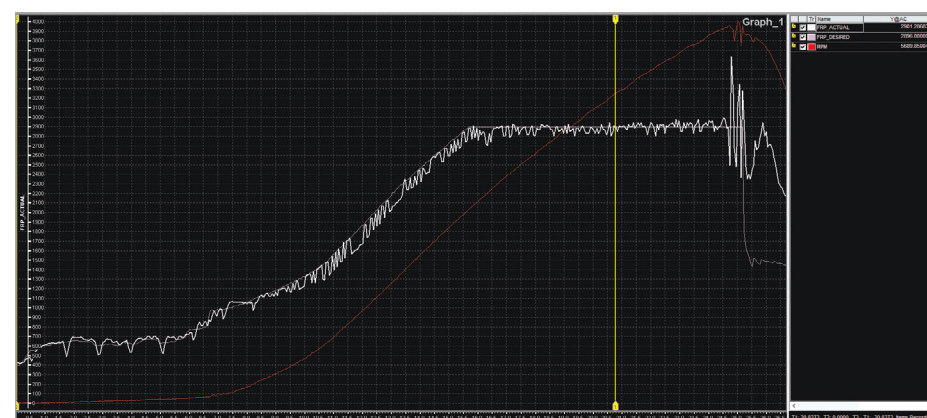
There are two approaches to combat flow capability limitations, each having their advantages and shortcomings.

One solution is to use a supplemental system to provide the required additional fuel flow. Methanol injection and secondary port fuel-injection systems are the two most popular options in the marketplace for supplemental delivery. By providing additional fuel from an auxiliary source, the factory fuel-system demands can be reduced. These systems are often universal, or easily adapted, allowing them to go to market faster. However, these systems do erase some of the inherent advantages of a direct-injection system.

Direct injection has the ability to provide a controlled combustion event, which prevents pre-ignition and improves power and efficiency over a PFI system. By introducing PFI back into the vehicle, some of these benefits are diminished. Additionally, these independent



Certain fuel systems, such as those in the Ford EcoBoost line of engines, are often already at, or near, their limit at stock power output, and that's where the aftermarket can help. Pictured here are two graphs of a 2016 Ford Focus RS using E85. The graph above shows the use of an OEM fuel pump that is unable to achieve the desired 2,900 psi and drops as low as 1,500 psi. The graph below shows the same engine using E85 with an upgraded direct-injection fuel pump from Livernois Motorsports & Engineering that is able to maintain the desired 2,900 psi.



supplemental systems are separate from the vehicle's control and monitoring, which could lead to major engine issues if the system were to fail.

A second solution is achieved by addressing the direct-injection fuel system itself through upgraded high-pressure fuel pumps and injectors. The major benefit is that these are direct-fit solutions, which retain much of the packaging and OEM-designed control and safeties. With properly designed components for this solution, you retain all of the direct-injection benefits without having to monitor and maintain a secondary, independent system. The downside is that these direct-fit solutions typically take more R&D, therefore creating an extended time to market. We assure you, however, that patience is often rewarded with reliability, increased power, and ease of install.

WHICH OPTION IS RIGHT FOR MY VEHICLE?

There are several factors that contribute to choosing the right solution for your vehicle. There is no singular right or wrong answer. How quickly you want to upgrade your fuel system and how comfortable you are monitoring and maintaining an independent system are questions you need to answer before making a decision. However, because safety and performance are always at the forefront with our builds, we always recommend upgrading the direct-injection fuel system with direct-fit solutions. **PRI**

Dan Millen co-founded Livernois Motorsports & Engineering with his brother, Tom, in 2000. Today, their product line is focused on performance components for late-model Ford, GM, and Chrysler vehicles, as well as engine and machining services.

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PROBLEM SOLVERS

Race track management does have another option for an effective barrier system that falls in between traditional tire systems or metal railing and high-end soft walls.

By David Bellm

THE PROBLEM: Outdated or expensive race track barriers

THE SOLUTION: A low-cost plastic track barrier system that actually protects racers

Race cars are safer than ever. New technologies and innovative designs have brought unprecedented protection to drivers through a wide array of developments, including stronger roll cages, better helmets, and more effective restraint devices.

But while these innovations are a boon to driver safety, in contrast, many race tracks still rely on outmoded, inadequate barriers to protect drivers and cars from hard impacts against walls and railings.

Combined with the increased performance of race cars these days, that can be a dangerous mix. Just ask Chris Scribner of Scribner Plastics in Rancho Cordova, California. While racing an asphalt Super Late Model about five years ago he got tangled up with another car on the track. It instantly brought him up close and personal with the limitations of a tire barrier, one of the most common forms of race track wall protection. "So we got to where

that tractor tire was, and he hit it first and took the tire with him," Scribner recalled. "And I was coming in and there was nothing there for me. I hit driver side first on the blunt impact of that concrete wall."

Scribner was lucky—he sustained only minor injuries. But the story could have ended much worse for both drivers. Although tires are a widely accepted form of track barrier, they have significant limitations—tires can be surprisingly unyielding on impact; they can bounce cars into traffic; and they can scatter onto the track. In addition, tire barriers tend to be unwieldy to work with, consuming valuable time to assemble, repair, or reconfigure.

Soft walls are a better solution, but the expense of such systems often prevents smaller venues from using them. "On some of the big NASCAR tracks, you can see the technology they put in," explained Scribner. "But clearly every short track in America



can't afford to put in a wall that's designed to absorb a 200-mile-an-hour impact."

Fortunately, Scribner Plastics has developed a reasonably priced, highly effective alternative—polyethylene plastic segments that link together to form walls of almost any length and shape. The Link Barrier System works by yielding on impact, progressively slowing vehicles to reduce the chance of blunt-force trauma or vehicle damage.

The segments of this system are relatively short, and their connections can hinge to almost

any angle. This enables them to conform to a wide array of shapes, including irregular wall sections that are often left exposed. "We had a competitor one time hit the wall on our track offramp," said Bill McAnally of All American Speedway, Roseville, California. "It was one of those things that looked impossible, but it happened. So we put some Scribner block barriers in there. Not long after that, a driver bounced off a wall and hit that plastic barrier. I guarantee it saved him some injury."

In addition to providing greater protection for drivers, these plastic barriers are also easier and faster to set up than tire barriers. The quick setup is important when building a temporary circuit in public spaces. But it's also a factor in the event of a crash. If a barrier replacement is ever required, it takes just minutes to do the job, resulting in faster crash clean-up and reduced race delays.

Plus, most tracks can cover their urgent hazards for a reasonable total, explained Scribner. "Every track is different, but \$2,000 to \$3,000 is something that can usually get you some pretty respectable protection."

Furthermore, the Link Barrier System can be thought of as a long-term investment, making the cost even more attractive. "We have systems out there that are over 15 years old," noted Scribner. "They've sat out in sunshine and then in the cold in the winter, and they're still going strong."

Adding it all up, plastic barriers can be a significant improvement for any track, making them a worthwhile investment for a number of reasons. But perhaps most important of all is the human element. "I've never had to deal with a fatality," said McAnally. "But I couldn't imagine how hard that would be. I don't want to have to talk to the wives or kids of a racer that's in a hospital getting treated for something I could have helped avoid."

SOURCES

All American Speedway
allamericanspeedway.com

Scribner Plastics
linkbarriersystem.com

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EDITORS' CHOICE

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

PRO28 WELDING TABLE

STRONG HAND TOOLS

stronghandtools.com

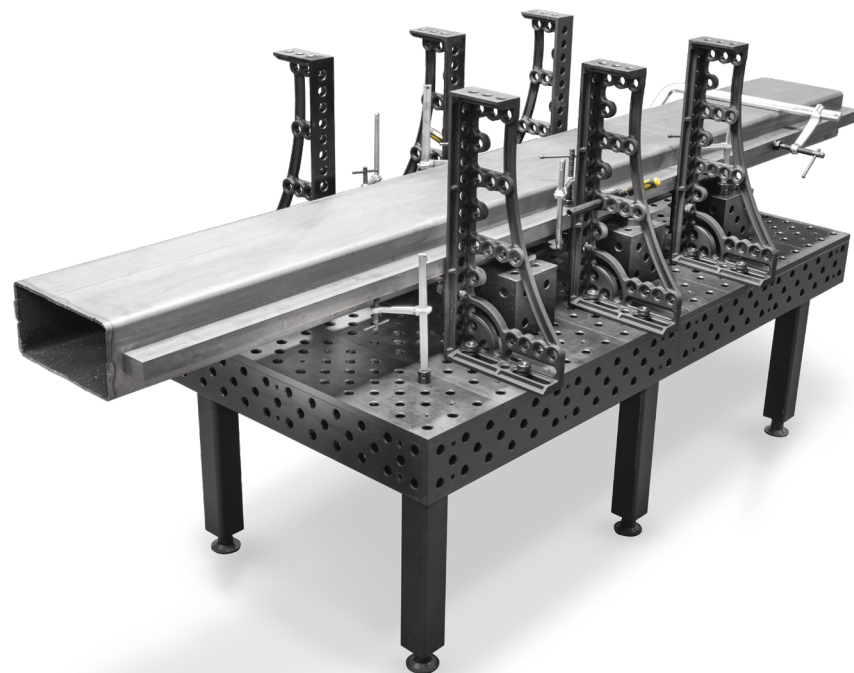
Flexibility and precise fabricating are the benefits of this new modular-style PRO28 welding table from Strong Hand Tools.

"We needed a heavy-duty, five-faced counterpart to the BuildPro line. People were asking for it," said Danny Ulloa of the Santa Fe Springs, California-based company.

The table features multiple plates that can be staggered to accommodate unique-sized projects. Ulloa said the table flatness is rated at .064-mm per 600- x 600-mm square area. The 28-mm holes are spaced every 100 mm and accept a wide variety of fixturing components to help ensure accurate welding.

"By staggering the plates, you don't have to buy an awkward-sized table that is too large for one project," said Ulloa. "The plates slide out and you don't lose your level surface. If you're working with heavy-duty equipment and were to damage a plate, it can be flipped over or replaced. You don't have to buy a new table."

The top plates are constructed of P20 steel and nitrided for a Vickers surface hardness rating of HV 750. The side plates are constructed from Q345B steel and have a surface hardness of HV 550. Nearly 20 fixtures, clamps, and tools designed for the table are available in a variety of kits. —Mike Magda



TRINITY SERIES INTAKE MANIFOLD

BRIAN TOOLEY RACING

briantooley racing.com

The increasing number of performance cylinder heads for select LS and LT applications prompted Brian Tooley Racing (BTR) to develop the Trinity Series modular three-piece intake manifold.

"There are lots of different cylinder heads with different port heights on the market," explained Brian Tooley. "And we get requests to match them all. So, we decided on a three-piece design with a center plenum and bolt-on runners that we could easily make to fit those applications."

Tooling to cast a single-piece intake could cost more than \$30,000 while the tooling for a set of runners is around \$3,500.

"For some high-power applications, the only choice was billet," continued Tooley, whose shop is based in Bardstown, Kentucky. "A lot of these billet intakes are modular three-piece. If we could take that concept and make it cast three-piece, we could service more markets."

BTR had to work out issues of machining and designing O-ring seals, and now there's development of additional plenum sizes to



accommodate larger throttle bodies.

"We're also working on a dual-injector version that could be serviced with a single fuel rail on each side," Tooley told us.

Current applications include LS3, LS7 and Gen V with or without injector bosses.

"Whether NA or boosted, it's definitely for high-rpm applications and for those who want durability over sheet-metal and price point over billet," Tooley added. —Mike Magda

MOD SERIES SHOCK ABSORBER

QA1

qa1.net

Due to limited valving options, shock absorbers are rarely flexible enough to adapt to different tracks and racing conditions. Racers can't go autocrossing and drag racing with the same shocks and expect optimum performance. QA1 addressed this conflict by developing the MOD series with interchangeable valve packs that allow quick adjustments to achieve the desired suspension dynamics.

"Say you're at a Pro Touring event with autocross, road race, and speed-stop challenge. Those are three very different disciplines that the suspension needs to adapt to," explained David Kass of the Lakeville, Minnesota-based company. "We found the traditional adjustable shock was unable to suit those needs very well."

The MOD series features interchangeable QuickTune modular valve packs that allow adjustable compression and rebound with low-speed bleed. High-speed valving allows for tuning over impact events, like coming off a wheelie. Low-speed valving is for fine tuning weight transfer. All the shock fluids and nitrogen gas are separate from the valve pack.

"We took the valving off the piston and put it in the valve packs that you swap out in just a few minutes," said Kass. "Now the racer has greater flexibility in valving options. He can make adjustments



between events or if track conditions change. These work great on the street, but they're really for track cars, Pro Touring, and radial tire drag racing." —Mike Magda

MAKE THE CASE

PISTON COATINGS

When it comes to pistons, it's no secret that friction and heat can affect performance and overall longevity. In this month's column, Swain Tech's Richard Tucker and Gary Huffman of Calico Technologies explain how their respective race-ready piston coatings are designed to stack the odds in your favor.

As told to Bradley Iger



TBC & PC-9 ADVOCATE:
RICHARD TUCKER,
SWAIN TECH

"ANY TIME WE'RE DEALING WITH HEAT, WE'RE GOING TO USE CERAMIC-BASED PRODUCTS TO MANAGE IT."

Decades ago, one of the key benefits of using piston coatings was the ability to run higher clearances and pick up horsepower as a result. While that's still true today, clearances are much better now than they were in, say, the early 1980s, and power is a lot easier to come by through other means. These days it's more about adding an extra level of protection—an insurance policy in case things go wrong and there's an unusual surge of heat—to either prevent a catastrophic failure or reduce the potential damage done by that event.

In a motorsports application, we'd address this with two different coatings: Our TBC (Thermal Barrier Coating) for the dome of the piston, and our PC-9 (Performance Coating #9) for the skirt of the piston.

Any time we're dealing with heat, we're going to use ceramic-based products to manage it. TBC is a reflective coating that is going to be thin and uniform so that it will be an effective thermal barrier, but not so effective that it traps too much heat in that dome surface—if it did, it would promote detonation rather than discouraging it.

We have industrial ceramics that are very effective at blocking heat, but the problem is that when you use it in a motor, it blocks too much heat and actually traps it right on the surface. There's a balance between the two, and TBC was developed to be a "plug and play" solution that doesn't require you to make clearances for your valves and reshape your combustion chamber to accommodate it.

And with the piston skirt, wet lubricants are always going to do the primary work. So the main purpose of that PC-9 coating

is to provide a backup form of lubrication to help in "what if" situations: oil starvation, lean conditions—anything that has the potential to make that piston grow larger than it should and want to stick. This will provide some more protection for a little bit of extra time to mitigate bigger problems.

Other folks use a hard-anodizing process to address this, particularly in the drag racing world, and that treatment is applied to the entire piston. That's certainly an acceptable way to help protect that skirt in those types of applications, where they're pulling those pistons out of the engine regularly for servicing.

But the downside is that the hard-anodizing process makes the skirt hard, so you're going to notice problems between the skirt and the wall. So if you're not taking the motor apart regularly, you probably don't want to use that hard-anodized process. You want the skirt to be softer than the cylinder wall.

Hard anodizing is providing wear resistance by making the skirt hard, and that's great for those really demanding applications where you're just running for a few seconds at high load and checking the piston skirts and cylinder walls regularly. The challenge is that, over a long period of time, you might be doing a great deal of damage to the cylinder wall.

PC-9 is on the opposite end of the spectrum from hard anodizing—it's a durable coating, but it's intentionally soft so that when things are too tight, it acts as a sacrificial surface. It's generally preferable for the skirt and the coating to be the wear surfaces rather than the cylinder wall.



CT-3 & CT-2 ADVOCATE:
GARY HUFFMAN,
CALICO TECHNOLOGIES

In a perfect world you wouldn't have a lot of loading on a piston skirt, but in this world, we do. Pistons are designed with cams on the skirts in order to minimize the contact between the skirt and the cylinder in the load area, but at the end of the day there's still a significant amount of contact, and that's the largest metal-on-metal frictional area in the motor. So it stands to reason that when you're looking to reduce friction and heat in the motor, you're going to want to reduce friction at the largest frictional point

"ANY TIME YOU'RE LOOKING FOR ANTI-SCUFFING PROPERTIES, YOU'RE GOING TO WANT TO USE SOMETHING WITH GRAPHITE IN IT BECAUSE OF ITS LUBRICITY."

in the motor. That's probably the biggest advantage that piston coatings can provide.

For that reason, our CT-3 dry film lubricant coating is great for a wide range of motorsports applications. It's a graphite blend—any time you're looking for anti-scuffing properties, you're going to want to use something with graphite in it because of its lubricity. Molybdenum disulfide coating is also very popular in the racing world for the same reason, and it's very slick as well.

The reduction in friction that the CT-3 coating provides reduces heat in turn—when you rub two pieces of metal together, you create a lot of heat. By using a skirt coating, you're going to reduce overall engine temperature and ultimately save money because the wear will be on the coating rather than the cam on the piston skirt.

The coating is a sacrificial layer, and it's going to conform to the cylinder bore to some degree. But typically, when you pull a coated piston out of a motor that hasn't reached its cycle life, it can be recoated and reused. When most "Saturday night" motors are torn down for rebuilds, the coated pistons can be reused. And a lot of guys do just that.

We also tailor our CT-3 coating to specific

applications. In reality it's an entire family of coatings, and we adjust the chemical blend of it based on the needs of each application. For instance, a four-cylinder, turbocharged, nitrous-injected 600-horsepower drag engine requires a very specific CT-3 coating blend—it comes down to criteria like the expected rpm range, power adders, and the type of fuel you're using.

Managing heat is also crucial in a high-performance motor, as it allows the tuning to go places it wouldn't be able to go otherwise. That's why we also, strongly recommend applying a thermal top coating like CT-2. Like the CT-3 coating, it's focused on managing the heat in the piston, the only difference is that we're using a ceramic blend.

Not only does CT-2 reduce heat in the piston overall, it also keeps heat off of the pin bore, and that's a big problem area in a lot of motors because you generally want to run your pin bores as tight as you can. It also keeps heat off of that top ring, which is very important—you want to do anything you can to reduce heat on the ring package. Anyone who's racing in a class that allows ceramic top-coated pistons should be running them. **PRI**

STOP DOING THAT...DO THIS INSTEAD

TURBOCHARGER INSTALLATION

Getting the details right means the difference between making more power and destroying the whole system. Here's how to ensure you're on the correct path.

By Drew Hardin

Power adders—and turbochargers in particular—are an integral part of racing's quest for more performance. But as turbos grow more popular, and the demands put on them more extreme, the risks of making mistakes in their installation and use grow as well. We asked representatives from some leading turbocharger companies about the most common mistakes they see when their customers install a turbocharger system and how to fix them, or avoid them altogether.

SIZE—AND QUALITY—MATTER

"Most people are using turbos that are way too big," said Geoff Raicer of Full-Race Motorsports, Phoenix, Arizona. "A lot of enthusiasts are focused on peak horsepower for drag racing and don't know how a large turbo is going to behave during the 98% of the time you're not at wide-open throttle. An overly large turbo can be terribly laggy and ruin what makes the vehicle fun to drive."

"Stop using turbos designed for 1970s John Deere diesel tractors on gasoline race engines," said Kevin Kenney of AGP Turbo, Tempe, Arizona. When asked if that really

happens, Kenney said, "Oh, yes. All the customer sees is a 56-mm turbo for cheap. A few hundred dollars more will get you better performance in every way. Every gasoline engine displacement, rpm band, compression, and target boost level will require different precise matching. The compressor wheel size and design, compressor housing, turbine housing, and turbine wheel size and design need to match all the aspects of the engine."

Proper sizing doesn't have to be difficult, Raicer said. "We help people with these calculations every single day. There are some YouTube tutorials on the BorgWarner MatchBot page that can help walk you through the process before you contact Full-Race."

BLOWING SMOKE

Reggie Wynn of Turbonetics in Moorpark, California, has years of experience responding to end users' questions, including turbocharger oiling systems. "The customer will call and say, 'My turbo's smoking.' They want to blame the turbo, but most of the time it's an installation error." Because the oil coming out of the turbocharger's center housing

Selecting the correct turbo manifold is "critically important," according to our source at Full-Race Motorsports. One option is a log manifold, pictured top right, which is inexpensive but can be problematic in its open tube design. Another option is an investment-cast stainless-steel or Inconel manifold, shown top left, that features longer runners and more thoughtful runner geometry. Photo courtesy of Full-Race Motorsports.

Turbo manufacturers and installers frequently troubleshoot problems for end users. Two common issues, seen here from left to right, involve using a gasket maker for the flange instead of a solid gasket, which blocks oil flow, and using flanges with holes that are too small. Photos courtesy of Boost Lab.



rotating assembly (CHRA) is not pressurized, "any restriction is going to cause smoking from the turbo."

Most of the remedies are straightforward. Use a gasket, not gasket maker, on the oil drain flange, Wynn said. "You cannot control where the gasket maker goes when you squeeze the flange onto the surface of the CHRA. You don't want it in the passage where the oil comes out."

Also, beware of oil drain flanges with small passages. "We recommend using a -10 on the oil drain for your average turbo. That comes out to about 3/4 or 5/8 of an inch. The size of the hole in the flange needs to be the size of the hole in the gasket."

When plumbing oil lines, "turbos and 90s do not get along," Wynn said, referring to the angle of an oil drain fitting. "Since the oil's not pressurized, it will make an abrupt stop, back up into the drain, and follow the path of least resistance, which will be that rear piston ring." Wynn recommends at most 45-degree fittings.

And since the return oil isn't pressurized, be sure the oil returns to the pan "above the oil level in the pan," Wynn said, not at the bottom of the pan. "It can't fight the oil that's already in there."

"It's critical to prime a turbo with oil before its initial startup, especially if it's a journal-bearing turbo," Raicer said. "If you don't, it may experience enough wear on initial startup that the turbocharger's life can be shortened."

STRONG FOUNDATION

Raicer said it's "critically important" to select the right turbo manifold. "The manifold is the foundation of the whole turbo system. If you get the manifold wrong, the entire turbo system will be wrong."

Two key elements of manifold selection are the "design component—the runner geometry and turbo position—and the materials and fabrication method," Raicer said. Log manifolds, while inexpensive, can be problematic in their design, as they're basically "just an open tube, where all the ports feed into each other and the exhaust pulses smash into each other. The engine basically exhales through a bottleneck. It's bad for volumetric efficiency and turbine efficiency."

Poor construction methods, such as "thin-wall, low-grade tubing, stamped collectors instead of fabricated collectors, and MIG instead of back-purged TIG welding can ruin a decent design," Raicer said. "Before you know it, those things can cause 25%, 30%, even 40% losses coming from a leak or a crack."

A high-quality fabricated manifold doesn't have those issues, but fabricated manifolds "are labor intensive, and it costs so much in material and argon to properly fabricate turbo manifolds," Raicer said. An alternative is investment-cast tubular designs. "With investment-cast stainless-steel or Inconel manifolds, we're creating longish runners and more thoughtful runner geometry in turbo manifolds that don't have the downsides of log manifolds or the constraints of fabricated manifolds." **PRI**

SOURCES

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agpturbo.com

Full-Race Motorsports
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Turbonetics
turboneticsinc.com/performance

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NEWLY APPOINTED

NICK BUBLITZ

Having earned his rookie stripe as a drag racer at Sonoma Raceway, this lifelong enthusiast returns 10 years later to manage that same quarter-mile track.

By Jim Koscs

For Nick Bublitz, a brush with drag racing at age five sparked a passion that later revved up a career in drag racing management. Bublitz first took to the quarter-mile at Sonoma Raceway in Sonoma, California, 10 years ago while earning a bachelor's degree in history from Sonoma State University (SSU). He seemed destined to work in the industry, and this year became drag strip manager for the historic Northern California track.

Sonoma Raceway also is home to the famous 12-turn, 2.5-mile road course that hosts a NASCAR race and other major series.

In his new role, Bublitz will oversee day-to-day operations of the drag strip, including the weekly Wednesday Night Drags program where he got his own start in racing.

The busy 29-year-old also remains the track announcer and race director for Redding Dragstrip, the oldest NHRA-sanctioned strip in the US (and a 200-plus mile drive from his home in Cotati). Of note: He loves to make passes in a 1970 Chevelle that he built up with a 502-cubic-inch big block, 700R4 overdrive, Wilwood brakes, and Global West suspension.

Bublitz recently shared with PRI his plans and goals for drag racers who treasure this iconic track.

PRI: How did you get started with drag racing?

Bublitz: When I was five, my father's friend let me sit in his Top Alcohol dragster. That started a lifelong passion. Scheduling left me unable to do any regular racing in high school, but when I moved to Cotati for college, I started racing on Wednesdays in my street car. From there it just snowballed.

PRI: As a drag racer, and especially one who has competed at Sonoma Raceway, how will you use that

experience in your new role?

Bublitz: I've been fortunate to compete at Sonoma since 2011 and spectate there for many years before that. I feel it's important for the person in this role to have experience as a competitor because it adds valuable perspective. I'll continue the "racer first" philosophy that the previous track manager, Kyle Seipel, had continued from his mother, Georgia.

PRI: What strengths do you bring to this new role?



NICK BUBLITZ

TITLE:
Drag Strip Manager

ORGANIZATION:
Sonoma Raceway

HOMETOWN:
Cotati, California

FAST FACT:
Nick is the first non-Seipel track manager for Sonoma Raceway's drag strip in over 30 years, having recently taken the reins from Kyle Seipel, who in turn took over from his mother, Georgia, in 2017 upon her retirement after three decades at the track.

Bublitz: When I'm not at the race track, I am a facilities project manager at a game company. Attention to detail, progress tracking, and budgeting are all part of my daily scope. A track manager basically manages a series of smaller projects and events that take place in a compressed timeframe. This skill set has served me well in my role as race director at the Redding Dragstrip, and I feel it will do the same at Sonoma Raceway.

PRI: What changes are on the horizon?

Bublitz: Months before my hiring, the track had discontinued the weekend bracket drag program, but many racers and fans want to see it return. I'm working on new ideas to bring it back on some scale in 2022.

PRI: With fan safety in mind, how will Sonoma Raceway follow COVID-19 guidelines for this season, including the NHRA date in July?

Bublitz: We'll be following guidelines from the state and the county, according to whatever tier we happen to be in at the time. Each tier change potentially allows us to offer more to the fans. (Sonoma County was transitioning into the red tier from the most restrictive purple tier when PRI spoke with Bublitz in late March.)

PRI: What's your most gratifying accomplishment?

Bublitz: As a racer, I am most proud of winning a Division 7 NHRA title in my daily driver Ford hybrid hatchback. In my game company job, it was, with my team, delivering a \$7 million motion capture facility on time and within budget. And, in race

management, it has to be managing the Kool April Nites event at Redding. It's their biggest race of the year, and it was only the second race I had ever managed.

PRI: Since you started racing at Sonoma in your college days at SSU, do you have some ideas for encouraging more young people to enter drag racing?

Bublitz: This is a very important issue for me. I'm working on a plan to drum up local interest on multiple levels. High schools and colleges are just two of the avenues I plan to take. We are continuing our "Top the Cops" program, which gives high school students the chance to race against police officers in their squad cars. I'm also pleased to announce that the Juggers Racing Team has continued their sponsorship of the high school program by donating a tech card to each Wednesday Night Drags event.

PRI: Who inspires you, and why?

Bublitz: I've been blessed with many inspirational figures in my life. In addition to my parents, I owe much of who I am today to my high school physics teacher, Michael Smidebush. He was the kind of person that one aspired to be: level-headed, honest, direct, and always present. That he was well-respected goes without saying. As far as racers go, Glen Terry was about as inspirational as they came. He was a local legend, with countless wins in more than 60 years of drag racing. He was always an innovator and was still competitive in his 80s. **PRI:** What can you not live without, and why? **Bublitz:** My dog, Frill. She's a three-year-old golden lab who somehow manages to make life so simple and pure. **PRI:** What do you enjoy doing when you are not at the race track?

Bublitz: I'm a bookworm. I typically go through a book a week, give or take. I also enjoy 4WD exploration, camping in Death Valley and the like. **PRI**

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INDUSTRY INSIGHTS

MARK MAYNARD

A champion for racing and performance, this state senator is making a positive impact on West Virginia's motorsports community through business-friendly legislation and advocacy on behalf of professionals and enthusiasts like himself.

By Dave Argabright

The performance industry has long been aware of political and regulatory forces at various levels that threaten our existence: noise ordinances, environmental pressures, zoning restrictions, and so forth. Through the years the industry has been the target of people and entities seeking to limit or even abolish motorsports and performance endeavors.

Those of us who love automotive performance might have a difficult time explaining the emotional bonds that fuel our passion; we are intimately tied to automotive performance by the sights, sounds, and feel of motoring. We sometimes express frustration that government and regulatory officials don't understand or appreciate our passion.

But some officials and regulators actually share that passion, and Mark Maynard is a great example. A lifelong and admitted "gearhead," Maynard is currently serving his second term in the West Virginia Senate. He grew up working at his father's Union 76 gas station, and watched as his father competed in sand drag races throughout the region. Maynard later served for several years as a professional crew member with multiple racing teams, including with Jim Head's nitro Funny Car in NHRA competition.

Today he owns a small business in his native Genoa, West Virginia, and remains an avid muscle car and off-road enthusiast.

A rising star in the West Virginia Republican party, Maynard made a stunning political debut in 2014 when, seeking his first political office, he upset Truman Chafin—the longest serving Senator in West Virginia history—in a tight race for the 6th District senate seat. Maynard won re-election in a landslide in 2018, and today is chairman of several key Senate committees including Economic Development, Natural Resources, Enrolled Bills, and Rule-Making Review.

Maynard is a tireless advocate for West Virginia in terms of motorsports and performance causes, including quick work in spring 2020 that allowed motorsports facilities in the state to remain open during the COVID-19 pandemic. He also led the way in the creation of the West Virginia Motorsports Committee, which will advance causes related to the industry.

Despite a busy schedule during this year's Senate session, Maynard recently took time to visit with *Industry Insights*. He invited readers with questions or comments to contact him on his cell phone (304-360-6272) or by email at mark.maynard@wvsenate.gov.

an email from an association like yours, or a newsletter that establishes what's going on in the different states, that really helps. Matter of fact, way before I became a legislator, in my Petersen's *4-Wheel & Off-Road Magazine* I would read about a piece of bad legislation that had been introduced in a particular state. It would give the name of the legislator and their party, and that gave people the opportunity to reach out to that legislator.

can reach many legislators with the same message. You can also save the email address of all of your legislators in a document, so that whenever you have a message you can copy-and-paste using the CC or BCC function. In West Virginia, for example, you could get your point across in less than five minutes to 134 legislators. We also have our phone system, which is not used as much anymore, but in the Senate we each have an administrative

"MY MAIN RECOMMENDATION IS BELONGING TO AN ASSOCIATION THAT CAN KEEP YOU UPDATED AND REPRESENT YOU ON TOPICS RELATED TO YOUR INDUSTRY."

PRI: What do you see as the biggest threat to racing and the performance industry?

Maynard: I have no reason to think this other than just being pessimistic, but at this point federal regulation is probably my biggest concern. As a state legislator, many times I see federal regulations get passed down to the state, with the threat that if you don't support the federal mandate you risk losing federal funding. So that is one threat.

What the threat would exactly look like, I don't know. I would hate to see regulations that could prohibit the use of passenger cars in motorsports. That would really hamper our sport, financially and other ways. One other concern is public land usage.

I recently became interested in desert racing in America, and if we lose our right to traverse public land in desert races it would devastate the desert racing community, plus other forms of racing that take place on public lands.

PRI: I suspect any representative at the state or federal level is inundated with information and requests. How can we cut through all the noise and help our representatives better understand our industry?

Maynard: If there is something very important on someone's mind, they could spend less than 15 minutes and accomplish every method of contact for their legislator: email, phone call, and a letter. Unfortunately, it's not easy to find a contact database for all of the representatives in your state to allow you to send one email to all legislators. But with copy-and-paste you

assistant that listens to every voicemail and passes that message on to us. We also still get snail mail.

But my main recommendation is belonging to an association that can keep you updated and represent you on topics related to your industry.

PRI: This is very interesting. To be honest, I've often had the sense that my representatives are so overwhelmed with constituent feedback that my single message isn't going to make any difference. But as we talk about this, my instincts are that maybe my message has more resonance than I realized.

Maynard: Absolutely! I am not overwhelmed; I have a manageable amount of messages and feedback. I share my cell phone number readily and have really tried to get it out there. I receive a manageable number of text messages every day. And Facebook Messenger, I get a lot of junk emails there and it's hard to keep track, but that's another way I can be reached. We try hard to keep an eye on feedback, especially when we're in session. That's when it's really important for constituents to contact their legislator, when they are in session. As a matter of fact, I got behind on my communication this week, but we just had our last committee meeting for the week and I'm going to hold myself in my office this afternoon and evening to respond to all of the messages I have received. Grassroots efforts can have a big impact on a bill.



A lifelong "gearhead," West Virginia State Senator Mark Maynard is a passionate champion for the rights and freedoms of motorsports participants throughout his home state.

PRI: One of the areas you mentioned working on is tort reform language that would limit liability of motorsports facilities in West Virginia. How would that work?

Maynard: It's in the early stages right now, and the research has been much more difficult than I anticipated. I started on the project months ago. The reason this came on my mind was that there was a local drag strip in my area and a competitor had signed the release of liability waiver, but his throttle stuck and he missed the sand trap and crashed and was badly injured. The next thing you know, the track shut down. Now, I have no idea of what specifically happened in that case, but it got me thinking. My idea is that somehow through legislation we could protect the tracks from closure related to lawsuits. I'm doing this because I love motorsports and I want it to grow in West Virginia. I want to see people responsible for their own actions. A liberal legislator was kidding me recently, having fun, and he said, "You know what, when we have a roast for you, I'm going to use your quote, 'Every time my feet hit the floor in the morning, I'm in charge of my life and the decisions that I make, good or bad.'" So that's what I'm looking for; I want people to

be responsible for their own actions. I don't know where this will go, as I'm still in the research stage. But I'm going to continue to work on it.

PRI: As electric and hybrid vehicles gain popularity, there will inevitably be some attention from regulators looking at motorsports. How can we make sure the internal combustion engine is specifically protected in motorsports applications?

Maynard: That's a great question, Dave. The idea of the internal combustion engine not being a part of motorsports, that actually almost brings a tear to my eye. I embrace all forms of motorsports, electric or otherwise, but my first love is the rumble of an internal combustion engine. It's going to take a grassroots effort for constituents to say, "No, we will not allow these engines to go away." I'd hate to see it come to this someday, but it's one thing if we lose the cars on the street, but we're going to have to stand firm to not allow the electric engine to ever be exclusive.

PRI: You were the lead sponsor in 2019 on legislation that created the West Virginia Motorsports Committee. What will be the primary mission of the committee?

Maynard: Our mission was to grow

motorsports in West Virginia. Recently in March, Governor Jim Justice confirmed five appointments to the committee. Last spring (2020), when our governor issued the COVID mandates, one of the mandates covered outdoor sporting events, and motorsports events fell under that mandate. However, I had to do the work the motorsports committee would have done, spending a couple of days contacting every venue in the state to let them know what was going on, and going to bat with the governor to specify that motorsports facilities could be open and practicing certain precautions. That is the kind of work the committee could really have a positive impact with.

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COMBUSTION ENGINE
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MY EYE."*

PRI: You've also been an advocate of attracting more motorsports events to West Virginia. How can government officials attract new events to the state? How can a state become more hospitable for motorsports?

Maynard: There are always tax incentives and that sort of thing. We recently had a deal that was very simple; it allowed motorsports facilities that were doing infrastructure improvements to not pay sales tax on those improvements. So technically, it's not money lost by the state but it's a savings for the facility. There are also elements through tourism where states can make a real difference by welcoming events, even if there is no direct funding help. Just the fact of being listed on their schedule of events, brochures, things like that, it is supportive. Every state does this sort of work and they could really help motorsports by including that information in their marketing. It makes a difference.

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Mark Maynard sponsored a dirt late model car during the last election. In the past, he has crewed for a late model team, and once served on Jim Head's NHRA nitro Funny Car team.

PRI: You touched on this a moment ago. Another important issue for segments such as off-road racing is land access. You were recently appointed as a board member of the BlueRibbon Coalition. How can we make certain we have access to the land needed for different forms of competition?

Maynard: You know, it once again comes back to your state and federal legislators. They are in control of this land, but when it

comes right down to it, they share control. State and federal agencies are technically in charge, and the legislators can make the greatest arguments in the world (for land usage for motorsports) but if these agencies don't agree then it doesn't happen. They are considered the experts, and their opinion many times outweighs the points made by a legislator or a committee. I can have the greatest ideas in the world for land

access, but when the Department of Natural Resources says it's bad, the idea goes down in flames most of the time.

I've talked about contacting your legislators, but in many cases the head of a state agency actually has much more authority than the legislature. But they are known as bureaucrats for a reason. They are often appointed and in a position to do good things, and sometimes when you think outside the box it's not always a good thing. So this bureaucrat could risk his position if he gets a little too radical and tries to make things happen. But for an individual to try to make things happen, contacting your state and federal agency, the EPA, and either National Forest (USDA) or the Department of the Interior (DOI), those are avenues.

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The fight for land usage is becoming a pretty big job. I have scheduled meetings in (Washington) DC with the USDA (US Department of Agriculture) and the DOI stressing the importance of land access. If I lived closer to DC I would be there once a month, knocking on their doors.

And one more thing...go to the Capitol. I know it's difficult now with the COVID situation, but go to Washington and set up an appointment with your legislators, and talk to them. Stress to them the importance of land usage for off-road sports. The squeaky wheel gets the grease...that's still true. Ranch Pratt of the BlueRibbon Coalition has been very active on this front.

PRI: Speedway Motors announced in January plans for a new distribution center in Kearneysville, West Virginia. How can West Virginia continue to attract motorsports and performance companies to your state?

Maynard: We are making friendly changes in our state code, through tort reform and employer sanctions. I was pleasantly surprised when I learned of Speedway locating here—in fact, I need to reach out



"Each individual has a voice here," said Mark Maynard, urging motorsports enthusiasts to express their concerns to legislators. For this, he even offers his cell phone number.

to them and congratulate them for choosing to expand with a facility in West Virginia. I think it boils down to making your state "business friendly." And it doesn't hurt to have motorsports-friendly language every now and then to get the industry in the news.

PRI: The backbone of the performance industry is comprised of small businesses. What can the government do, in a broad sense, to help those businesses thrive? How can government create a business-friendly environment?

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As an ATV enthusiast, Mark Maynard knows firsthand how critical it is to preserve outdoor spaces for motorsports. "The fight for land usage is becoming a pretty big job," he said.

Maynard: The most important thing is to do away with over-regulation. That is one of my main goals, every day. That doesn't mean to get rid of regulations; I'm talking specifically about over-regulation. When you get to that point, when you have the right balance of regulation, you can start working on positive things like tourism efforts, tax incentives, and employer-friendly regulations.

I recently heard that Edelbrock is moving their facility from Torrance (California) to Mississippi. I toured the Edelbrock facility some years ago when I was working on Jim Head's Funny Car crew, and it is a massive and impressive facility. It took up two or three blocks, an amazing facility. The fact that Edelbrock would go to the expense and work to move such a facility from California to Mississippi, that shows the dramatic situation with regards to state regulations and business climate. It's expensive to move, but you can definitely see the motivation.

PRI: Your Senate service has surely been a unique learning experience thus far. What's been the biggest surprise for you, in terms of what it's like to serve as an elected official?

"THE MOST IMPORTANT THING IS TO DO AWAY WITH OVER-REGULATION."

Maynard: One thing is just the amount of unknowns you deal with. As a business owner, whenever I felt like we were over-regulated, I would accept it and think, "Okay, those are the rules, gotta live by 'em." But after serving, I realized that every individual and every business owner has a voice. If you don't like something, you can come up to the capitol and tell us about it! That's probably been the biggest epiphany I've had, the fact that every person has a voice. Unfortunately, people often don't realize this. On my Facebook page I try to post things to inform my constituents on what is going on, to let them know what is happening.

PRI: You spent several years on the crew of Jim Head's nitro Funny Car in NHRA competition. You've also crewed on a late model stock car. What did your crew experience teach you? Were there things you learned that serve you today?

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Mark Maynard is pictured here in 1980 with his father, who competed in sand drags. Maynard hopes to revive one of his dad's racing trucks from the period and bring it to Gravelrama in 2021.

Maynard: Absolutely! Serving on Jim Head's crew for all those years—my Senate colleagues would be shocked to hear this—but I rank those years right up there with serving as a senator. It was hard work, it took a lot of determination, but I learned a lot of technical expertise. Seeing the cars run from

behind the scenes, that was an amazing experience. Learning how things work, that was amazing. Ten of us would thrash on that car, hoping to make eight passes in a weekend, tearing it down completely between rounds. Doing the bottom end is a dirty job, and torquing the mains to 110 ft.-lbs., torquing the rods to 100...hot oil dripping on your face...it was tough, but it was an incredible experience.

PRI: Are you still interested in working with a team? Would it be possible given your current workload?

Maynard: You know, I would love to. And I could do it on a limited schedule. My favorite races on the NHRA schedule are Las Vegas and Pomona, and I would probably do whatever I had to do every year to work those two events. Now, during an election year that would be difficult. And in the spring, that part of the season is off-limits for me because we're in session during that period. But I would love to work on a trophy truck, something like that.

When I worked on Jim Head's team, he was number one. That's how it is when

"SERVING ON JIM HEAD'S CREW FOR ALL THOSE YEARS—MY SENATE COLLEAGUES WOULD BE SHOCKED TO HEAR THIS—BUT I RANK THOSE YEARS RIGHT UP THERE WITH SERVING AS A SENATOR."

you're on a crew. The team comes before everything else; before family, before any extra-curricular activities. You had to be very dedicated to the team. You either make the team number one or you don't work on the team. It wasn't because Jim made that stipulation; it was because you have a job and if you're not there, nobody could do my job because they all have their own work.

But yes, there are times when I think about going racing again. If I get that opportunity again, I definitely plan on carrying my own weight.

PRI: Your dad competed in sand drag racing when you were growing up, and you've talked of your passion for sand drag

racing. Do you foresee getting involved in competition of some sort?

Maynard: I actually have competed in sand drags. He still has the amazing truck he ran back then. My dad is 82 now, and the event that is very popular here in the East is called Gravelrama. The 50th anniversary was in 2020, but it was rescheduled to 2021 due to COVID-19. My plan this summer is to bring the truck out of mothballs, get it serviced, go through it, get it ready to race, and race it in the 50th anniversary of Gravelrama. Hopefully I would get to take my dad with me to help me race it.

PRI: What an exciting idea! On the political front, you're nearing the end of your second term in office. What do you see in your

future? Will you want to continue to serve in the legislature? And do you have aspirations of a federal office, such as US Congress?

Maynard: You know, I do, because I see the difference I can try to make as a state senator and the way our state code is run. But my job is not done here, and I plan on running again here in 2022. After that I would definitely entertain a federal office. I would try to do the same things I'm doing right now, only doing it in Washington, DC. Dealing with USDA on land access, working with the EPA on motorsports regulation, doing tort reform to make people responsible for their own actions. But yes, that's on my radar.

PRI: Senator, we appreciate you giving us time from your busy schedule. Thank you for your service to the people of West Virginia, and we wish you the best in the future.

Maynard: Thank you, Dave, it's been an honor to talk to PRI. I enjoy talking about motorsports, my passion. And I invite any of your readers who can help us better represent motorsports to reach out to me with suggestions or input. **PRI**



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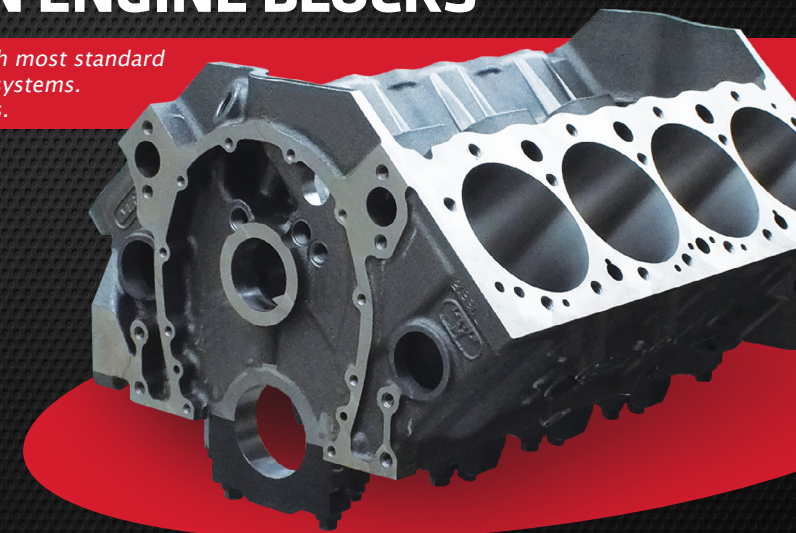
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Special Report:

Eyes on the Prize

Purse structure is really not all that complicated, but that doesn't mean there is a one-size-fits-all solution to how payouts are determined, or their impact on front and back gates.

By Steve Statham

No matter the activity, it's impossible to get away from the subject of money. And for a sport like racing, money can be the make-or-break factor for whether a team can hit the road in search of victories, or throw in the towel and be content to watch others race on TV. The size of the purse—or the lack of—is never far from a racer's mind. Grumbling in the pits about prize money is as age-old a tradition in racing as raising a trophy in victory lane.

For such an important subject, however, much of what people think they know about racing purses often comes from rumors, assumptions, and guesses, with a lot of relevant information filtered out. That's only natural, given that how prize money is calculated is rarely discussed openly.

At a fundamental level, the amount of prize money available comes from just a handful of sources: Front gate revenue (paying fans), back gate (racer entry fees), and sponsor money. Add in a few unique elements for larger series like TV or streaming revenue, maybe some concessions sales, and that's the pie to be divided.

Nonetheless, with such seemingly simple and obvious sources of revenue, racers often encounter wildly varying purses. Some tracks and series offer huge money to win, and not so much for finishing mid-pack. Others pay well deep into the field, and less to win. The best offer guaranteed-start money.

How does all that get decided?



Attention-grabbing prize money is increasingly common throughout motorsports. But beneath the surface lies a complex array of factors that needs to be considered.

Numerous calculations go into how much prize money to offer, and it can differ from track to track depending on local conditions and management philosophy.

"There's a lot of different theories about how to balance that money back out," said Brian Carter, CEO of World Racing Group, which encompasses the World of Outlaws, based in Concord, North Carolina. "A lot of places like to run for huge money to win, and then it doesn't pay a whole lot through the field. That may be good for promoting or for encouraging some of the top cars, but it doesn't create a cycle with the racer that is

feature," he added. "That's the place where there's a lot of inconsistencies across the country, with what does the start money look like, what does the tow money look like, and how is the breakdown of the prize money."

For a number of tracks, giving special attention to the grassroots ranks is a fundamental building block, even if the immediate payoff is not always obvious. "I think you step back and you first identify that your Sportsman program, at your host facility,

that then feeds all of the specialty races that you have not only in your calendar year, but in neighboring tracks' calendar year. This year we have a 15-race series, the Edelbrock Super Series, and it's really designed to attract and reward your weekly bracket racer. Those core racers then support everything else you do, whether it's a brand event, like Ford or Chevy, or an event like the Halloween Classic, or the \$40 Grand Nationals or No Box Bonanza. That is the pool upon which you draw that really feeds your entire year. And people don't always consider that. They look at their bracket program as a standalone rather than the base upon which your entire year is built."

Building a healthy weekly Sportsman program can pay big dividends, but it's not an easy process, especially when it comes to purse payouts. "If you look at it on a standalone basis, those weekly bracket programs don't make a lot of money," Bader said. "So while they are vitally important to why we get 1,200 cars at the Halloween Classic, or why we get almost 900 cars at the Night Under Fire, or why our \$40 Grand Nationals and No Box Bonanza sell out, there's kind of a macro view and a micro

"I FOUND, TO BE HONEST, PAYING MORE IN THE MIDDLE TO THE BACK SOMETIMES CAN BRING YOU MORE CARS THAN THE FRONT."

sustainable if the guys who are running 10th aren't getting paid a lot of money. At some point you start discouraging the guys from coming and trying to run for 10th. You pay great 'to win' money, but if you're not paying through the field it may not be the right spread of the prize money.

"Some places only pay if you make the

is the absolute bedrock, the foundation, the core that you build your business around," said Bill Bader Jr. of Summit Motorsports Park, Norwalk, Ohio.

"It's certainly our core at Summit Motorsports Park," he continued. "So, to have a strong and healthy bracket program on a weekly basis is the cornerstone, and

Big first-place prizes don't always come with payouts deep into the field. "There's a lot of different theories about how to balance that money," said our source at World Racing Group.

view. On a macro level those programs are essential, and critical, and vital. But on a micro view, they, as a standalone 15-race series, make very little money. So, therein lies the problem. Because what's the single biggest expense you have at a Saturday night bracket race? The purse."

To be clear, cultivating grassroots loyalty pays dividends, but sometimes track promoters find out that prize money doesn't always matter as much to racers as is generally assumed. "We're always looking for something new to keep racers interested and coming to the track," said Wayne Delmonte of Lebanon Valley Dragway, West Lebanon, New York. "Two years ago we went to what most tracks don't do, we went to a second-round winner money. So basically, if you won second round, you got money back. Which isn't much—it doesn't even cover



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While big-money-to-win payouts are still the standard, several operators are moving to more evenly dispersed payouts to attract "the smaller teams, the hobby teams, the drivers that have a full-time job or own their own business," one source said.

your entrance fee. We just found out that a lot of racers never even come and pick up their purse when it's that little. I don't know if they feel bothered by it. They had to know it, because we announce every weekend, 'If you won second round you need to pick up your money.' And the amount of racers that don't come in for second-round winner money was quite surprising."

Making sure the prize money is spread deep through the field seems to move the needle for most series and tracks, however. "Our Fonda 200, which is a 200-lap event at Fonda Speedway coming up in September, this year I raised the green money up to \$1,000 to start that event because of the extra laps," said Brett Deyo, series director with the Short Track Super Series, a touring series for modifieds based in Delaware.

"It's \$53,000 to win that race, but we moved the green money up to \$1,000 to try and attract some of the smaller teams," Deyo explained. "I found, to be honest, paying more in the middle to the back sometimes can bring you more cars than the front.

"THE LAST FEW YEARS, PROMOTERS HAVE REALLY BEEN MAKING AN EFFORT AT SPREADING THE MONEY THROUGHOUT THE FIELD, SO IT'S NOT SUCH A TOP-HEAVY PURSE."

The big names are going to come whether it's \$5,000, \$10,000, because they race for a living and they need to. But it's the smaller teams, the hobby teams, the drivers that have a full-time job or own their own business, those are the teams we need to target to make sure the car count stays up."

"I'd say, the last few years, promoters have really been making an effort at spreading the money throughout the field, so it's not such a top-heavy purse," said Shawn Miller of Inside Line Promotions, Lewistown, Pennsylvania, which specializes in marketing and promotion for the motorsports industry.

"That's been a big topic in grassroots racing over the last few years," he continued. "That's great to offer the big money, and that's what's on the billboards and social media

graphics, what it pays to win. But almost as important, or maybe as important, is 'What does it pay to start?' And can we make sure the guys that are making the show and finishing 20th are happy that it's a big event and that shows in their pay, and not just the guy who's going to win the event."

For the moment, at least, the big-money-to-win events are cruising through the motorsports ocean like giant tankers, pulling smaller vessels in their wake. "Our goal is to retain as many people in our pit area on a weekly basis as we possibly can, to defend against these predatory events that want to suck our core out of the pit area every week. I do believe tracks are suffering from the volume of big-money races that are taking place," said Bader. "I also think that the big-

money race is novel, it's the new shiny toy. But I think it will run its course. I don't know that this type of racing can sustain long-term. Because again, there are going to be so few winners and so many losers."

Also complicating the subject of racing purses is just how much money many of today's racers are willing to spend to compete. How can a local track that's paying \$1,500 to win lure a racer traveling the country in a six-figure motorhome with a fleet of expensive support equipment, but who believes the purses should cover all his costs?

"Racing back in the day, you had a lot more people that were racing for fun because they were racing at home tracks, and that's just what they did on Saturday nights and they enjoyed it," said James Sawyer, general manager at Volusia Speedway Park, Barberville, Florida. "And now you have so many more people that are racing as a living or as a business, so they have to look at the same revenue costs and sponsorships just like we look at it from the promoter's side of things, as to what kind of

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Purses are funded mostly by ticket sales, entry fees, and sponsor money. Offsetting these are the high costs of running a track, which many racers simply aren't aware of.

money and purses can we pay, and who can help fund it."

"What none of us could have probably anticipated 30 or 40 or 50 years ago was the wealth in the sport and the manner in which racers are traveling across the country coming to our race tracks," said Bader.

"I think the drivers sometimes don't really consider the effect of where they race on what they get paid," said Deyo. "With our tracks, especially Fonda in New York, because we have so many neighboring tracks, I look hard at who goes where. I have probably one of the higher purses in the region that we race on Saturday nights, and when I see drivers racing on Friday for 60% of the purse, it definitely makes you question your business model. I've always

said that drivers set their purses just as much as promoters do by selecting where they race."

Attempting to make prize money work more efficiently for the racer has led to new ways of looking at the subject. The Bandits Outlaw Sprint Series, based in Dallas, Texas, was started to try to find a more sustainable model for sprint car racing, said Darin Short. What that led to was a rulebook oriented toward keeping costs low, equalizing opportunity, and making the purse go further, as well as making high-finishing payouts more accessible.

The Bandits Outlaw Sprint Series restricts the amount of horsepower that can be transmitted from the engine through the tires to the race track. It does this in part by limiting the top wing angle to 20 degrees, which limits downforce, which in turn saves tires and other components on the car that are stressed when the wing angle is high. There's a minimum weight limit of 1,500 pounds, and when weight must be added it has to be placed in front of the motor plate.

"OUR GOAL IS TO RETAIN AS MANY PEOPLE IN OUR PIT AREA ON A WEEKLY BASIS AS WE POSSIBLY CAN."

FROM THE OTHER SIDE

For racers to understand the ins-and-outs of prize money, it helps to peek behind the curtain at what tracks and promoters face to put on the show. They might be surprised to discover that some long-held beliefs are out of date.

"I think the racing community is very smart—look at the manner in which they are traveling around the country," said Bader. "A lot of these folks are white-collar professionals, well-to-do, or highly compensated blue-collar folks, so there's a lot of money in the pit area. There was a time when the track operator was the wealthiest guy on property, and now he's probably one of the poorest guys on property. There's not a lot of money to be made in this sport. Now remember, we are a sport, we're an outdoor

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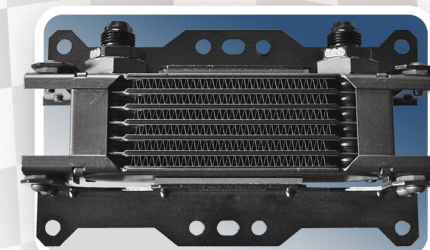
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entertainment, we're subject to weather, we're subject to the economy, we're subject to fuel prices, we're now subjected to a pandemic. I think there is a misconception that tracks and promoters are just making a lot of money. And that is not true. That is absolutely not true."

The costs involved in keeping a track operational just keep expanding, according to our sources. "I think sometimes a lot of the other costs are overlooked," said Short Track Super Series' Deyo. "You might think, 'Oh, there's not that many employees here,' but when you start adding up all the corner workers and ticket booth people, concession people, security, I think that's underestimated. Just Porta Potties alone at our race track in Delaware, I spend \$2,800 a month. You have to have them, it's the right thing to do for the people that are attending the event. Other improvements, sound system improvements, equipment failures, there's just so much. There's a lot of

"I THINK THERE IS A MISCONCEPTION THAT TRACKS AND PROMOTERS ARE JUST MAKING A LOT OF MONEY. AND THAT IS NOT TRUE."

other expenses," he said. "Imagine Walmart existed and had to pay taxes and all the other expenses but could only open 20 out of 365 days."

Many trackside services, too, often get taken for granted, but they aren't free. Somebody is paying. "Where I can really shine is the off-track experience, creating a culture, and all of these creature-comfort features like free electricity in the pits," said Bader. "I mean, I have a \$300,000 electric bill every year because we can hook up close to 300 motorhomes in our pit area for free. Flush bathrooms, the fact that a human being answers the phone every minute of every day as opposed to voicemail. There are a lot of services that go into running a race track."

Counting cars at the track may not give a clear picture of the economics at work either. "A lot of racers say, 'Oh, you have X amount of cars there, you're making millions of dollars every year.' Well, that's not true for any facility with racing anymore," said Delmonte. "It's a tough sell to make money at a race track, especially if you have a lease on your facility or don't own it outright and have a mortgage, that's just another added bill. And it's got to come from somewhere. The way sponsorships are going these days, the sponsors aren't handing out the money like they used to. So, you're relying on one of two things—either the spectator coming through the gate, or the racer."

Away from a track-level view of the money

situation, a wider angle can paint a bleaker picture. Short, who has been promoting sprint car races for 40 years, said the 21st century has been one upheaval after another for the economics of racing. He traces it back to the rising costs following 9/11. "This is when the wheels fell off the wagon in this sport," he said. Rising gas and diesel prices made transportation costs skyrocket, keeping racers and fans closer to home, and raising prices for parts. Steel and aluminum prices also increased dramatically, touching all areas of racing. Behind the scenes, another cost began ratcheting up—track insurance. "Everybody started to sue everybody for any little thing that happened at the race track, because they could find a lawyer and make it happen. That became a huge issue over the past 20 years."

FUTURE MONEY

Of course, large-scale forces are still at work even now that affect racing, some

of which may benefit both drivers and promoters.

"Streaming revenue is a newer revenue stream for the sport, and it's still developing," explained World of Outlaws' Carter. "We reinvest a lot of the resources that we create through the series, either through ticket sales or sponsorship, and streaming revenue is becoming a bigger and bigger part of that. Our reinvestment is being made in different ways. We're reinvesting back into the fan experience, we've reinvested into the large-scale video screens, we've done some staffing on promotions, and we have enhanced the prize money along the way. Five years ago, 10 years ago, it wasn't a measurable factor, and now it's becoming a bigger part of the resources created by the events and how they get managed back in."

For the Short Track Super Series, streaming has been a big positive that has led directly to better prize money, reported Deyo. "For us, we were able to run in

Louisiana last fall during hunting season when I knew we weren't going to get big grandstand gates and pay big purses," he admitted. "I paid \$20,000 to win on a Saturday in Chatham, Louisiana, last November, and I wouldn't have been able to do that without the livestreaming. And that's definite. To me, it adds a third gate. It has always been that promoters look at back gate, which is the pits, front gate, which is the stands. To me, now you have three gates to work with because you have the livestream option. It opens the door for some bigger payouts."

"For us," Deyo continued, "because we are such a Northeast-based division with our modifieds, it really has opened the door for us to go to other places. We went to Tri-County in North Carolina last year, Cherokee in South Carolina, we went to Ark-La-Tex, which is basically on the Texas border.

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MONEY TALKS...OR DOES IT?

The pressure was on.

It was the mid- to late-1990s, and several Indiana dirt tracks were facing pushback from racers to increase their purse for weekly traditional sprint car programs. Weekly programs had been paying in the range of \$600 to \$800 to the winner, and tracks such as Bloomington, Gas City, Putnamville, Lawrenceburg, Kokomo, and Haubstadt began bumping purses to the \$800 to \$1,000 range in hopes of continuing to attract cars.

As this was happening, promoter Keith Ford of Paragon Speedway made a surprising announcement. Ford—an old-school promoter with a strong independent streak—announced that Paragon's Saturday night program would pay \$500 to win, and \$100 to start. And there was a caveat: Every car would run a feature race. If the car count exceeded a set number, a second feature would be added. And, if needed, a third feature.

People throughout the state laughed. "Wow, Paragon won't get any cars!" was the conventional wisdom. Why would anyone drive past a track paying \$900 and race somewhere else for \$500?

Soon enough, on a weekly basis Paragon was drawing enough cars to run multiple features, and their pit area was filled with eager racers. The robust weekly program—and the unique purse format—would continue unchanged for more than a decade.

Those racers could have easily chosen to race for a higher

purse at a nearby track. However, the higher purses also meant a traditional program, in which only the top 20 to 24 racers would run the feature. Everyone else ran a 15-lap B-main and loaded for the ride home. The lure of Paragon was the guarantee of running a feature race—along with a minimum of \$100.

The reasoning of many racers was immediately obvious: I'm willing to race for less money if I'm guaranteed to run a feature.

It was yet another example of the tricky and complex issue of purses in motorsports. There is a bedrock truth in racing—particularly at the grassroots level—that has been proven over and over again: The majority of racers are driven not by economics, but by passion.

Don't misread this and think that money isn't important to racers—quite the contrary. It's just that it isn't typically the driving force that keeps them in the sport.

In short-track racing, a purse with big up-front money is sexy. "\$10,000 to win!" "\$25,000 to win!" "\$50,000 to win!" Those races tend to generate a lot of attention, and fans are often drawn to such events because they believe they will see the best racers. But it has become more and more common to see many racers pass up a high-dollar event to race elsewhere for a fraction of the money.

Why? There are often myriad reasons, but typically the central issue is they don't think they can win at the bigger race. Most racers would get far more enjoyment from winning a \$1,000 race

than making \$1,000 for running 10th.

Any serious discussion of purse structure involves as much psychology as finance. Racers will tell you they deserve more money (they're probably right) and many view the purse as a measure of the respect they command. If you offered the World of Outlaws sprint cars a \$100 top prize they would probably be offended, and rightfully so.

And racers have a fierce and dogged belief that they deserve their fair share when it comes to payouts. But what exactly is their fair share? And would more money make racers more loyal, and happier? Not necessarily, and that's where things immediately get very complicated.

A quick poll of drivers, mechanics, and team owners—at every level, top to bottom—reveals a surprising lack of understanding of the financial ecosystem of motorsports. A racer looks at a full grandstand and assumes the track is making a pile of money, very much unaware of the costs involved with running a track or series. (By the same token, very few series owners or officials have a full understanding of just how expensive it is to field a race car today.) There isn't a lot of transparency in this business on either side, and it's been that way since day one.

And the advent of streaming has brought another dimension; many racers assume tracks and series are making another pile of money from streaming. It's inevitable that racers will begin to insist on a piece of the streaming pie as well.

Aside from emotional considerations, there is a practical element to the issue of racing purses. The bottom line is that it costs a lot to go racing, and the money has to come from somewhere. For most teams that "somewhere" is a mix of race winnings, sponsorship, and family or business money. With everything combined, the team is able to keep going, more or less.

The best practical advice for every series and track is this: Get to know your racers. Talk to them until you have a clear idea of how they operate, how much it costs to be competitive, and their goals and ambitions. Don't assume; ask. And then listen very carefully.

In a perfect world the purse is an equitable share of the total revenue and is enough to keep the racer going up and down the road. And it's equally crucial that the promoter is still able to get to the bank on Monday morning—with a deposit.

And here's a footnote to that earlier story about Indiana sprint car racing in the 1990s: What everyone quickly realized is that both purse structures were feasible. The traditional setup worked well for most tracks, while the unique, guaranteed-to-run-a-feature structure worked for Paragon. The bonus was that Paragon soon became a development track, where many young racers got plenty of laps each weekend to build their skills before moving up the ladder.

Malcomb Forbes once observed, "The answer to 99 of 100 questions is money." He was right, of course. But that doesn't mean it's simple. —Dave Argabright



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We went to Chatham, Louisiana, and I've raced in Florida for two consecutive January and February events, and none of that I don't think we'd have been able to do without the option of giving our Northeast fans the ability to watch from home."

Deyo expects streaming will have an expanded role in filling in the gaps for a fragmented audience. "The other thing I see is, especially for weekly racing, a husband that likes to go to the races every Saturday, his wife wants to go camping one weekend. If you have no livestreaming you lose everything from that family—they're gone, they're not at your race track. But if you have the livestreaming option and they go to the lake camping, they can sit down, get it on their computer, watch it on the TV at the campground. So you get something from them. I see that as a gain, too."

The jury is still out as to whether livestreaming will do much to add revenue and enhance purses at smaller venues. After

all, there's not much of a streaming market for a weekly bracket program.

Delmonte at Lebanon Valley Dragway is wary of the possible incentives being introduced. "If you give that person the opportunity to stay home in their seat and you charge them whatever it is, say \$12 to stream that event, when you come through the gate that's \$12 per person. They can stream the event for \$12 and have 20 friends over and watch the races," he said.

Short with the Bandits Outlaw Sprint Series is also conscious of how lopsided the benefits of livestreaming can be. "I am completely not a fan," he said. "I know the race tracks are getting something from online streaming. It depends on what the contract is. But those are huge venues. That's only huge venues that can service several thousands of people that those types of economics can work in. If you have a race track—like the bulk of race tracks in this country—it might only hold a couple

thousand people in the stands. Those are the tracks that are going to have a problem with this, the whole online streaming revenue platform. There's just not enough series out there that are that high end, that command that many viewers."

Short sees the potential danger of creating a legion of "couch customers," and those fans don't contribute at the gate, let alone line up to purchase beer and hot dogs at the concession stand. Livestreaming made sense during the pandemic when fans were kept from the tracks, but there are big questions to be answered going forward, he believes. "If the track ends up getting left with an empty bag, because somebody comes in and basically uses their venue and their event to just make money, and it doesn't help the track, well then I've got a real problem with it," Short said. "The tracks better be making sure they're getting their end covered."

Many of the stakeholders we spoke with see

Counting cars at a given event doesn't always offer a clear picture of the economics at work: "It's a tough sell to make money at a race track," noted one of our sources.



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purse payouts rising as the pandemic recedes in the rearview mirror, and most have already announced boosts for 2021. In February, Lebanon Valley Dragway announced a \$20,000 bump in year-end points payouts for the Summit ET Series. "That's more than a double increase from last year for what we had Super Pro to win," Delmonte said. "In the past couple years, we've offered, basically, to win the Super Pro points championship was \$2,100. For this season, we're upping it to \$5,000. Pro was the same thing, \$2,100, and we upped that to \$3,500 this year, just hoping that more guys want to join our points system and come on a weekly basis to compete for that championship."

World Racing Group has also announced bigger payouts in 2021 for both World of Outlaws series. "At the World of Outlaws level, we increased both the sprint car and the late model base prize money for a standard event," Carter explained. "For the sprint cars we increased that about \$3,000 a night, on a standard purse. And on the late

models, we increased that about \$9,000 on a standard purse. So effectively, the sprint cars and late models World of Outlaws base purse is exactly the same. That's a nice raise for everybody that's racing, and it's based on the continued resurgence in the sport and the increased attendance and the resources that are being made available to everybody by just promoting the sport better. We were able to implement those for 2021 and are already in place. The long and short of that,

with everybody else that followed, it's an extra million-and-a-half dollars over the sport in 2021 alone just in the baseline purses and everybody else that followed suit."

For an industry still on the rebound from pandemic lockdowns, rising purses is a hopeful sign. "It has been coming for a long time. You could see enough of the trends," Carter said. "We would probably have done it in 2020 if we had a better year, but we're ready for it in 2021." **PRI**

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THUNDER AND



LIGHTNING

Photo courtesy of Hyper Racing

Micro, mini, and Lightning sprints offer big fun and competitive racing at budget prices. And with steadily escalating purses, are they finally getting the respect they deserve?

By David Bellm

What would heaven look like for a dirt-track racer? It would surely be filled with tight, anyone-can-win racing. It would be easily attainable, too. And although it might not be a grandstand-filling epic, it should feel at least somewhat professional. At the same time, it would be accessible to guys and gals who want their last hurrah before fading to the sidelines and raising their mugs to the glory days.

When you put it that way, it might just look a lot like the world of micro, mini, and Lightning sprints. These feisty machines offer much of the thrill of bigger, more expensive cars, but in a format that puts them within reach of pretty much anybody who has an itch to go racing and a truck to pull their trailer.

Micro, mini, and Lightning sprints are basically downsized sprint cars powered by motorcycle engines. But the specific terminology isn't always precise. Mini sprints and Lightning sprints are fairly interchangeable names used to describe sprint cars that are essentially midgets powered by a 1000cc chain-drive motorcycle engine. Micro sprints are roughly half the size of a Lightning or mini, and use a 600cc chain-drive motorcycle engine.

Within these broad categories are a number of different classes, including stock and modified, winged and non-wing. Outlaw classes allow extensive modifications to engines. But at the moment, the most active class appears to be the A-class 600cc micros, which run an engine that's essentially stock. "A-class non-wing is the most popular, because a lot of people can afford it," explained Austin Quick of Hyper Racing, Lewisberry, Pennsylvania. "Your backyard guy can literally just go buy a motor off the bike for 1,500 bucks, go find a car, and be racing for anywhere from five to 10 grand."

Most tracks offer wing and non-wing classes, and there are perceived pros and cons to each. Many of these center on the very young racers these cars are attracting. "Some guys won't race non-wings for the safety factor," said Kevin Bayer of the Midwest Mini Sprint Association, Greenfield, Indiana. "I myself like wings on cars because I think the kids are more stable. But, of course, non-wing is going to give them more experience feeling the car in the seat of their pants—how to make the car rotate through corners and stuff."

MICRO-SIZE BUDGETS

Arguably the biggest draw of micro, mini, and Lightning sprints is their affordability. Few popular race series offer racing that's as economical as these machines over the long haul. And that advantage is across the board, encompassing almost every aspect of a mini- or micro-sprint operation. "You've got a smaller trailer, with less inventory as far as tires and wheels," said Quick. "And the tires are half the cost. The other thing is the motor. On the Outlaw stuff you can get 20 races out of an engine. And then those A-class engines, you can go at least 40. I've seen some guys go 60 races before they even get a rebuild. Now, as far as you being competitive that whole 60 races, that's another thing. I'm sure they start to fall off a little bit toward the end of the rebuild. But it's nothing that puts you out of the ballpark."

Of course, like any type of racing, there are big spenders that are willing to devote a seemingly unlimited amount of money to their pursuit of small advantages. But with tight rules and the limited grip of these cars' relatively small tires, wild budgets typically don't translate into massive advantages on the track, according to our sources.

"There's the money guy that will buy all brand-new stuff every year and have the latest, greatest of everything," said Mike Dicely of Hyper Racing. "And then there's the budget guy who's buying the rich guy's used stuff, or even a third-hand car. But the cool thing is in 600, you can be competitive if you're knowledgeable and know what you're doing. You can buy a \$10,000 used car and go out and win races with it, no problem. There isn't a huge division between the haves and the have-nots when you're actually out on the track."

The economy of these cars is helped by the fact that their designs, rules, and setup haven't changed dramatically. This makes it common for racers to have considerable success with far-from-new equipment. "Our last major redesign was in 2007," said Quick. "There are still quite a few old cars out there. People will just update the axles and wearable components. They'll use the frame and be good to go. Nothing's really changed too much as far as pickup points or design of geometry. So a 2000 car isn't really that much out of competition compared to a 2021."

"THERE ISN'T A HUGE DIVISION BETWEEN THE HAVES AND THE HAVE-NOTS WHEN YOU'RE ACTUALLY OUT ON THE TRACK."



Micro, mini, and Lightning sprints offer action-packed racing at budget prices. POWRi and other organizations sanction regional series for these cars throughout the US.

"If you are running toward the front of the pack, you can literally run on what you earn," he added.

In spite of their bargain prices, micros, minis, and Lightnings offer strong performance and excellent racing. In some situations, their lap times are on par with V8-powered sprint cars headlining races. "We ran our cars at the USAC national at Bakersfield just before Thanksgiving," recalled Grigoreas. "If we were actually competing against midgets, we would have had Lightning sprints second, fourth, fifth, and sixth in qualifying."

The handling of non-wing micro sprints is similar to that of larger sprint cars, making them popular with young aspiring pros and veterans alike. Here, one gets wild at the 2021 Tulsa Shootout in Oklahoma.



Another big cost savings with micros, minis, and Lightnings is the fact that they don't require a large crew—or any crew at all for that matter. This not only cuts costs but adds tremendous flexibility to the logistics of getting to and from the race track. "The majority of guys will show up by themselves, or maybe with one guy," explained Alex Grigoreas of California Lightning Sprints, Upland, California. "There isn't the need for a crew like you would have with a sprint car or midget. These cars are self-starting, and they've got clutches, so you don't have to worry about being pushed off like you do a sprint car or midget. You literally get in the car, fire it up, and drive it to staging. You can show up by yourself and do just fine."

Adding further appeal to this type of racing is the emergence of big-money events, with payouts rivaling those of far costlier cars. This is prompting more racers to travel farther for a shot at these higher purses. "In the last three to four years big-money shows have really taken off," observed Quick. "There's a lot of \$5000- and \$10,000-to-win races. With those you can travel around and do kind of a tour schedule just with 600s."

These high-paying races, combined with the inherent low cost of running a micro, mini, or Lightning sprint, make it quite

YOUNG GUNS AND OLD HANDS

Micro, mini, and Lightning sprints are increasingly popular as a career development step for young drivers. "It's becoming a great feeder series," said Kenny Brown of POWRi, Belleville, Illinois. "A lot of midget drivers and a lot of the guys jumping up to sprints come out of micros. It gives you that same feel of running a midget or sprint car. They learn to understand a midget or sprint because of the similar dynamics and technology of those cars."

"IT'S BECOMING A GREAT FEEDER SERIES."

Helping fuel the move toward these cars becoming a major development class is the emergence of rent-a-ride setups. This allows competitors to easily and quickly race a strongly competitive car that's set up well. "Pay-to-ride type driver development platforms have really taken off in the 600s," said Dickey. "They're good for parents who don't have a lot of mechanical experience or racing experience, but their kids love to race. If they have the money to be able to rent a ride, their kids will have good guys behind them who can teach them how to drive and give them good equipment."

Another plus for these cars serving as development classes is the strong presence of veteran drivers that populate race fields. These cars have always been popular with experienced drivers looking for a simple, relatively inexpensive way to compete. And those fields benefit up-and-coming young drivers, too.

"We're seeing a lot of kids coming up from quarter midgets," explained Grigoreas. "And half of the guys racing 600s here have run midgets and sprint cars competitively over the years. This gives those younger guys an opportunity at 13 years old to run competitively against really experienced guys."

"We welcome those new kids," he added. "There's not too many guys here that don't like racing with them, because a lot of them have already got 10 years of experience. And once they get ahold of these cars and figure out how to drive them, they get kind of hard to beat!"

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MICROS, MINIS AND LIGHTNING SPRINTS

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The stock-engine affordability of non-wing A class micros is fueling their emergence as an extremely popular class, according to Hyper Racing's Austin Quick, shown above in the 28 car.

With tight competition, strong performing cars, and the lessons of veteran drivers, the young guns that use micros, minis, and Lightnings as a steppingstone often graduate to other series relatively quickly. While this isn't particularly surprising, some in the sport feel this progression perhaps moves a little too quickly.

"Top drivers come in and race two, three, four years—they get to the top of our class and they just move on because they want something bigger and better," noted Bayer. "I'd like the young guys to stick around longer. But I understand why they don't. And that's not what the series is built around. So I don't think we'll get there."

MOTOR MATTERS

Although micro, mini, and Lightning sprints haven't seen any radical technical upheavals

in recent years, there is nonetheless evolution in their mechanical systems, most of which centers around the engine.

In particular, much attention is being paid to auto tuners, and their potential to be used for traction control. "We can run either gas or methanol in these cars," said Grigoreas. "And a lot of the guys that run methanol have to have tuners and things to make these production-based engines run a little bit different with alcohol. But some of the systems have the capability of auto tuning the car. It's kind of a gray area—trying

Micro, mini, and Lightning cars all have starters and clutches, eliminating the need for a support crew. This contributes to keeping car counts high at events like this POWRi race.



to cheat a little bit, by being able to restrict timing on stuff that has no traction control."

Although much of the action in this segment is in the stock class, there are still opportunities to gain additional power through careful prep by engine builders. "Eighty percent of the engines we do are A-class engines, which are essentially stock," said Don Sakakura of Yoshimura R&D, Chino, California. "But there's a lot to be gained with the minor modifications within the rules that are legal. A lot of it is in reprofiling the valve seats. And that's within the rules. You're not touching any aluminum. There's a lot there in intake and exhaust flow. And you can adjust compression ratios very slightly. We get an average of about 12% to 15% more power doing these things to an A-class engine."

Yoshimura's A-class 600cc engines begin life as brand-new crate engines from Suzuki. But most of the engines powering micro, mini, and Lightning sprint cars start their racing career in a far less favorable manner—they come from wrecked motorcycles. Some in the sport feel this is one of its biggest vulnerabilities.

"I think the biggest challenge for micros is that they use motorcycle motors," said Brown. "We're depending a lot on crashed bikes. They go to the junkyard, then people purchase them and dump a bunch of money into them. A lot of guys are running 2007, 2008, maybe 2010 motors. It takes a lot of money to upgrade them so they can be competitive."

Some say that brand-new crate engines are the solution. That can be a tough sell in these budget-oriented racing classes. But in the long run, it may ultimately prove more cost-effective.

"From what I'm hearing now it's getting more and more difficult to find a good, low mileage used engine," said Sakakura. "They're just not available like they were a few years ago. A lot of these guys will buy a used engine, and down the road for them it turns very expensive, because they don't really know what they're getting into. We see engines come through that have only a handful of races on them and connecting rods are hanging out the front of them. It can end up much more costly than it would be to buy a new engine at the beginning."

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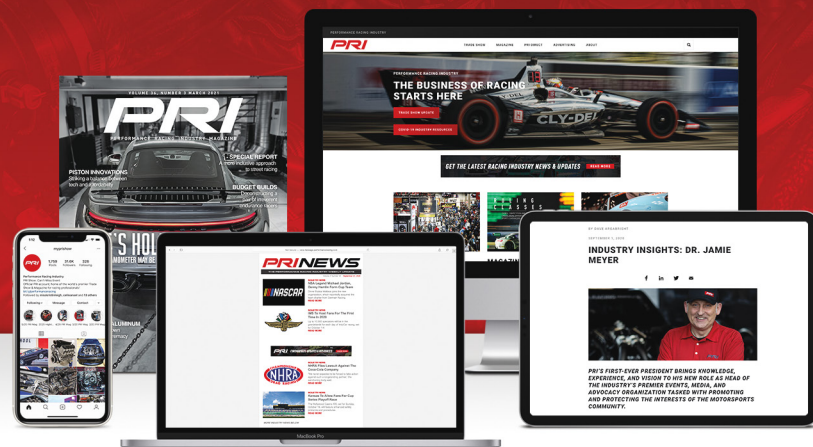
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MICROS, MINIS AND LIGHTNING SPRINTS

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Participants feel that motorcycle-engine sprint cars deserve respect befitting their strong performance. Here, Bruce Douglass qualifies for a California Lightning Sprints race.

R.E.S.P.E.C.T.

With so many positive elements going for them, micro, mini, and Lightning sprint cars are enjoying strong growth and solid popularity among participants. This is evidenced by the healthy car counts reported by all of our sources—typically averaging in the neighborhood of 25 to 35 cars.

But this raises a frustrating question echoed by almost every one of the sources we talked to: Why don't these cars get more respect and publicity?

"I'd like to see fans giving us the recognition that we deserve for the awesome racing we put on," said Dicely. "I think if they gave it a chance, if they came out to see a 600 race, they'd see it's really good stuff. And if we get that, then I think the class could really take off."

Some feel this apparent lack of respect stems in part from the motorcycle DNA of these cars. "If nobody knew these are chain-drive cars, they'd probably get a lot more

attention," said Grigoreas. "I know that sounds kind of funny, but old sprint car guys and hardcore midget guys look at these cars and go, 'It's got a chain on it, it's not a real race car.' But if they were ever to get in one and actually race it, they'd be absolutely amazed at the performance of these cars. And it's kind of the stigma that we've always dealt with.

"But I can argue that point all day," continued Grigoreas. "When a chain-drive, motorcycle-engine car is running just two thousandths of a second slower than quick time against national midgets, that's pretty good." **PRI**

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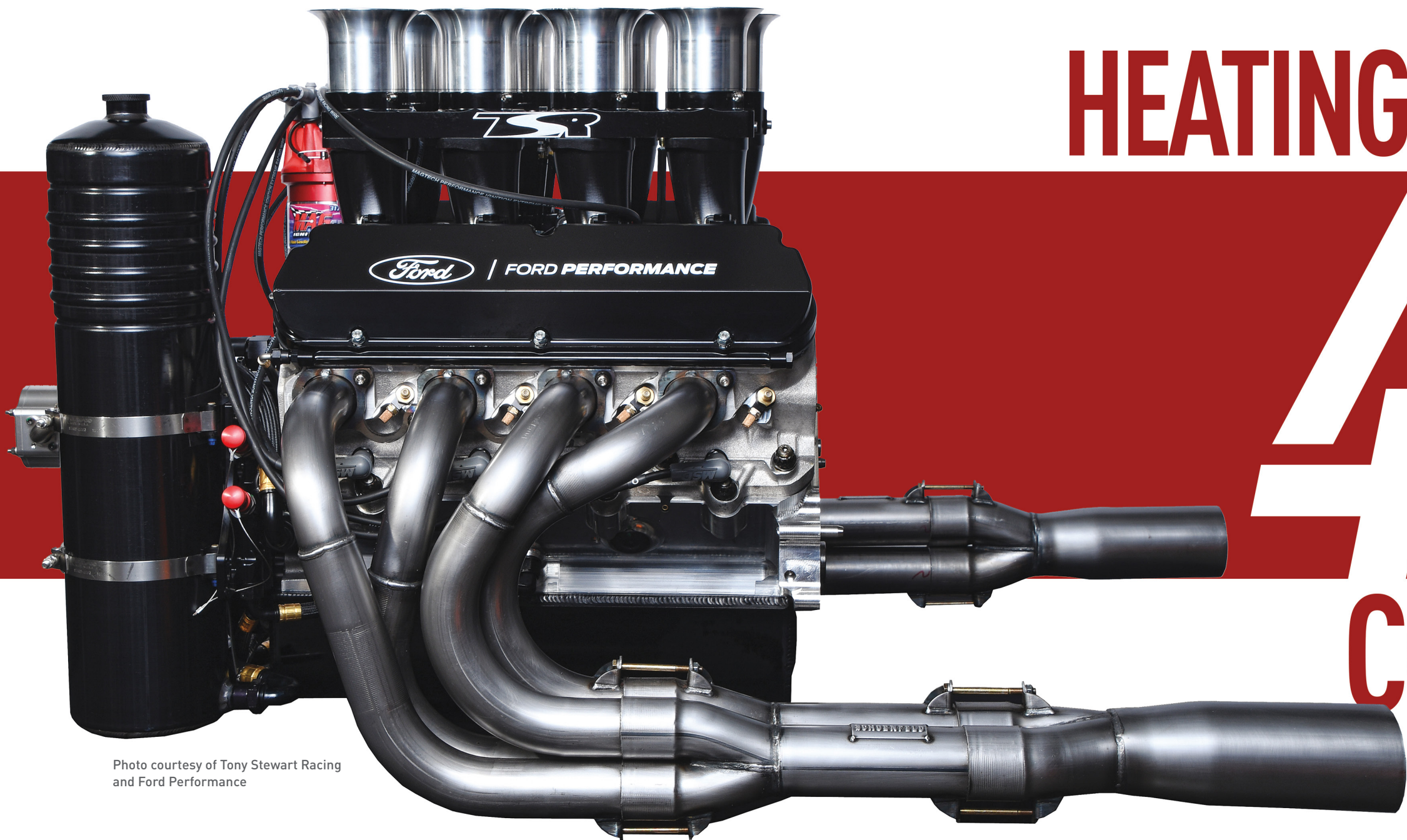
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HEATING UP THE 410 COMPETITION

Photo courtesy of Tony Stewart Racing and Ford Performance

Ford Performance and Toyota Racing Development are both putting the finishing touches on their purpose-built 410-cubic-inch sprint car engines. With a fresh approach that focuses on performance, durability, and low weight, these new mills could soon be setting the pace for open wheel fields.

By Bradley Iger

With some classes boasting power-to-weight-ratios that would make a Formula One driver jealous, top-tier sprint car racing is one of the most demanding forms of motorsports around. The 1,400-pound tube chassis race cars employ a wholly unique blend of suspension tuning and aerodynamic aids, and since it's a direct-drive powertrain, striking the right balance between horsepower and gearing is absolutely crucial. And when you've got nearly a thousand naturally aspirated ponies on tap, engine reliability is an ongoing concern.

The long-standing power plant of choice for sprint car racing is an all-aluminum 410-cubic-inch pushrod V8. The GM-based small block has been a staple of the sport for decades, with engine builders like Kistler, Gaerte, and Donovan supplying their own iterations of the worked-over motor to teams across the country. Viable alternatives for those looking to go a different route with their engine choices have traditionally been slim, but now Ford

Performance and Toyota Racing Development are poised to shake up the status quo.

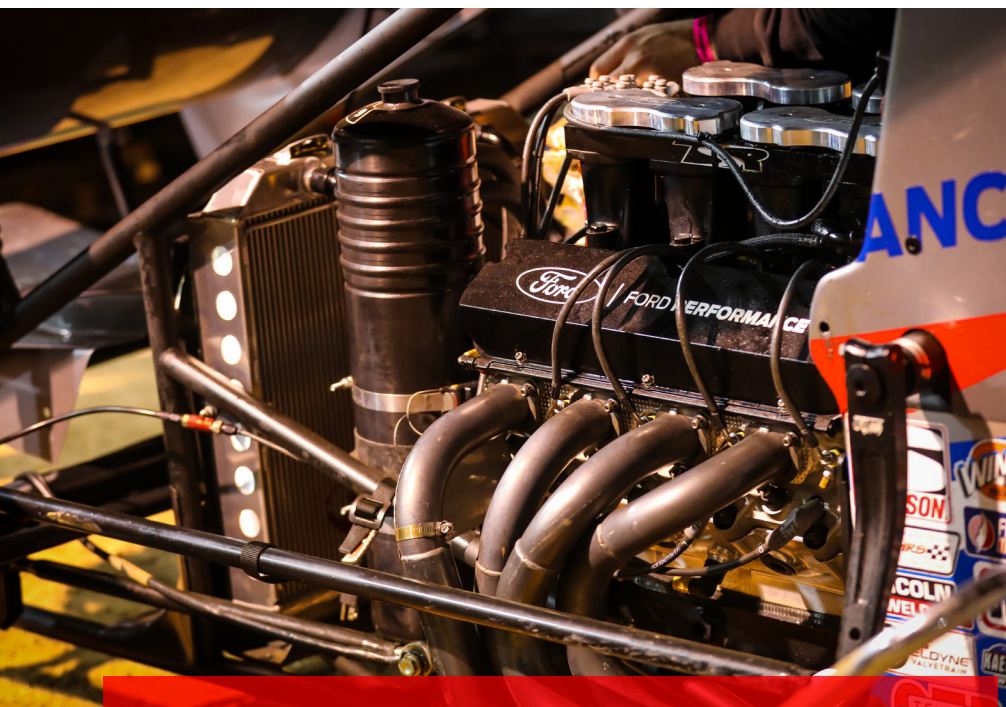
As they seek to expand their presence in the popular racing discipline, both automakers are in the midst of developing 410-cubic-inch sprint car engines of their own. Although these mills currently lack the many hours of refinement that have helped to make the GM engine a cornerstone of the sport, they each benefit from a contemporary engineering approach that has the potential to improve performance while also addressing concerns about the rising costs required to campaign a competitive car.

FORD PERFORMANCE GETS THE FPS 410 UP TO SPEED

Ford's new methanol-fed 410 is a Windsor-based block and features a 4.135-inch bore, a 3.800-inch stroke, a 90-degree bank angle, and a compression ratio that's expected to be greater

than 16:1. In terms of output, the team targeted figures over 900 horsepower and 700 pound-feet of torque to achieve a general sense of parity with the rest of the field while maintaining their focus on keeping the package robust, reliable, and affordable.

"The program originally kicked off back in 2016, when Tony (Stewart) and Stewart-Haas Racing (SHR) signed with Ford," explained Christian Hertrich, Motorsports Powertrain Supervisor for Ford Performance in Dearborn, Michigan. "Part of the agreement was that we would support Tony's sprint car program, and an element of the game plan was to change the power plant over to a Ford engine. Development was a little slow-going initially, as we were sort of wrapping our heads around what the sprint car engine was going to be. So in 2017 and into 2018, we started working on some cylinder head stuff and putting together what the structure of the engine was going to look like. By 2019, we were ready to move on to using Ford's analytical tools for data collection and dyno testing."



Engine choices for 410 sprint cars have been extremely limited, but Ford Performance and TRD aim to change that with new designs to rival GM power plants.

While the partnership between SHR and Ford was the catalyst that set the gears in motion for the FPS 410, Hertrich told us that Ford saw other opportunities associated with the project. "A lot of the racing that Ford supports is grassroots, and interest in sprint cars is huge among our fanbase," he said. "Right now, the sprint car world is dominated by Chevy; you see a smattering of Ford engines here and there, but ultimately, we were getting outclassed. So it was really about getting our stamp on it, being more directly involved, and giving the Ford name a bigger footprint in the discipline."

Hertrich said the team used Stewart's Chevy engine for baseline targets and went from there. "Well, you never want to be worse off than where you started, of course. So we used the Shaver engine to establish baseline targets that we needed to beat in different applications, whether that's a short track or mile track. And at the same time, we also wanted to make sure we weren't adding any weight. That's critical in the sprint car world, so we had to make sure we weren't putting mass where it wasn't needed."

Yet, with more than 90 races on the calendar each season, durability was paramount. "It's not NASCAR or Formula One, where there's just tons and tons of money to throw at the program, so you absolutely have to prove the engine out," Hertrich explained. "It has to be cost efficient, so part of the mission was to make sure that these things we're doing are not super expensive. You've also got to be able to run week-in, week-out with the same engine and not send it back to rebuild, because otherwise your costs are going to be a nightmare. So one of the goals was to maximize the number of races this engine could handle before it needs to be torn down. That's a specific metric for us, so we needed to make sure that we met or exceeded that target number."

Hertrich admitted that the Windsor-based block was already a stout piece to begin with, so the biggest improvements came from the cylinder head they developed for the FPS 410. "Cylinder heads are very temperature sensitive—we really needed to keep those temps down to increase durability and



Ford's 410 program began as a partnership with Stewart-Haas Racing. Once development was finished, driver Tony Stewart soon proved the new engine could win.

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Toyota Racing Development's success in midget competition (seen here) provides a strong foundation for the division's sprint car engine program.

set for 410 winged cars, the engine made its debut at an All Star Circuit of Champions event at I-96 Speedway on August 16, 2019. Development is still ongoing, but Hertrich said the early results are promising. "We won almost immediately after releasing it—Tony took a win with it in the second or third race it competed in. Tony was our proof point for the engine with the All Star series. We would get data from there and get some miles on the engine without worrying about messing up Donny Schatz's season in World of Outlaws."

Schatz incorporated the new engine into his program for the 2020 season, but with a limited calendar, vetting of the engine is still underway. "But we've come out swinging for 2021," Hertrich stated in March. "We've won three or four races out of the first six

maintain cylinder pressures. So the cooling system was a big focus as well, making sure that we're controlling the flows and we're even from cylinder to cylinder."

It's a sentiment that's echoed by Ricky Warner, crew chief for Tony Stewart Racing

in Brownsburg, Indiana. "Durability, along with drivability and performance are a big deal with this new engine. The Chevys were pretty bulletproof, so there's a lot of work to be done to get it to that level."

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or seven events, so we're very happy with the performance thus far." Going forward, Shaver Racing Engines in Torrance, California, will be handling the rebuilds of the FPS 410.

Warner noted that as the program ramps up and Ford prepares to finalize the spec with an eye toward offering up an engine package for other teams, the last hurdle is parts availability. Beyond components like the MAHLE pistons, CP-Carrillo rods, Bryant Racing crank, and Jesel valvetrain parts that are used in the package, the engine also utilizes a unique U-joint made by Winters Performance, of which they are the sole supplier.

"It hasn't taken much to get this engine up to speed," Warner said. "There are just some components that are unique to this engine package that need to be made more readily available now."

TOYOTA RACING DEVELOPMENT JOINS THE FRAY

Toyota Racing Development (TRD) isn't quite at the same stage with its 410 engine program as Ford Performance is—we

reached out for comment and they asked us to check back in with them when they're a bit farther along. But after speaking to Tom Rider of Rider Racing Engines in Mechanicsburg, Pennsylvania, the picture of what this engine will ultimately look like is a bit clearer.

Rider Racing Engines, along with Speedway Engine Development in Indianapolis, Indiana, will serve as the engine builders of the new Toyota mill, which is designed around the rule sets for World of Outlaws, All Star Circuit of Champions, USAC, and other sprint car series' 410 classes.

"When they contacted us in 2019, they were looking to do a new design from the ground up," Rider said. "And one of the main goals was to create an engine that would be available for anyone to buy or build—it wasn't going to be specific to a few in-house cars or something like that. And that changes some of the thought process in terms of design. They also wanted to keep the costs similar to the GM engine while also delivering output and weight that's similar or better."

Although development is ongoing, initial

testing puts the engine's output at around 915 hp and 685 lb-ft while weighing in at a few pounds lighter than the GM engine. The engine features an all-new aluminum block casting with a purpose-built aluminum head that's designed specifically for sprint car racing.

As with the Ford project, Rider said the TRD engine program is part of an effort to establish a larger footprint in sprint car racing. "TRD has been heavily involved with grassroots racing for a while now, and this is a segment that they want to be a bigger part of." **PRI**

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RACE TEAM PROFILE: CLAUSON MARSHALL RACING

Partnerships play an integral role for this championship-winning open wheel operation, from team members to sponsors and even a veteran engine builder.

By John F. Katz

Regularly placed among the top of its class in the open wheel ranks, Clauson Marshall Racing (CMR) is very much an evolution of Bryan Clauson Racing, an enterprise that ended tragically with Bryan's untimely death following a racing accident in Belleville, Kansas, in August 2016.

Since then, Bryan's father, Tim, has partnered with sprint car veteran Richard Marshall to, in the words of CMR's website (clausonmarshallracing.com), "Race on.... That's what we do." Their efforts have already been rewarded with two USAC National Championships—for sprint cars in 2018 and midjets in 2019.

PRI spoke with both Clauson and Marshall in early February, shortly after the Chili Bowl Nationals, where

CMR development driver Cole Bodine finished fourth in Tuesday's A-Feature, after Tyler "Sunshine" Courtney scored second in the A-Feature on Monday.

"The Chili Bowl is obviously a bucket-list race for our team," Clauson commented, "and anything less than a win falls below our expectations. But along with Tyler and Cole's performances," Ricky Stenhouse Jr. made a "run on Friday night, from the back of the C to third in the A, showing the gains we made going into Saturday. And while our Saturday night performance was impacted by Sunshine's crash in the last few laps, overall, I was pretty happy with the performance level of all the CMR cars and drivers. We were a whisker away from placing three in the top 10."



A CULTURE FOR SUCCESS

First and foremost, Marshall attributes CMR's ongoing success to a company culture that is "inclusive, of not only the driver and the crew, but of their family members. We try to have fun and make everybody feel like part of the team. It's a different atmosphere than I've seen in a lot of pits, where it's all business. I think we've created a really healthy atmosphere for everybody involved."

Within that context, Marshall continued, "There is no substitute for chemistry—and, unfortunately, I haven't seen a manufacturing guide for that. So it's a matter of finding a group of people who can work well together, and whose personalities mesh. Teamwork is created by individuals with chemistry, but you have to create a

culture for teamwork by being open-minded."

Additionally, Clauson cited "effective communication," as "paramount to being successful. We hold weekly meetings focusing on operations, marketing, branding, and performance. We focus on goals, both short-term and long-term. And we hold weekly competition meetings with our drivers and crew during the race season."

"I've always thought that the more heads in the room, the better," said Marshall. "We try to leave everybody's ego at the door and get input from every team member. Anybody should be able to feel like they can speak up. And I've been surprised over the years, where some of our best ideas have come from."



In just five years since its inception, Clauson Marshall Racing has earned two USAC National Championships—for sprint cars in 2018 and midgets in 2019. And, driver Tyler Courtney (left), recently won his 50th race for CMR team owners Tim Clauson (right) and Richard Marshall.

“We try to cover each other's backs, too, in duty positions,” he continued. “The tire guy is responsible for the tires, for mounting them and getting the pressure right; but there's nothing wrong with somebody checking behind him, or with him or somebody else checking bolts and making sure everything is tight. We try to teach the engine, from top to bottom, to everybody on the team, even though that may not be their daily job. You never know when somebody may be out, for any reason.”

A strong streak of independence helps, too. “My approach to the sport has been the same since I started racing as a nine-year-old,” Clauson reported. “I stay focused on what we can control, and I don't get caught up in what the teams we race against are doing.”

One of the best decisions to emerge from that culture, according to Marshall, was hiring Tyler Courtney. “He was a poster child for driver development, and we picked him up fairly early in his career. He wasn't 15 years old—he's 27 now, and he's in his fifth year with us—but he certainly hadn't established himself and accomplished what he has since. But he shows a true, die-hard desire to win, and to work hard. And that speaks to another aspect of the culture in our shop. We don't have any room for prima

donnas. It doesn't matter if you've won a thousand races. We are all in this together, and every team member is equally valuable.”

Courtney had worked previously on Bryan Clauson's team, Marshall noted, “where he showed that he could be a team player. So we gave him a shot, and just recently he won his 50th race for our organization. There are not many team owners who can say that about a single driver.”



PRODUCTS & PARTNERS

While Marshall called Clauson “the operational guy” in their partnership, Marshall “tries to apply what I learned in the business world, to make sure we have the best equipment that money can buy. It's a very competitive sport, and if you don't have the latest and the greatest, you might as well stay home.” Conversely, buying only the best “takes that issue off the table—so that if we're not winning, that's not an excuse.”

So, in terms of the equipment CMR buys, what does that actually mean for the team headquartered in Fishers, Indiana, about 30 minutes northeast of the Indianapolis Motor Speedway? Of course, two key suppliers have been Spike Chassis Inc., in nearby Brownsburg, Indiana, and Stanton Racing Engines of Nicholasville, Kentucky. “Our relationship with Spike goes back to when Bryan and I built our first USAC midgets and sprint cars,” Clauson recalled. “We believe they build the best product, and logistically they are perfect for us, because of their close proximity to our shop.”

Good equipment doesn't guarantee success, but it “takes that issue off the table,” noted Clauson Marshall Racing co-owner Richard Marshall. For engines, the team swears by the Stanton SR-11 midget engine.

“We got involved with Stanton Engines in 2015–2016,” Clauson added, “when we were building our program for Bryan's ‘Chasing 200 Tour,’ using their then-new SR-11 midget engine. So when we were looking for a midget engine package for CMR, they were our first call. We knew we would be competing against factory-supported teams, so it was important to work with someone we trusted, who was open to what we could learn on-track.”

“EVERY TEAM MEMBER IS EQUALLY VALUABLE.”

Stanton Racing Engines had built Mopar, and later Toyota-based midget engines before launching its own billet-block SR-11 in 2016. “The SR-11 isn't derived from anything,” Gary Stanton emphasized. “It's a whole different design, a clean sheet of paper. Nothing in this motor existed before we built it. We wanted it to be lighter, and it is about 20 pounds lighter than the competition. We wanted an overhead cam, so it could turn more rpm. We took it to the limit—and it turned out great.”

Beyond that, what sets a Stanton Racing engine apart from the competition? “We don't tell anybody that,” Stanton said, laughing. “But we've sold over 100 of them in the past four years. We won the national championship in 2019, and in 2020, Toyota beat us by one point—and they did it in the last race.”

Currently, Stanton supplies between 70 and 80 midget teams, but CMR is its single biggest customer, buying eight to 10 engines per year. “And we maintain them, too,” Stanton added. “We're not with CMR at the track 100% of the time, but we're there a good part of the time—and when we're not, we're in constant communication with them. And we get along real well. They do a great job for us, and we try to do a great job for them. They show good—and we sell motors.”

“Not only is Gary Stanton a friend,” said Marshall, “he's become a true partner in our business. And I think one example of that is how they keep us on the cutting edge of whatever technology they develop in their shop, week-in and week-out.”

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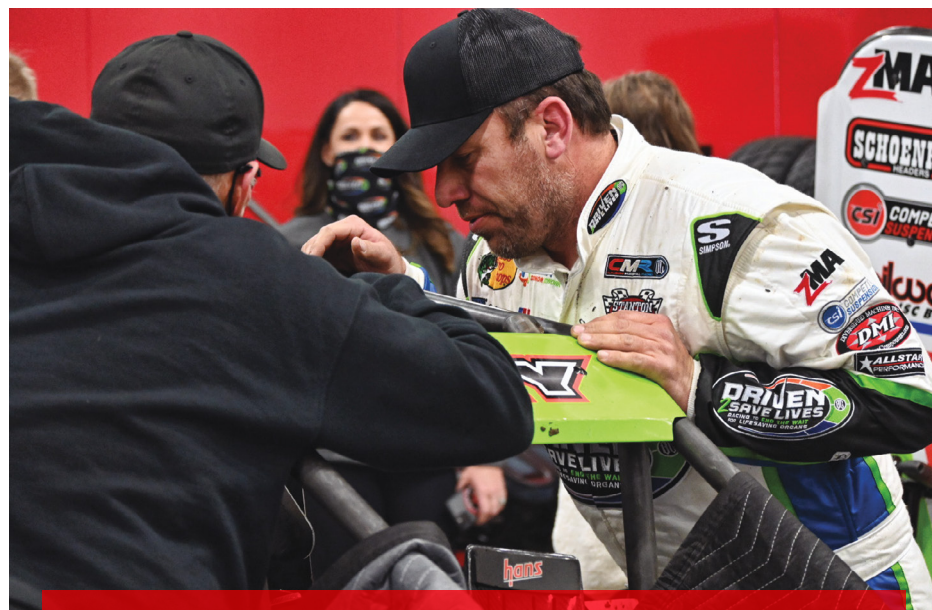


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NASCAR driver Ryan Newman (right) teamed with Clauson Marshall Racing to compete in the 2021 Chili Bowl Nationals, a "bucket-list race" for CMR co-owner Tim Clauson.

"I think from Stanton's standpoint," Clauson added, "we are able to offer a platform to showcase their product at the national level. One of my biggest accomplishments in the sport was winning the 2019 USAC National Championship with Stanton engines, and knowing that we played a small part in helping Stanton reach that level."

Marshall also cited CMR's relationship with Competition Suspension Inc. (CSI): "We've learned a lot with them. They are a boots-on-the-ground, roll-up-their-sleeves organization. They are at almost every race, out there problem-solving all the time. Their shocks have been a game-changer."

"And I want to give props to one of our newer sponsors, zMAX Racing Oil. We vetted their oils in our midget and sprint car engines last year, and subsequently changed to zMAX products exclusively," he added.

"We have built great relationships with all of our partners," Clauson noted, "and in some cases we've been the test dummy for their new products. As time has passed, that loyalty—not jumping from vendor to vendor for the next shiny object—has allowed us to build trust with our partners, and that has allowed us to be one of the first to try a

new product and/or provide input on a new product that ultimately helped not only us, but our partners' other customers as well."

DELIVERING VALUE

CMR refers to all of its sponsors and suppliers as partners, and custom-tailors sponsorship programs to its partners' individual needs. "We call them partners," Marshall explained, "because our goal is to make them a partner in our success, and vice-versa. And in the first conversation we have with a prospective partner, we ask them what are the top three things they are looking to gain from the relationship. Some of them just want to be part of a racing organization, and to see their name on a car. Some want to entertain their customers" at racing venues, "and others are big into branding. It's actually surprised me over the years, how many different answers we get."

"It's not a one-size-fits-all proposition," Clauson agreed. "Some are looking for the branding opportunity. Some are looking for places to offer hospitality, or at-the-track experiences. Some want to grow their brand awareness through motorsports, and to use social media to push their message. While we are a race team first, we try to look at different

ways to maximize ROI for our partners."

"Social media is a great example," said Marshall. "It has evolved a high expectation from multiple sponsors, and that's why we've added a media person to our payroll. You need to always create content, to make people feel like they are at the track, whether they are or not—to make them feel like they are part of the team. The sponsor is spending dollars that aren't always easy to come by. So we're mindful that we are not only competing for those dollars against other race teams, but against other sports and other forms of advertising. But one thing that hasn't changed since I've been involved with the sport—and that's been a long time—is that our grassroots fans are fiercely loyal to the companies that support the sport and have their names on the side of the car. Making that connection is vital—making sure our fans know who is supporting us, and what they are selling. Tim and I share a passion for racing, and a passion for winning. But we can't forget who literally puts the gas in the car."

CMR began racing winged 410 sprints in 2020. For 2021 they've intensified the effort, with driver Tyler Courtney now racing full-time in the All Star Circuit of Champions.



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TAKING WING...

With that in mind, said Clauson, "In 2020 we dipped our toe into the winged sprint car world," and in 2021, Tyler Courtney will compete full-time in the All Star Circuit of Champions.

It's a natural progression, particularly for Marshall, who concurrently campaigns World of Outlaws sprint cars via a separate partnership with Stenhouse. Cole Bodine will continue to drive USAC sprints and midjets, "and Sunshine will participate in those events as his schedule allows," Marshall added.

Clauson sees this expansion as "an opportunity to get our partners in front of the majority of the growing grassroots fanbase."

Of course, CMR—like just about everyone else—has been impacted by the COVID-19 pandemic. "One thing I'm proud of," said Marshall, "we kept everybody employed the whole time. Everybody got paid, though

"OUR GRASSROOTS FANS ARE FIERCELY LOYAL TO THE COMPANIES THAT SUPPORT THE SPORT AND HAVE THEIR NAMES ON THE SIDE OF THE CAR."

CMR approaches its sponsors and suppliers as individual entities—all with unique goals— noted team co-owner Tim Clauson, pictured at left above. "While we are a race team first," he said, "we try to look at different ways to maximize ROI for our partners."

obviously we weren't racing all of the time. But we were fortunate that our form of racing was the first professional sport to re-open, and that in the winged sprint car program we were running a flex schedule rather than a for-points championship. So we were able to run the same number of races that our sponsor/partners expected, albeit at different times and different venues." Also fortuitous was the USAC schedule, where "the majority of their races are in the summer, when more venues started opening up."

As Clauson explained, "We were fortunate to have the flexibility to chase the races that were available. For a while it seemed we were the only sporting event going, and the way that DIRTvision and FloRacing supported the events created an opportunity to get our partners in front of a different audience. We saw it as a challenge, to change the way we approached access to our team via social media.

"And we feel we have grown from it," Clauson concluded. **PRI**

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SECURITY FORCES

Manufacturers are meeting new standards with lighter and more advanced materials, while premium features are migrating to lower-priced driver safety products.

By Jim Koscs

Driver safety equipment manufacturers report that business is booming as the sport roars back for 2021. And, fortunately for those behind the wheel, personal safety equipment keeps improving, getting lighter and more comfortable while meeting increasingly higher standards. In addition, some premium features are showing up in lower-priced products, including removable pads and more ventilation options in helmets. Meanwhile, there is also an emerging trend for lower-priced Nomex driving suits.

Beyond meeting or exceeding standards set by third-party organizations including FIA (Fédération Internationale de l'Automobile), the SFI Foundation and, strictly for helmets, the Snell Foundation, manufacturers are also locked in constant competition to improve driver comfort.

"You want the equipment to be transparent," said Ben O'Connor of Impact Racing, Indianapolis, Indiana. "If you're thinking about your equipment when you're driving, something's not right. But those are the more organic elements. There are no specs for them."

With that in mind, here's a look at eight trends we're tracking in driver safety for 2021.

1. SUITS: LIGHTER BUT SAFER

SFI Foundation of Poway, California, issued its latest certification updates in June 2020, with SFI Spec 3.2A for drivers suits, and SFI Spec 3.3, which covers accessories including gloves, shoes, underwear, and balaclavas. Following each spec is a heat and fire protection rating, with SFI-1 being the minimum, and SFI-5 being more common.



Today's safety gear offers greater protection without sacrificing driver comfort. "You want the equipment to be transparent," said our source at Impact Racing.

The number is an indicator of Thermal Protection Performance, or TPP. A suit with an SFI-5 rating has a TPP of 19, which translates into 10 seconds of protection before skin is subject to second-degree burns. A suit rated at SFI-20, as used in Top Fuel drag racing, has a TPP of 80, which equates to 40 seconds of protection.

Driver suits made from Nomex, a heat and fire-resistant fabric invented by DuPont in the 1960s, remain the popular choice across motorsports. They're lighter and more comfortable than suits made from treated cotton materials and PROBAN but are also more expensive. An SFI-1 rated PROBAN suit can cost well under \$200 but will be hotter to wear than Nomex.

"A driver who overheats can become dangerous on the track," said Steve Russell of Pyrotec Safety Products, Redmond, Oregon. "Two years ago, we saw a racer removed from the track—he'd been suffering from heat exhaustion in the car and was taken to the hospital. He was wearing one of

the heavy low-cost suits on a day that was over 100 degrees."

The technology behind driving suits continues to evolve.

"IF YOU'RE THINKING ABOUT YOUR EQUIPMENT WHEN YOU'RE DRIVING, SOMETHING'S NOT RIGHT."

"Some of the biggest advancements in personal safety equipment have been in textiles," O'Connor explained. "A lot of it is in the milling of the fabric, with micro air spaces to improve insulation. Suits today are lighter and more breathable than just five years ago, especially when getting into SFI-15 and

SFI-20 suits."

O'Connor points out, however, that meeting the new FIA 8856-2018 spec, which calls for an increase in protection from direct flames from 10 seconds to 12 seconds, will result in the super-lightweight suits adding back some weight.

This new FIA homologation standard is in effect for FIA's highest classes, including Formula One, Formula Two, Formula E, WRC, WEC, World Rallycross, and European Rallycross. All other FIA-sanctioned races will require the new standard beginning January 1, 2029, and certified equipment will come with a 10-year expiration date. The new FIA spec also calls for an extra second of burn-through time for suit fabric when stretched while in the driving position.

"For racing requiring that standard, manufacturers are switching to a heavier suit while staying as light as possible," said JR Twedt of K1 RaceGear, Carlsbad, California.

Twedt explained that K1 invested heavily in premium European Nomex a few years ago, a bet that paid off in 2020 as many factories shut down due to COVID-19. He noted that the cancelation of trade shows last year, including PRI, forced the company to offer remote fitting assistance for custom suits via Zoom calls.

"That part might not go away," Twedt explained. "There is still a considerable number of people uncomfortable about being in crowds. You have to make it as convenient as possible for people to do business with you."

2. NOMEX BECOMES MORE AFFORDABLE

Twedt also noted the requirement for SFI-5 two-layer suits for child drivers, as some racing classes such as micro sprints, sportsman drags, and even asphalt late models now allow drivers as young as 12.

"That was unheard of two years ago," he said, citing it as a financial burden on some parents. "Kids outgrow suits quickly. They might need to buy two in a season," he said.

Twedt referenced K1's new Precision II youth suit, available down to size 5X-small, giving parents an entry-level Nomex option for their young competitors.

Other new Nomex products in K1's pipeline include an entry-level sprint suit, a

premium FIA 8856-2018 suit, and an entry-level Challenger Nomex and suede super-light go-kart shoe. Twedt anticipates a fall launch, just ahead of the PRI Trade Show.

Also reflecting an emerging trend in lower-priced Nomex suits, RaceQuip of Riverview, Florida, offers its SFI-5 rated Chevron-5 race suits. Patrick Utt of RaceQuip attributes this value proposition to the company's large-scale manufacturing efficiency. "This allows a racer on a budget to buy a high-quality suit and not cut corners with regards to safety," he said. "We manufacture these suits using two layers of premium Nomex fabric plus a durable Nomex knit material for all the expansion panels."

Canadian manufacturer Red Camel offers a full line of SFI-approved suits, gloves, balaclavas, and helmets. Syed Tirmzi of the Winnipeg, Manitoba-based company touts a new SFI-5 double-layer Meta-aramid suit that he said performs on par with some triple-layer suits in the market, but is lighter weight.

"Considering the summer heat, we have come up with a combination that is lighter and cooler as compared to a triple-layer suit but with safety still staying as a top priority," he noted.

For racers on a budget, Tirmzi touts a single-layer premium PROBAN suit that he said is more practical than regular FR

cotton. "There's no bad smell from a fabric FR coating, and you can still wash it with chemicals," he added.

3. DON'T FORGET THE EXTREMITIES

The new FIA spec also calls for longer glove gauntlets and higher ankles on racing shoes. Weight is an important consideration for both.

"The highest level of interface with the vehicle is through the wheel," said Impact's O'Connor. "The tactile feel you get through the glove is critical. Thinner materials are needed for lightness but must retain grip and prevent the glove from bunching up."

He described Impact's Alpha glove using material cut in such a way that it is "pre-curved" to naturally wrap around the steering wheel and not bunch up under fingers.

Twedt said the Flex Gloves introduced by K1 two years ago use SFI- and FIA-rated two-layer bonded Nomex. Bonding the layers together, rather than stitching, also prevents the material from bunching up in the driver's hands.

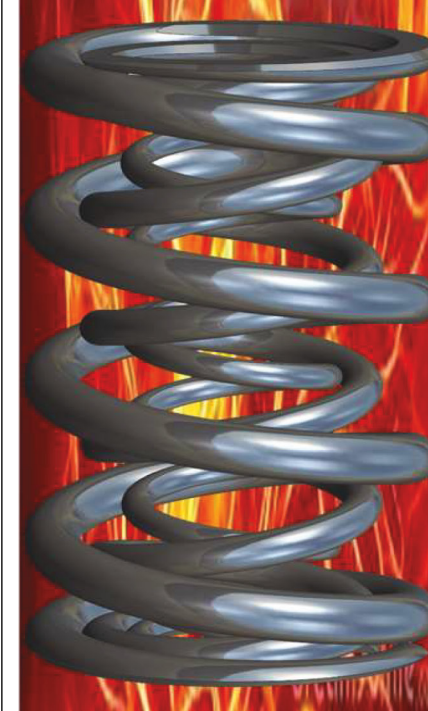
4. HELMETS: MOVING TO SNELL SA2020

Helmets can have either an FIA or Snell certification, or both, which is referred to as

Cost is a crucial factor for many racers. Fortunately, improvements in materials, design, and manufacturing are making better safety gear available at lower prices.



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"A DRIVER WHO OVERHEATS CAN BECOME DANGEROUS ON THE TRACK."

"dual homologation." However, the new FIA 8860-2018 spec by itself does not include a Snell component. "You could buy a \$4,000–\$5,000 helmet that's FIA rated but won't be allowed in a race that requires a Snell rating," cautioned Kyle Kietzmann of Bell Racing USA, Champaign, Illinois.

Founded in 1957, the Snell Foundation in North Highlands, California, revises its standards every five years. The latest standard, SA 2020, took effect in October 2020. The SA 2015 helmets will remain available and allowed for racing, but racers should always check with series rules beforehand to ensure compliance.

"There's not much difference between SA 2015 and SA 2020," said Russell of Pyrotec. "Shell impact has gone up a bit, but shield impact is the same."

Keitzmann concurred, adding, "As things progress, you want to be able to get the benefit of new materials and construction techniques. We recommend replacing a helmet every three to five years anyway as part of your safety routine."

5. HELMETS: TAKING OFF THE WEIGHT

Inexpensive entry-level helmets can exceed four pounds, while the lightest carbon fiber helmets priced are under three pounds.

Bell Racing's RS7C Lightweight was developed initially for Penske Racing's NASCAR drivers, but is now available to anyone. Kietzmann described the RS7C as "race ready" at just under 2.8 pounds.

"We applied lessons learned from our FIA Formula One helmet," Kietzmann said. "We use a unique compression molding system with pre-preg carbon fiber material that enables a really light shell while meeting all impact standards."

(For reference, the Bell Formula One helmet is a bit heavier at just over three

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Snell helmet standards are revised every five years, most recently for 2020. SA 2015 helmets are generally still allowed in racing, but drivers should verify compliance. Photo courtesy of G-FORCE Racing Gear.

pounds, since it has different ballistic characteristics that require more material in the front for the FIA spec.)

Bell last year introduced a sprint car version, the RS7SC Lightweight, which also weighs just under 2.8 pounds but is non-ventilated to seal out dust and dirt, and also features a duckbill. Earcups can be added for noise attenuation.

"Weight is not a criteria for testing, but helmet makers consider it critical to prevent secondary type injuries, concussions, and neck injuries from whiplage," said O'Connor.

He cited advances in the textile mats used for weight reduction. "Before, you'd have alternating layers of fiberglass, Kevlar, and carbon fiber lay ups in different orders. Now, there is a variety of different combinations of materials in those mats that we have not seen before. We're gaining a lot of strength that way while maintaining a light shell. We've seen big improvements in both impact resistance and controlling G forces, as well as being able to lighten the helmet."

6. KEEPING YOUR COOL

Track safety depends on drivers keeping cool heads—figuratively and literally. Air circulation systems, also known as forced air, are becoming more prevalent.

"Bill Simpson, founder of Impact,

developed a method years ago for getting air into the top of the helmet,” O’Connor said. “Inside the helmet, a series of channels direct the airflow. Impact owns the patent.”

Others, too, offer channeled helmets. Pyrotech has seen forced-air models becoming almost the majority of its helmet sales, according to Russell.

“We’re seeing vehicles that never ran pumped air doing so now,” he said. “Combined with an air-channeling helmet, it really helps the driver stay cool. Pumper systems have gotten better, too.”

The company’s higher-end carbon fiber helmets, the Pro Airflow and Pro Sport, offer air channeling and, in the Pro Sport, a corrugated liner. “The corrugation gaps go in 3/8-inch increments where the liner is a bit recessed from the head,” Russell explained. “The top of the pad is all channeled and then channels air around the top to the side pads. Four slots separate the two sides, forehead, and rear pad to create a larger channel.”



The heat reduction provided by cooling garments boosts physical endurance and mental concentration. This can improve comfort, safety, and race performance. Photo courtesy of Rini Technologies.

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- Head socks are available with a single eyehole or two eyeholes.
- CarbonX crew socks are also available.



Pyrotech’s newest helmet, the Pro Ultra Tri-Flow, can be used as a standard or forced-air helmet, the latter with entry on the side or top. Covers on both the left and right side of the chin area enable the user to move the side air position, which is ideal for a driver and co-driver with a pumper system in between. On the comfort front, all Pyrotech helmets feature a customizable six-pad liner system with seven different thickness pads to adjust the fit.

Bell’s new BR8, due out in June, offers five different airflow options. It is designed for off-road racing and dirt racing that use external airflow. The customer can choose an air portal on top, 3/4 on either side, or side air in front—left or right.

“Unique to this model, there is an air chamber on top to distribute air evenly around the crown,” said Kietzmann. “You get consistent, even airflow no matter where the air comes in.”

Cooling systems go beyond just cooling the driver through the helmet. Although, some people may view cool suits, like Rini Technologies’ Personal Cooling System-Automotive (PCS-Auto), as more of a comfort item than a piece of safety gear. “But in truth it’s really about performance and safety more than anything,” said Dan Rini of the Oviedo, Florida, company. Racers “are tough. They don’t need comfort. But we’ve all seen drivers get out of the car and pass out on crazy-hot days. That’s not good.”

The PCS-Auto system consists of an SFI-approved cooling shirt with surgical tubing sewn into it that’s worn under the firesuit. A small tube sticking out of the shirt connects to a refrigerator device, mounted in the car, with water in it. “As long as it gets electrical power from the car, it keeps cooling that water and pumping it to the driver’s shirt,” Rini said, noting that it’s a closed-loop system. “Cold water pumped from the cooling device flows through the tubes and back to the device. There’s no water squirting around in the car.” The pump is only about the size of a thumb, and the refrigerator keeps the water at around 65 to 68 degrees, Rini said.

“The body, just sitting there, is 95 degrees,” he pointed out. “When a driver puts on a firesuit and sits in a car that could



Weight reduction is vital for helmets, but not just for comfort—it can help prevent secondary injuries in crashes. The lightest helmets are now less than three pounds.

be 120 degrees in the cockpit, the skin temperature can be over 100 degrees. The body’s core temperature goes up, and all sorts of bad things can happen. But under the suit, instead of feeling sweaty and hot, the driver feels the sensation of cold water flowing through tubes.”

Currently the PCS-Auto suits are used primarily in NASCAR, but Rini said the

what we’ve learned with the first product and adjust it to be appropriate for other race series.” He expects the new “family of cooling systems” will launch later this year.

7. LOWERING THE PRICE POINTS

Under new ownership since 2020, G-FORCE Racing Gear in Acworth, Georgia, is revamping all products, upgrading materials, and bringing top-end features to lower-priced helmets. All G-FORCE Racing Gear helmets are SA 2020 certified.

The all-new Nova and top-of-the-line Super Nova share a shell design but differ in material. The Super Nova is full T800 carbon and weighs under three pounds, while the composite Nova weighs 3.3 pounds.

“The Super Nova is one of the only full T800 carbon fiber helmets on market,” said Jeremy Speich. He explained that the company focused on comfort and fit, giving both models a sizeable, customizable liner using removable pads to fit the face/head and crown. In addition to the set that comes with the helmets, two others are available.

“SOME OF THE BIGGEST ADVANCEMENTS IN PERSONAL SAFETY EQUIPMENT HAVE BEEN IN TEXTILES.”

company is “looking at developing a second product that might serve other race series as well. What’s good for NASCAR may not be right for club racing, and neither of those may work for IndyCar. We’re trying to take

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"A poor-fitting helmet rolls off and cannot do its job when it has to," said Speich. He added that the maker's lower-priced REVO and Rift helmets will get the pad system "within the next year or so."

Speich also confirmed the increase in forced-air helmet popularity and said that with the addition of a Rift Air model to the line, all of the brand's helmets will offer the

**"WE RECOMMEND
REPLACING A HELMET
EVERY THREE TO FIVE
YEARS ANYWAY AS
PART OF YOUR SAFETY
ROUTINE."**

option. Both the Nova and Super Nova models have a screw-less and tool-less design for adding forced air to the top inlet.

RaceQuip offers a price breakthrough for helmets, too. "Sometimes a new safety rule or SFI specification will cause us to re-engineer a product, and sometimes we just find a better manufacturing technique or material and incorporate it into an existing product," said Utt about RaceQuip's new high-value SA 2020 carbon fiber helmets.

He explained how the company has been able to reduce the cost of manufacturing with aerospace carbon fiber materials on the PRO20 Carbon Fiber helmet. "These helmets offer modern styling and safety features, so there's no compromise based on the price," he added.

8. FURTHER PROTECTION

Whether required by specific series or a growing awareness of their protection, frontal head restraints (FHR) continue their march into motorsports fields.

Stand 21, established in 1970 in France, offers a wide array of FHR devices in its full line of driver safety gear. To determine which FHR is correct to use, Stand 21 recommends drivers measure their neck circumference and consider the recline of the driver's seat. The full carbon fiber Featherlite weighs just 310 grams and is produced in limited quantities due to the complex

manufacturing process, confirmed Clément Chaudonneret from Stand 21's Huntington Beach, California, location. The relatively heavier—coming in at a still impressive 640 grams—Club 3 has a larger neckline to accommodate a wider variety of drivers, long grips for improved harness support, and an ultra-thin design for high-end ergonomics. Both are SFI and FIA certified.

On the road racing scene, Stand 21 is an official supplier for the new Porsche Carrera Cup North America series, a long-anticipated addition to this global series, for which the company provides exclusive-design Nomex driving suits and other equipment. **PRI**

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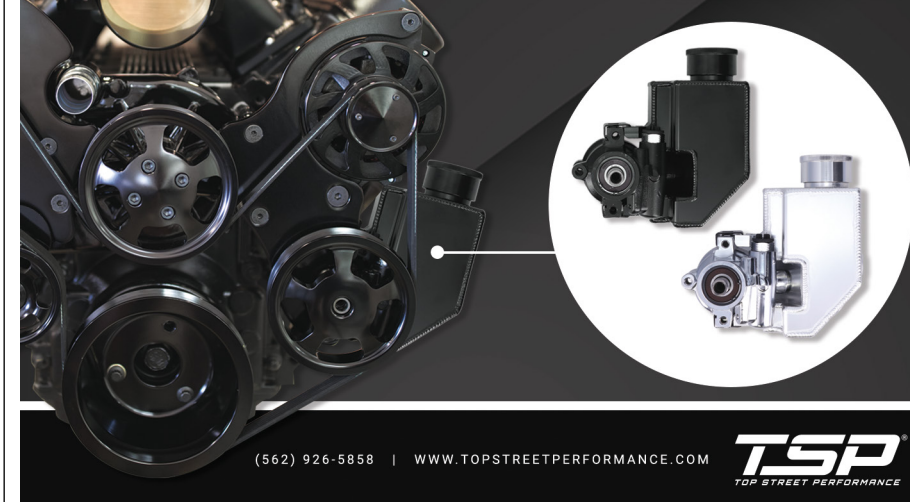
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OPERATING SYSTEMS

Seats, harnesses, and other vehicle safety equipment are now designed as a system, giving racers their best opportunity ever to walk away from on-track incidents.

By Drew Hardin

Though it's been 20 years since the death of Dale Earnhardt, his fate still looms large whenever racing safety is discussed.

"Racing will always be dangerous," said Randy LaJoie of The Joie of Seating, Concord, North Carolina. "But the industry has changed immensely since 2001, and NASCAR hasn't lost anybody since then."

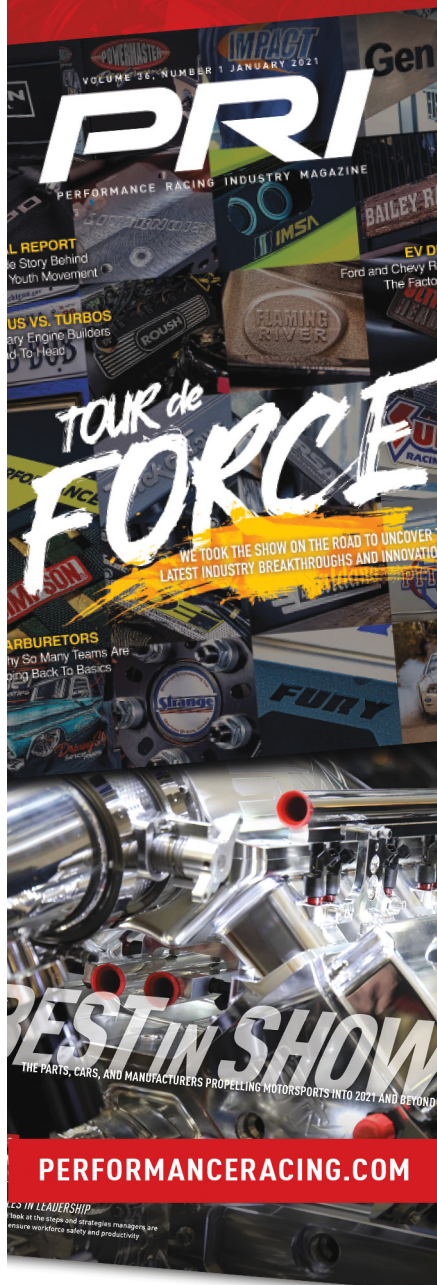
To LaJoie, who knows firsthand about the dangers of racing, these changes aren't just about one piece of equipment.

"Safety in the car is a system of things. It's not just the head-and-neck restraint. It's not just a better seat. It's not just better seatbelt mounting, or the way the seat is mounted. It's everything going forward from Earnhardt and the other guys who passed [Adam Petty, Kenny Irwin Jr., Tony Roper in 2000; Blaise Alexander Jr. in 2001] that has saved a lot of race car drivers' lives. Enough information has come out since 2001 that, with the proper system, a racer can get out of a wrecked car, go home, and see the wife and kids."

What follows is a look at some of the newest safety components for racing vehicles, each of which can contribute to a comprehensive safety system.

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Seat design is vital to safety, as our source at The Joie of Seating noted that racers are better equipped to withstand hits if they're held tightly and their movement is limited.

SEATS

"As the industry learns more about mitigating injury in a vehicle crash, the one underlying theme is limiting driver movement," said Patrick Utt of RaceQuip, Riverview, Florida. "Everything touching or near the driver is there to limit movement during a crash. Besides a harness, the seat is the most important safety item in the cockpit. Racing seats have evolved to the point where they severely restrict sideways body movement at the thighs, hips, ribs, and shoulders. Add head and neck to this list if you

"AS THE INDUSTRY LEARNS MORE ABOUT MITIGATING INJURY IN A VEHICLE CRASH, THE ONE UNDERLYING THEME IS LIMITING DRIVER MOVEMENT."



go with a full-containment seat that features a halo to limit side-to-side head movement."

LaJoie, too, advocates for full-containment seats. "I tell race track promoters, push the guys at the tracks to go to containment seats," he explained. "If you hold the occupant as tightly as possible and limit the movement, more than likely they're going to be OK if they hit something."

LaJoie's newest seat was developed for the all-star Superstar Racing Experience (SRX). "It incorporates a lot of our NASCAR Cup features, including attaching the belts to the seats." NASCAR mandated the all-belts-to-seat (ABTS) feature several years ago for its

Impact Racing's Genesys II seat is made with manufacturing processes designed to reduce cost without compromising safety or increasing weight significantly.

top series. The belts in the seats "are really short," LaJoie explained, "which is good for the occupant." Because any type of belt material will stretch during an impact, "limiting the length of the belts by attaching them right to the seat is good because it limits the occupant's movement."

Once he has supplied the cars in the SRX series, LaJoie plans to make the seat available to the general racing market by the end of this year.

Impact Racing of Indianapolis, Indiana, is utilizing what it calls "aerospace manufacturing technology" to produce its new Genesys II racing seat. Ben O'Connor explained that the new Advanced Negative Displacement (AND) technology "is a completely different way of manufacturing." Negative Displacement means "any unnecessary resin is removed from the finished piece assembly. It's not like an autoclave, where you vacuum it out. It's really pressing the two molds together, squeezing the resin out. With that process we're getting such good permeation in the mat that we don't need as much resin. That makes the assembly a lot lighter—the seat is only about 2 1/4 to 2 1/2 pounds heavier than our full carbon-fiber seat—but it's more cost-effective compared to carbon fiber. And it still has all the strength to

meet the SFI homologation."

"Modern materials and manufacturing techniques continue to evolve," noted Utt. "Sometimes the benefit is stronger or lighter products, and sometimes it just allows us to reduce manufacturing costs." Utt said RaceQuip's new line of composite FIA racing seats "is an example of both. The aerospace industry has further refined composite materials to increase strength and reduce weight, so our seats can exceed the FIA 8855-1999 Certification Standard while remaining lightweight. We were also able to reduce the cost of a composite seat to the point where we sell a standard FIA seat for \$399.95 and a containment-style seat for \$599.95."

HARNESSES

Charlie James of Simpson Performance Products in Mooresville, North Carolina, pointed out that safety belts, too, have evolved as conventional wisdom about their purpose has changed.

"Everything touching or near the driver is there to limit movement during a crash," said our source at RaceQuip, who pointed to seats and safety belts as critical parts of that equation.



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“The thinking used to be that you wanted to bring the body to an immediate stop” in an incident, he explained. “Now we’re trying to slow down the acceleration of the body versus bringing it to a stop. We want to have a slower stop as the belts stretch and everything takes its hold.”

Simpson doesn’t keep a massive inventory of “off-the-shelf-type” belts, James said. “We offer multiple variations and options with our belts for whatever your situation and preference might be.” Included among those options are harnesses with widths that taper from 3 inches to 2 at the shoulder area to

Safety belt development continues to evolve. Now belt manufacturers are focusing on slowing down the acceleration of the body versus bringing it to a stop.



PRODUCT FOCUS



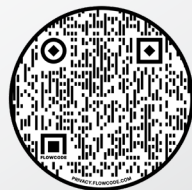
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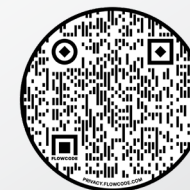


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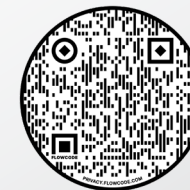
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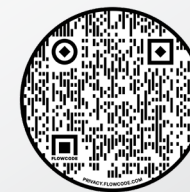
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better fit head-and-neck restraints, a feature available from other harness manufacturers as well.

“We recently came out with FIA-certified harnesses with tapering shoulders,” said Jeremy Speich of G-Force Racing Gear, Acworth, Georgia. Of the four FIA-certified six-point harness systems G-Force offers, two include belts that taper from 3 inches at the buckle “to 2 inches where it starts to cross your shoulders to make it easier to fit on different head-and-neck restraint devices.”

G-Force changed ownership in January 2020, and manufacturing was put on hold during the transition to reduce inventory, Speich explained. “Now that the I’s are dotted and the T’s are crossed, we’ve gone back to square-one with all our products, and the quality of the products we’ve been getting in since the middle of last year is better than anything we’ve ever had.”

“LIMITING THE LENGTH
OF THE BELTS BY
ATTACHING THEM
RIGHT TO THE SEAT
IS GOOD BECAUSE IT
LIMITS THE OCCUPANT’S
MOVEMENT.”

Stroud Safety of Oklahoma City, Oklahoma, makes a 2-inch wide, SFI-approved shoulder belt “that you can put on any of our belt sets,” said John Gentry. “Doing that allows the driver to be more comfortable and feel safer when he puts on the head-and-neck restraint.”

Another area Stroud Safety has focused on is harness weight, Gentry said. “A lot of the PDRA guys, the Midwest Pro Mod racers, and Top Sportsman NHRA racers are looking to cut weight anywhere they can.” In response, the company developed titanium harness hardware that can “cut about 2.5 pounds off a set of belts. Titanium is as strong as steel and weighs about a third, but it costs four times as much,” he explained.

As such, the hardware is priced based on the application. “You tell us what you need, and we price accordingly.”

To shave off even more weight, the titanium hardware can be used with Stroud Safety’s new Defender series of belts, which has black aluminum adjusters instead of steel rollers.

“That cuts weight, and aesthetically makes it look a lot nicer,” Gentry said.

Impact Racing has new belt hardware as well, a 2-inch integrated camlock restraint with adjusters at the camlock end of the belt.

“One of the main issues with restraints, particularly lap belts, is getting them as tight as you can,” O’Connor said. “It’s safer when you’re strapped in very tight because your lower body has the highest load-carrying capacity of the human body. That’s why you want to be anchored in the seat with lap belts.”

The “big challenge,” O’Connor said, “has been getting the leverage to get them really tight.” With traditional pull-down adjusters, which are closer to the hip, a driver can wind up pushing the adjuster “down into the seat or over the seat.” Reversing the adjuster, to pull up to tighten, has its challenges, too. “If you don’t have them set up correctly with the right lengths at the mounting end, you can end up with an adjuster that’s getting into the cutouts in the seat, or you can run out of adjustment before the belt gets tight.”

By putting the new Impact adjusters “on the tangs that clip into the camlock assembly, it gives you a lot of space to tighten them, and you don’t have to worry about where the adjuster is,” O’Connor said. “It’s not floating, and it won’t run out of adjustment before you get the belts tight.”

The adjuster itself is a “unique design,” he added, “a knurled roller assembly that is pretty free-moving, and the lever assembly that releases it uses tension on the restraint to keep it tight. The harder you pull on it, the tighter it gets. It really makes it easy to get tightened in the vehicle.”

WINDOW NETS

While there haven’t been major technical innovations in window nets—“the tried-and-true continues to hold on and is exactly what it needs to be,” said Speich—their role in a vehicle’s safety system remains important.

“Window nets are a big part of the strategy

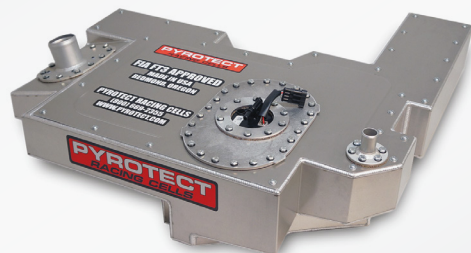
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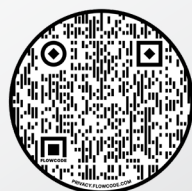
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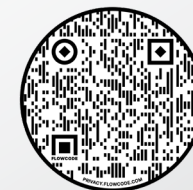
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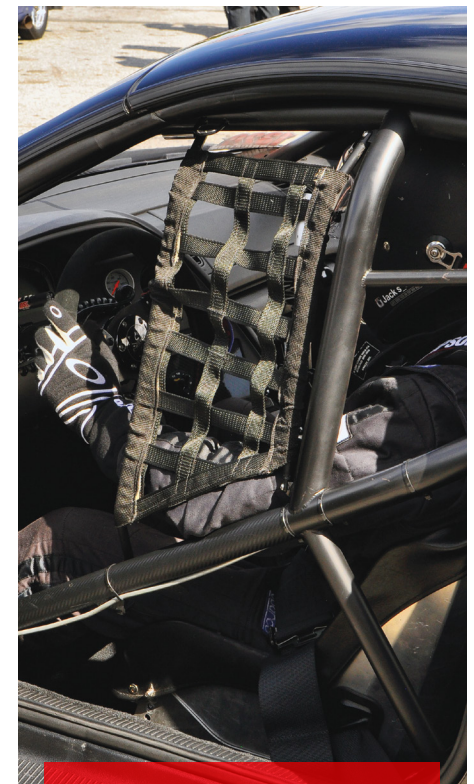
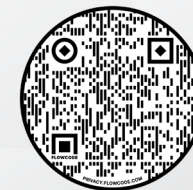
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Window nets are a “tried-and-true” driver-containment method that remains largely unchanged. Still, they continue to play a major role in keeping competitors safe.

of keeping people safe,” O’Connor added. “Containment is something we learn more and more about when we review in-car footage of an event. We have learned that one of the main causes of injury in a lot of events is due to people not staying contained. Not just the main body in the seat, but arms and legs as well. We are learning new ways to prevent those types of injuries, and window nets are a big part of that.”

Car builders are also “looking at stuff in the cockpit in terms of what can cause injury during an event,” O’Connor explained. “It could be something, like a bolt sticking out, that may not be an issue when you’re driving normally, but in an event where the driver’s arms and legs are flinging around, they could hit something sticking out. Builders are tending to look around the cockpit a little more and planning a little better.”



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ENGINE CONTAINMENT DEVICE

"NHRA mandated a rule several years ago that cars going faster than 12.99 have to have an engine containment device," Gentry said. "If you have an oil leak or blow up the motor, that saves the driver from running over his own oil and crashing his car or hitting somebody else. It also saves track clean-up time, and makes the people going down the lane after an incident more comfortable."

Stroud Safety offers SFI- and NHRA-approved versions of these "diapers." (The SFI requires Kevlar and ballistic nylon in the device, while the NHRA version is without the Kevlar.) The company has recently come out with an SFI-approved, quick-release buckle that allows the diaper to be removed, without special tools, in less than a minute. "A lot of racers heard that and said, 'Sold! Send me one,'" Gentry said.

YOUTH SAFETY

Some golf club makers allow young golfers to lease a set of clubs and trade them in for bigger clubs as they grow. Borrowing that idea, LaJoie offers a seat leasing program for young racers.

"My boys [Casey and Corey] started racing when they were seven and eight years old, and I had to build them two or three seats over the course of a year because they grew," he said. "If the parents buy into the seat lease program, I'll upgrade two or three times without a lot of cost to them. The seat might not be the prettiest, but then again, they're only in it for six races and then they have to get another one."

NHRA updated its rules for Junior Dragsters in 2020, requiring SFI-spec roll cage padding "anywhere a driver's helmet may come in contact with the roll cage components during an accident."

James said Simpson responded "with a complete new rollbar/roll cage padding kit that satisfies those needs."

PRIORITIES

"It's always a question of choices," James said about racing safety equipment. "We see racers spend \$30,000 to \$40,000 on an engine, but they really don't want to spend that \$2,000 on a helmet, a nice set of belts, or whatever it might be. It sounds self-serving when we say safety has to be taken first, but that's at the core

of who we are. The racer might not like having to spend that money on belts or the helmet, but we want them to be able to walk away from whatever they might find themselves in."

LaJoie put it more bluntly: "They'll spend money on other speed advantages before they'll worry about their own ass." **PRI**

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FAILURE IS NOT AN OPTION

Though valvetrain parts probably break down more often than any other engine component, when subject to constant testing and improvement they are responsible for huge power gains.

By Mike Magda

A Stock Eliminator drag racer wanted answers. Though he had run a full season without any valvetrain failure, and even won the class championship, he was annoyed at the wear on all the exhaust valves. Each had a noticeable “trench” dug into the tip.

“He had been concerned about it for some time and was going to contact the manufacturer to investigate the hardness and quality control to see if they could solve the issue,” recalled Billy Godbold of COMP Cams, Memphis, Tennessee.

Instead, the racer sent block, heads, and valvetrain to Ben Strader at EFI University in Lake Havasu City, Arizona, for testing on the shop’s Spintron machine. About two minutes into the first run the first of many questions was answered.

“We could all visually see the issue,” said Godbold. “The valve was so severely out of control and was likely jack-hammering the rocker on the valve stem.”

“Yes, we could clearly see the loft was uncontrolled and bouncing on the nose of the camshaft lobe,” added Strader.

A larger, stiffer valve spring would generally be the prescription, but this was Stock Eliminator. Cylinder heads can’t be modified to accept any spring larger than stock. And the camshaft lobe design was also a possible source of the problem.

“There are strict rules to limit total valve lift, which causes racers to want as much area as possible on the nose—think ‘square lobes.’ This is incredibly challenging because the acceleration rates near peak lift—that is, when the lifter transitions from the ramp to the nose of the lobe—can get to be very high. And that makes controlling loft nearly impossible for the springs,” explained Strader.

COMP Cams and Strader have a long history that has cataloged numerous lobe profiles that, when combined with the correct valve spring or other valvetrain changes, will solve most problems.

“Occasionally, when we can’t get just what we want, we ask for Billy to take a swing at a new lobe design,” said Strader. “In

this case, Billy came up with a design that gave us a gentle opening ramp with a very aggressive velocity at the .200-inch lift points. It had a lot of area under the curve, but would not have as much speed near the nose so that we could prevent it from lofting out of control.”

The next step was testing four spring combinations and pushrod setups.

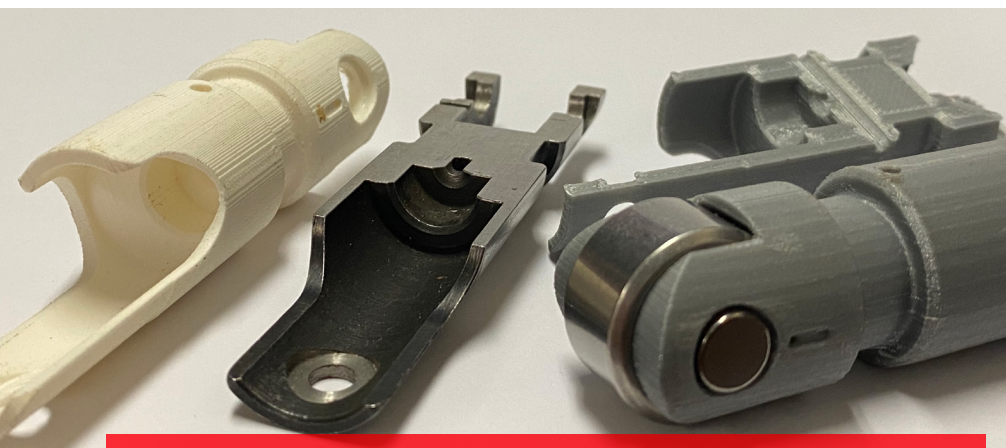
“We then settled on a terrific package that had great reliability and made more power than when they arrived,” added Strader. “This total system approach works really well for us and pairs well to our relationship with Billy and COMP, as we can provide independent testing to look for new ways to solve valvetrain problems.”

Probably nowhere in a pushrod V8 engine built for racing has there been more problems and failures than with the valvetrain. From the lifter to the valve, it’s a delicate linear arrangement that can be compromised by mass, harmonics, and geometry—not to mention cylinder pressure. For a while, engine builders simply

made more power than the valvetrain could withstand.

“Cam manufacturers have come to the realization that we can’t destroy the valvetrain to make horsepower,” said John Partridge of Bullet Racing Cams, Olive Branch, Mississippi. “It used to be that the more aggressive you got, the more power you’d make. But there’s a limit if the valvetrain is going to live.”

Shattered lifters, bent pushrods, and broken valve springs were often dismissed as simply the cost of racing. To their credit, sanctioning bodies implemented rules that forced engine builders and suppliers to rethink their strategies. Some have instituted rpm limits to help keep the valvetrain under control. Others are imposing reliability standards. NASCAR teams used to have practice engines and two-lap grenades called qualifying motors. Then on Sunday they would install the race engine. NASCAR now requires teams to use sealed short blocks over multiple weekends. The goal is to reduce the number of engines a team can use during a season by forcing them to improve durability.



Isky Racing Cams can develop lifters for specific applications. After the part is designed via a CAD drawing, our source told us, 3D-printed prototypes using the actual wheel and axle are sent to the customer for test fitting.

Suppliers quickly learned that by understanding the total picture of valvetrain dynamics, reliability would improve, followed by horsepower increases.

"It all started with the Spintron," recalled Nolan Jamora of Isky Racing Cams, Gardena, California. "We bought the third one off the line. We saw some of the work Richard Childress was doing in NASCAR and applied that to drag racing."

"You always have failures as you develop products," added Rob Remesi of Jesel, Lakewood, New Jersey. "You discover the reasons why and make them better, whether trying different materials or different heat-treats. That's how the lifter has evolved over the years."

FOLLOWING THE TRENDS

Some definite trends have developed over the years. The industry acknowledges that

strength and stiffness is preferred over weight savings on the lifter side of the valvetrain. That has led to massive components, such as lifters more than 1 inch in diameter and pushrods that are 3/4-inch in diameter.

"We just came out with a 3/4-inch pushrod," said Steve Rhodney of Trend Performance, Warren, Michigan. "It's wide open to whoever can fit that big a pushrod into the head and block."

Trend developed the big pushrod by starting with 4130 tubing for the body and machining the tips out of nitride H13 tool steel. The key to making a stronger pushrod came in determining the radius of the tube's inside diameter where the tip feeds into the body.

"There's some technology in this radius," noted Rhodney. "We're looking at the mating radius, the type of fit, and also the heat-treatment. The pushrod comes in either

long or standard clearance styles. The most popular seems to be the long clearance."

Such a fat pushrod has become necessary in high-powered engines where open valve-spring pressures are in the 1,700-pound range and valve lifts are well north of 1.1-inch. And those numbers put considerable pressure on the lifter. Isky has been leading the movement toward a roller lifter design that uses a bushing to support the wheel axle, compared to more traditional designs that use needle bearings.

"We developed better springs [testing on the Spintron] but we kept failing the lifter," explained Jamora. "So we came up with the bushed lifter, and that stopped the failures. Of course, that allows you to go even more aggressive on the camshaft and springs."

Isky is now delivering the seventh version of its bushed lifter following changes in materials and design. Early designs couldn't retain oil, then engineers discovered that porosity of the metal surface was key to lubrication.

"If the material is too hard, it can't hold oil," said Jamora.

Jesel acknowledges the trend toward bushed lifters but continues to promote its needle-bearing designs. "We do offer the customer a choice, but we still prefer needle-bearing over bushing," said Remesi, who noted that failures from lower-quality needle-bearing versions on the market have alarmed engine builders, especially when pieces of the broken needles are scattered throughout the engine. "We have a custom-made needle; it's not off-the-shelf. We can control the sizing and heat-treat."

Jesel offers a full line of lifter designs, including keyway, tie-bar, and roller-guided cartridge.

up with the oil galley in the block.

"Proper clearances are critical because the lifters' oil feed is not in constant contact with the oil galley. Pre-assembly checking can reveal potential problems when the lifter oil feed is out of alignment with the galley," he continued. "This can happen with reduced-base-circle cams causing the lifter to ride lower in the bore, or conversely, when larger cam journals are employed causing the lifter to ride higher in the bore. It may be necessary to use lifters designed for these applications and/or bushed lifter bores to correct the alignment and ensure adequate oiling." —Mike Magda

Meantime, Crower is seeing the market expand for solid roller lifters. "People aren't afraid to run solid rollers on the street," said Louis Floquet of the San Diego, California-based company. "A thousand horsepower is average for the street car today. With new materials, CNC machining, and tighter tolerances, everything is more exact."

Crower is working on a new lifter with select engine builders testing them. "This one is different in how we're doing the oiling. It should be a pretty trick deal by the time it's done," Floquet added.

Meeting a lower price point is what motivated Bullet Racing Cams to develop a new needle-bearing lifter for sportsman racers. "It's less pricey but still has pressure oiling to the wheel," said Partridge. "The difference is about \$200 per set. We're also working on our bushing lifters. That's an ongoing process with materials and design."

Partridge acknowledged there are differences of opinion when considering bushed versus needle-bearing. "Top Fuel teams aren't running bushed lifters. That tells me they have a purpose and not for all

applications," he said. "If it's high quality and used in the right applications, there's nothing wrong with a needle-bearing lifter."

DEBATE OVER ROCKER ARMS

Overall, the industry appears to be leaning more in the direction of steel rocker arms versus aluminum models; and there's also a movement to shaft rocker arms. "That's where everything is being pushed these days," said Floquet. "More cylinder heads are being designed for shaft rockers, and stainless-steel rocker arms don't fatigue like aluminum. With aluminum, you had to adjust the rockers due to the heat cycles. With steel, you can set the rocker and forget about it."

Crower recently introduced a new Legacy steel shaft-rocker design for the LS that's available in 1.7:1 or 1.8:1 ratio. "It puts most of the offset into the stand and not the



Jesel's wheel-guided, cartridge roller lifter allows the wheel diameter to exceed the body diameter, which ultimately helps add to lifter longevity, a company source noted.

PARTS FAILURE OR CLUMSY INSTALLATION?

Over the past few years, valvetrain failures have led to vast improvements in quality and design. However, Jack McInnis of Erson Cams in Louisville, Kentucky, believes manufacturers and suppliers shouldn't shoulder all the blame.

"Many times, a valvetrain failure may result from inattention to detail rather than the component itself," McInnis said. "One of the problem areas we've heard questions about concerns top-end oiling issues when running a solid roller cam. It's important to check for proper clearance between the lifters and lifter bores. Also, pre-assemble to make sure the oil feed on the lifter is lining

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Stainless steel rocker arms are gaining in popularity, largely because they don't fatigue like aluminum, according to our source at Crower.

rocker," said Floquet. "It basically straightens out everything. There's less stress on the part. And we're also doing a bushing tip, but a needle bearing is optional."

Jesel is also addressing the demand for

more steel rocker arms but has some words of caution. "Steel is stronger, and aluminum will eventually fatigue over time. Unless something catastrophic happens in the motor, you're not going to break a steel rocker,"

noted Remesi. "Our target when we first started the steel rockers was turbocharged, nitrous, and blower motors where there's a lot of cylinder pressure that the rocker arm has to open into. There are a lot of applications where aluminum rockers will be fine. But a customer has the peace of mind knowing that a steel rocker won't break."

Steel is heavier than aluminum, so there are high-rpm applications where aluminum might be preferred. And there are some engines with unique offsets that pose difficult machining operations to produce steel rockers. Otherwise, the only real downside to steel rocker arms is price.

"They can cost 50% to 100% more than aluminum because the manufacturing process is longer and more involved," added Remesi.

DIESEL GETS INTO THE ACT

Engine Pro in Wheat Ridge, Colorado, is adding some 275 new part numbers in its next catalog, including new valve springs and performance roller lifters.

"There are also definite opportunities in the

midsize diesel market," said Dave Sutton. "We have a drop-in valve spring to help increase rpm, and we see a strong market for our Nitro Black valve line."

The exhaust valves in the Nitro Black line are made from Inconel and HNV-3 alloys, while the intakes are constructed from 21-4N steel. All valves are finished with a five-step liquid nitriding process.

"Ours is a proprietary process," explained Sutton. "Everyone is pushing the envelope for products that will be more durable and last longer."

QualCast in Nashville, Tennessee, is also targeting diesel customers with a new performance valve kit that includes valves, springs, seals, keepers, and retainers. "It gives the user one part number instead of spending time on the phone or computer looking for the parts individually," explained Paul Hauglie. "The springs will increase the seat pressure, but you can still use the stock camshaft, and no machining is needed."

The valves in the kit are from the company's Black Lightning performance



Suppliers are constantly working to improve valvetrain reliability and longevity—for Engine Pro, its proprietary manufacturing process is key to those efforts.



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Racers can be quick to blame manufacturers for failures, but oftentimes the real cause is "inattention to detail rather than the component itself," noted our source at Erson.

line. The exhaust valves have a higher nickel content to handle high heat, and the intake valves are constructed of 21-4N stainless steel. All the diesel valves have a hardened tip and a black nitride finish.

MAKING LIFE EASIER FOR THE VALVE

All valves are positioned in a guide and rest on a seat. CHE Precision in

Newbury Park, California, are veterans in manufacturing those two components along with other valvetrain gear.

"We've had one of our best years ever," Ed Doyle said of the past 12 months. "So, it's been hard just to keep up with the normal work. However, we do have some new materials that I can't talk about because they're for certain teams."

Doyle did tell us the new valve-seat material came from a trusted supplier, and

both discussed the possibilities with the teams. "It offers a lot of heat dissipation," explained Doyle. "I'm hoping to start introducing that material to more teams as we get more data on it. Right now it works very well in endurance racing."

Doyle added that he's also trying a new material with the 410 sprint car engine builders, but all seem to prefer the current beryllium copper alloy.

ENGINEERING AROUND THE SPRING

Howards Cams of Oshkosh, Wisconsin, supplies spec springs to the Racesaver series, which offers a cost-effective rules package to attract more sprint car drivers.

There are very specific limits on the valvetrain, including cast-iron camshaft, .842-inch flat tappets, 3/8-inch rocker studs, specific size and weight valves, and valve springs with specific seat and open pressures. There's also a maximum valve lift .510 inch on the intake and .535 inch on the exhaust. To help racers find a little power with those limitations, engineers at Howards are developing cam lobes to work with those specific springs.

A company spokesperson said Howards Racing Cams has developed a new family of lobes, noting the ramp rates were tuned to control harmonics with the Racesaver spring.

This effort truly confirms a delicate balance between all valvetrain components, yet there is a synergistic cooperation between them. Spintron testing can confirm how little changes have a huge effect on one or more other components. Sophisticated engine simulation programs are also helping engine builders find the right combinations.

"Eventually, we learn what to stay away from and what we can live with," concluded Bullet Racing Cams' Partridge. **PRI**

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WHEN *TOO MUCH* IS *NEVER ENOUGH*

Driveshaft manufacturers are taking a strategic approach to design in order to deliver lightweight components that are both reliable and cost-effective.

By Bradley Iger

As four-digit horsepower becomes the norm both at the race track and on the street, driveshafts are being put to the test like never before. With racers constantly upping the ante to find a competitive edge, driveshafts are playing an increasingly critical role in teams' success; unlike many other components in a race car, failure here is at best a DNF, and at worst, a serious safety risk.

"We're constantly in a state of development," said Lee Mejia of The Driveshaft Shop, Salisbury, North Carolina. "From both the custom side and the OEM-style replacement side, we are regularly faced with challenges that require good solutions—some of the stuff that worked a few years ago doesn't work so well now."

Whether we're talking about a street/strip drag car or a tube chassis circle track racer, the demands from competitors are the same—high strength, low weight, and affordability. But with tire and suspension technology rapidly evolving alongside the rise in engine output, accomplishing those goals is often easier said than done. And for many, the approach comes down to the specific needs of a given application.

THE MODERN ARMS RACE

"There's a new kind of race car out there," said Jesse Powell of G-Force Engineering, Wichita, Kansas. "Nobody is building 1969

Camaros to go race in NHRA Super Stock today. But if you go to any NMCA race, you'll see about 150 late-model vehicles there to run the quarter-mile. These are the new race cars—it's not the Fox-body Mustang that was bought for five grand that had \$70,000 invested in it to make it competitive. It's the new car that was bought for \$70,000 and had five grand invested in it."

Powell cited late-model Dodge Challengers and Chargers, Ford Mustangs, and Chevrolet Camaros as the main drivers of current demand. While all are capable of producing serious horsepower with fairly minimal changes from their showroom stock spec, these vehicles are often equipped with two-piece driveshafts from the

factory in order to minimize noise and vibration from the driveline—designs that meet the strength requirements of an unmodified car and not much else.

"The demand is pretty simple to understand—we're dealing with a lot of horsepower and a lot of weight," he said. "The cars are heavy and their horsepower potential is almost unlimited. A Hellcat makes 700 horsepower from the factory, but for about \$2,000 in modifications you can make more than a thousand. The driveshafts that the OEs are designing are fine for the power that these cars make in stock form, but that's basically it. The minute you start adding horsepower, you start breaking parts."



Since many of these cars serve double-duty as race cars and street machines, the priorities for these driveshaft designs differ from traditional high-horsepower motorsports applications. "I think you can quickly reach a point of diminishing returns with light weighing," Powell said. "The guy with the 4,500-pound Demon isn't worried about adding two pounds to the driveline—he wants to support more power. There is a threshold that you reach where you start to lose more capability than the advantages you gain from keeping the weight down. You obviously want to do the best you can to keep the part light by using materials like aluminum and carbon fiber, but if the part breaks, you need to move to hardened steel, and that might be a few pounds more. At a certain point, if you want more horsepower you need to make sacrifices elsewhere."

Powell noted that driveshaft designs for modern performance vehicles are limited by tight production car packaging, so engineers look for specific aspects of the design to pinpoint where meaningful improvements can be made. "We're trying to defy physics. Right now a lot of what we do is aluminum, and we've gotten incrementally better with it by working with our partners like Sonnax to find the shortcomings, adding material where it's needed, going to a thicker wall tube, reworking the bonding process—those types of things."

He said he feels like they've reached a pinnacle of what they can do right now from a materials standpoint, so the current strategy is mainly focused on making

the parts more robust as a system rather than making the driveshafts themselves stronger. "That means putting together the right bushing package, making sure we're not binding up the U-joints, or putting the driveshaft into some sort of undesirable angle that can excite the driveshaft or compromise its integrity. For instance, we developed a new set of dual-stage bushings that provide OE-drivability at idle and while cruising, where the bushing material has a softer durometer. But it also has a harder durometer material that comes into play as you start to load the driveline that holds it firm so the pinion can't move so much."



With horsepower on the rise throughout racing, driveshafts are being punished like never before, which in turn is driving rapid development of stronger products. Photo courtesy of The Driveshaft Shop.

THE BALANCING ACT

While weight might not be a big issue for street/strip applications, it takes on greater importance for those running in series with purpose-built race cars, where the application necessitates different design priorities.

"You usually don't have as many constraints to contend with here," said Mejia. "Obviously we work with our manufacturers to make sure the tubing of our carbon fiber and aluminum driveshafts is of the best quality, but there are also innovations that are helping to support the driveshaft, effectively making it stronger. For instance, from our axle technology we've developed what's basically a stub-mount system that uses a 300M chromoly stub shaft

As racers examine every component on their race cars for a competitive edge, driveshafts are playing an increasingly critical role in teams' success; unlike many other components in a race car, failure here is at best a DNF, and at worst a serious safety risk. Photo courtesy of Strange Engineering.

that connects the CV to either an aluminum or a carbon fiber driveshaft."

He added that it's important to consider how the vehicle is going to be used in order to spec out an effective setup. "If a driveshaft is properly selected for the application, we tend to see very low rates of failure. They typically happen because something is being used in situations it wasn't designed for. The criteria that we usually go by includes the weight of the car, horsepower range, the kind of racing they're going to be doing, and the kind of tire they're going to be running. We also verify any possible diameter restrictions—in some cases we can only do a chromoly tube or something like that because of the amount of space that we have to work with."

While steel isn't the lightest option available, it does provide some peace of mind in terms of outright strength. "We focus on strength," said JC Cascio of Strange Engineering, Morton Grove, Illinois. "Accordingly, all of our driveshafts are manufactured with heat-



Racers fielding hefty late-model cars are willing to consider lighter alternative materials for driveshafts, such as this carbon fiber driveshaft from The Driveshaft Shop. But as horsepower climbs, strength becomes the ultimate criteria.

treated seamless 4130 chromoly material with 4130 chromoly weld ends, which provides the strongest option. Both our 3-inch and 3.5-inch diameter tubes come with 0.083-inch wall thickness and are straightened to have less than .008-inch of total runout."

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Steel is relatively heavy, but its strength is a proven asset. Even so, "driveshafts will evolve as the weight and horsepower dictate," said our source at Strange Engineering.

For others who're looking to get the strength they need with the minimal amount of weight penalty required to do so, other materials can provide a more targeted solution. "We do a lot with 4130 chromoly, but this is where carbon fiber really shines," said Mike Bennett of Dynamic Drivelines, Des Moines, Iowa. "It's super light and it's very strong relative to its weight. Cost usually ends up being the main factor when choosing between the two."

Aluminum also offers a lightweight alternative to carbon fiber that's more budget-friendly, but it's ultimately not as strong. To address this, engineers at Diversified Machine

in Lancaster, Pennsylvania, identify where material can be added to provide meaningful improvements in overall strength, and where it can be removed without compromise.

"We can increase the OD—if we go bigger with the OD, we gain that strength, and we can still put a big hole through the center in order to provide a lighter product than the competition," said Diversified Machine's Dave Ely. "And maybe there's a spot where we had a 0.030-inch radius previously—if we can get that to a 0.060 or a 0.090 radius, that will make a difference. Any time you're able to put more radius in and make your transition points smoother, you're going to gain longevity. At this point, it's as much about the machining practices as it is about the materials."

THE NEXT BIG THING

With all signs pointing toward continued increases in horsepower, grip, and weight in the future, driveshaft manufacturers have no time to rest on their laurels. "As with all

Racers seeking a lighter alternative to steel but more affordable than carbon fiber can turn to aluminum, said our source at Diversified Machine, where engineers then strengthen the product by identifying where material can be added or removed without compromise.

race components, driveshafts will evolve as the weight and horsepower dictate," said Cascio. "And to that end, we're always doing research, development, and testing to improve the capability of our driveshafts and expand our line."

And by most accounts, that future is likely going to include an increasing shift toward carbon fiber driveshafts, despite the headwinds the material initially faced in this type of application. "I think they originally got a bad rap from the early years of sub-standard manufacturing," Mejia said.

That sentiment is backed by Ely, who noted that circle track sanctioning bodies were soured on carbon fiber early not only because of potential cost increases, but reliability issues. "Twenty years ago, some companies came out with carbon fiber stuff and it didn't really work very well. So right away the sanctioning bodies wanted to do away with this thing they saw as an unnecessary complication—just do away with them before everybody gets them."

"IF A CARBON SHAFT FAILS, IT DOESN'T HAVE THE POTENTIAL TO COME INTO THE CAR. IT OPENS UP LIKE A BROOM STICK AND BASICALLY DISINTEGRATES."

But as Powell pointed out, those processes and the resulting quality of carbon fiber parts have come a long way in the past few decades. "I think that's where the drivetrain world is going—we're just waiting for everything else to catch up with the technology. We know that carbon is where it needs to go in order to do this right in our segment."

Bennett also agreed that carbon fiber is the material of choice for the road ahead. "Carbon is probably going to be the focus—right now it's about getting the costs down. The way it's made is more labor intensive,

but the industry is definitely working toward ways to improve the pricing."

And while certain classes and series are still hesitant to bring carbon fiber driveshafts into the fold, the tide is turning. "As carbon fiber driveshafts have improved as a whole and more people understand the benefits there, they have become much more widely accepted," said Mejia. "The times that we run into problems running carbon today are mostly in series or classes where stock-style or spec components are a requirement because of the format."

Beyond the performance and reliability advantages that today's carbon fiber offers, the safety benefits are indisputable. "We do a lot of these for Pro Mods and things like that—big horsepower drag cars," he added. "And a big factor for that is how safe it is. If a carbon shaft fails, it doesn't have the potential to come into the car. It opens up like a broom stick and basically disintegrates."

And because of that behavior, it's also

less liable to really beat up the vehicle in the event of a failure. "Generally, if a carbon fiber driveshaft fails, it splinters and shreds," Powell explained. "So you usually have a lot less damage to the vehicle than you do with aluminum or steel. And in situations where you might not have a safety loop, carbon fiber is probably the least likely to cause the car to catapult because of how it breaks up."

Although carbon fiber is seeing wider use among OEMs these days as well, Powell noted that it's still largely relegated to specialty vehicles. "Stuff like AMGs, the new Mustang Shelby GT500 has a carbon fiber driveshaft—there's a few of them out there. But they're on premium vehicles, and I think it's going to continue that way for a while because it still brings a premium price. Until we see that come into the same price realm as steel or aluminum, I don't think you're going to see carbon as the everyday OE material of choice. And that's OK because it leaves room for us in the aftermarket." **PRI**

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DRAG RACING

Euro-Style



Competitors and fans—from Scandinavia to the UK—are passionate about their sport, and that means a world of opportunity awaits US-based performance parts manufacturers and service providers.

By Linda Spencer

This month marks the start of the European drag racing season, with May kick-off events scheduled for both the sportsman division—the Summit Racing EDRS Series—and the FIA European Drag Racing Championship.

“Racers have been waiting a very long time for the return of a normal race calendar [following the 2020 season disruption due to COVID-19], and we expect a strong 2021 season,” said Nils Lagerlof, CEO of Speedgroup, the Swedish-based administrator and promoter of both the Championship and EDRS series.

The EDRS Series is held primarily in the Nordic countries of Norway, Sweden, and Finland (with a round in nearby Estonia), and is expected to attract about 700 teams this year, similar to the number of teams it drew in 2019. But all bets are off regarding spectators.

“While the sportsman grassroots series typically attracts up to 4,000 spectators at an event, it’s really hard to guess the number of spectators we will see in 2021 because it has a lot to do with how the COVID vaccination process is advancing in Europe and if there are restrictions at the various venues remaining in place,” Lagerlof said.

Likewise, the Championship series—with 80 teams that usually attract up to 8,000 spectators at each round of the six-round series—may also be affected by COVID limitations.

“Currently, there are different COVID-related restrictions in the countries hosting championship rounds,” Lagerlof said. “The first event is in the end of May at Santa Pod, England, and no one knows what the COVID situation will be by then.”

OVERSEAS CONNECTIONS

Speedgroup was founded in 2006 by a small group of race

teams active in the European Drag Racing Championships. It sponsors a contingency program to connect US and other manufacturers with racers and fans in the sportsman division and through a Speedgroup subsidiary, DRE, to serve as a similar bridge for the Championship series. Speedgroup AB is currently a shareholder company registered in Sweden; the majority of shareholders are active racers in the Championship and EDRS series.

Several US-based motorsports companies work closely with Speedgroup and have developed ongoing—and strong—ties with European racers and fans and lend support to the growth of the European drag racing scene. All are eager for racing to resume.

“At Tierp [the Swedish drag arena], I was struck by how closely and passionately the Swedish fans follow NHRA drag racing,” said Jim Greenleaf, motorsports and event manager at Summit Racing Equipment, Tallmadge, Ohio, who represents his company at the EDRS Series. “Everywhere you look, you see Las Vegas Motor Speedway and Charlotte Speedway hats and T-shirts, as well as other gear. You really wouldn’t know you are in Sweden if not for the accents.”

He went on to explain why the sportsman grassroots division is a good fit for Summit: “We can provide the full range of products and services for [these] racers. In addition to our company making the commitment to support the racing scene in Europe, it provides the opportunity for us to learn how to service these customers.

“We focus not only on delivering the products, but also on how to do so as efficiently and cost-effectively as possible,” he continued, “as we also work out issues such as taxes, tariffs, and shipping to get the products from the United States to our European customers.”

Another US company that’s quite active in the European drag racing scene is San Antonio, Texas-based VP Racing Fuels. Peter Coleman, who’s in charge of European business development for VP, told us his company has been working with Speedgroup/EDRS as its official fuel supplier since 2017. He also noted a long-standing deal with Santa Pod in the UK.

“The relationship...serves to bring VP Racing Fuels closer to the racers who need our fuels and expertise,” he said. “Drag racers know that VP is available at the circuits.

“Our network of dealers and distributors is strong—particularly across Scandinavia and the United Kingdom—and there should be no need for racers to carry fuel long distances across borders, potentially breaking laws on the way,” Coleman continued. “Our network, including Old Hall Performance in the United Kingdom, Ljungdahl Racing and JAMS AB in Sweden, Lindtek in Denmark, Fannrem Motorverksted in Norway, and Specialty Engineering in Finland, are supported by the contingency program and should be able to get racing fuel to any location.”

On the standards side, Poway, California-based SFI Foundation works closely with the FIA European Drag Racing Championship, the EDRS, and other race organizations and federations throughout Europe, according to President Jennifer Faye, who noted that SFI specifications are utilized across the continent “to ensure that racing and safety equipment is tested and manufacturer-certified to the minimum standards. That ensures performance quality of the certified items and helps prevent part failures while in use.

“SFI also assists with the inspection process and recertification of parts,” she added. “Many SFI specs require the parts to be inspected periodically to check for damage,

undue wear, or other conditions that could harm the integrity of the part and prevent it from performing as intended or failing and causing a safety problem. Most of the hard-parts manufacturers are in the United States, and shipping heavy parts overseas for inspection can be very expensive, so we bring factory-trained inspectors to the racers in an effort to minimize cost for them. We have been conducting SFI inspections in the springtime before each race season for more than 20 years.”

Faye explained that during the pandemic, SFI’s regular inspection tour experienced interruptions, “but we have evolved our team of inspectors to be comprised of Europe-based technicians who have been able to carry on the inspections locally, with us coordinating the process from here in the United States. In addition to the annual parts inspections, we provide technical assistance with SFI specs using their regulations as well as providing a certification exam program for SFI International Technical Inspectors/Scrutineers.”

TIES RUN DEEP

The ties between European drag racing and its US counterparts—and the opportunities for stateside racing suppliers—run deep, according to Speedgroup and the firms we spoke with.

“In addition to the competitions we participate in and promote with our partners, we also work with fairs and other events,” Lagerlof said. “In 2019, Speedgroup met about 200,000 potential customers on seven trade fairs and events. Together with the audience of about 250,000 people at our competitions, our partners are seen as an attractive way toward a good target group.”



SFI specs are utilized in Europe to ensure that drag race and safety equipment is tested and manufacturer-certified to appropriate standards, according to our source. Pictured here are US racing parts awaiting inspection at a Swedish speed shop. Photo courtesy of Jennifer Faye, SFI Foundation.

In fact, Faye estimated that about 95% of certified hard parts used in European drag racing come from the states. "Many of the cars raced in Europe are American-based models, so there's a market for American parts, whether it's drivetrain or safety equipment," she said. "Of course, there are several safety-equipment manufacturers in Europe for sourcing personal protective gear, but drag race-specific items such as supercharger restraints are solely produced in the United States, and there is a need for that equipment across the pond."

"Particularly with safety equipment, the one area we are always trying to expand in Europe is customer service and support," she continued. "I would suggest that if there were US companies that would like to enter this market, they should connect with a local supplier or retailer in a particular country that they want to be in, whether it's Sweden, Finland, the United Kingdom, or elsewhere. Having local knowledge is invaluable, and setting up a relationship with a supplier who can help you communicate and offer

"There is a deep appreciation of American car culture there that keeps drag racing strong across European borders," Faye explained. "In addition to the American car models you typically see, you also have the opportunity to watch cars go down the track that are unique to Europe. One example is the Ford Anglia nostalgic gassers in the United Kingdom. They are serious race cars, running in the sevens at almost 200 mph, and they are very different-looking from the types of cars we have here, but what's under the body can be similar."

Summit Racing's Greenleaf agreed, telling us that "the enthusiasm in Europe for American muscle cars is incredible and evident on European race tracks." He also noted that American cars and equipment readily find their way from the US to Europe, creating huge opportunities for US-based manufacturers.

A deep appreciation of American car culture keeps drag racing strong across Europe, noted one of our sources, who pointed to nostalgia gassers as one of the many classes helping to fuel business and interest in the sport. Photo courtesy of Lena Pena, Speedgroup.



technical service and support to local racers goes a long way in gaining loyal customers."

From sportsman racing to the professional classes, there's a lot more drag racing taking place in Europe than outsiders may realize. Similarities are everywhere—Pro Mod classes, for example, are hugely popular on both US and European straightaways. The enthusiasm, too, is very much on par with what you'd find at a US drag strip, whether it's Gainesville Raceway, the Texas Motorplex, Bandimere Speedway, or elsewhere.

"While we have a longer season in the United States, with more stops and more racers, there are smaller groups of drag racers and enthusiasts in Europe," Coleman said. "But their depth of passion is no less than you'd get in the United States." **PRI**

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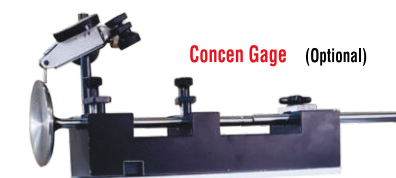
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A LOOK INSIDE NHRA'S EV EVOLUTION



As the motoring public warms up to electric vehicles and automakers continue to invest billions in their development, the drag race sanctioning body seeks to establish an open dialogue with OEMs, parts suppliers, car builders, and safety equipment manufacturers to chart the best path forward.

By Bradley Iger

Electric vehicle technology has come a long way over the past decade. If countless YouTube videos of Teslas putting the hurt on Hellcats at the drag strip weren't enough, consider the fact that last year, veteran racer Steve Huff became the first to break the 200 mph barrier in a four-wheeled EV, posting an ET of 7.52 at 201.07 mph at Tucson Dragway in the Huff Motorsports electric dragster.

"Big Daddy" Don Garlits, who has been campaigning an electric dragster of his own in recent years, had previously posited that hitting 200 wasn't possible with currently available technology. In the spirit of competition, Huff set out to prove Garlits wrong, and he's already set his sights on another milestone. "We're going out to be the first in the 6.00s," he said in an interview with *Drag Illustrated*. "I have the utmost confidence that will happen."

As electric vehicles continue their rapid evolution, and car counts increase at drag racing events in the coming years, the NHRA has created a forum for equipment suppliers, car builders, and OEMs to collaborate on various EV-related matters through a series of panel discussions, the first of which took place at the Gatornationals at Gainesville

Raceway this past March. The topics at these meetings are expected to be wide-ranging, but ultimately the goal is to allow EVs to be effectively integrated into NHRA's existing formats without encroaching on the current platform.

"Our tagline is 'Speed for All,' and this is very much in line with our mission of providing an accommodating environment for all competitors and a wide variety of vehicles," said Ned Walliser of the NHRA. "We really wanted to get everyone together and gather as much information as we could to see what we can build off of. We currently have EV racing rules in our NHRA rulebook—we race them in ET bracket as well as the Junior Drag Racing League side—so electric is part of our program already, and we see the evolution of electric racing in place. There's a big push for it now,

so we really need to investigate where we have synergies with the OEMs as well as the manufacturers of safety equipment that can help expand electric racing to multiple levels of the sport."

Walliser explained that the NHRA

"WE WANT TO MAKE SURE THAT THE DIRECTION THAT WE'RE GOING IS THE SAME DIRECTION THAT THE OEMS ARE GOING."

understands where the technology is headed on the OEM side and that they're seeing a strong desire for EVs to have their own category within the organization, but the design of such a category has yet to be determined. "Is it an OEM category or is it a purpose-built EV race class?" he said. "And if it's a purpose-built race car, what can we learn from each other in order to have the best possible program here?"

The symbiotic relationship between automakers and motorsports has been an intrinsic part of automotive development since the dawn of motoring, with OEMs

"WHEN YOU'RE TALKING ABOUT THE SAFETY, YOU CAN LEARN FROM EVERY SITUATION AND SCENARIO."

taking to the track in order to test their designs and identify where performance and durability improvements can be made. It's a process that not only improves the race cars, but also technologies that will eventually find their way into an automaker's street-driven production vehicles. Yet because of the inherent nature of EV technology the script has been flipped in some ways, as research and development at the OEM level has largely focused on road car applications. So, as EVs are gradually integrated into previously established race formats, sanctioning bodies like the NHRA are focused on ensuring that aspects of this development that could potentially impact motorsports efforts don't go unnoticed.

"We want to make sure that the direction that we're going is the same direction that the OEMs are going," Walliser told us. "And we expect that the OEMs will learn from

some of the things that we are doing at the race track as well."

And much of this information sharing revolves around issues of safety. He cited the discrepancies in weight between EVs and traditional ICE vehicles, and how that may affect equipment rules going forward, as a particular area of interest at this initial meeting. "We obviously have chassis specifications, and those specifications are developed by the speed and weight of the car as well as how that car is built by the OEM. From there we develop a roll cage or roll bar system inside the car to protect the driver in case of an incident based on that information. But with the added weight of the batteries in an EV, we want to review those specifications and make sure that we are providing the best safety we can for a given category."

Walliser is adamant that this increased interest in EV development by NHRA is not designed to overtake any existing categories and noted that it may present opportunities to usher in improvements across the board. "When you're talking about the safety, you can learn from every situation and scenario, and I don't think that what we learn from EV racing will be any different in that regard. We will learn some things along the way, and safety among all of the NHRA series will continue to evolve," he explained. **PRI**

The NHRA is soliciting input and weighing options for how best to integrate EV technology into the organization. "Is it an OEM category or is it a purpose-built EV race class?" said our contact. "And if it's a purpose-built race car, what can we learn from each other in order to have the best possible program here?" Photo courtesy of Ford Performance.



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INDUSTRY NEWS

CHUCK WATSON SR., 74, FOUNDER OF WATSON ENGINEERING

Chuck Watson Sr., the founder of fabrication services, machining, and parts provider Watson Engineering, Inc. and Watson Racing, has died. He was 74.

"Chuck wasn't your typical businessman. He built two successful businesses out of nothing," said Watson Racing Parts Division Manager Frank Naglich. "Still, along the way, he was connecting and building relationships with those around him, whether he was at the track or in the shop with customers and his employees."

In 1981, Watson founded Watson Engineering out of a three-car garage behind his house. Today, the company specializes in metal fabrication with facilities in Michigan's metro Detroit area and upstate South Carolina. He later went on to form Watson Racing, a race car building division based in Brownstown, Michigan.

Watson could also be found behind the wheel, most recently campaigning a 2016 Mustang Cobra Jet with a Coyote engine and Whipple supercharger in the NMCA Holley EFI Factory Super Cars and NHRA SAM Tech Factory Stock Showdown.

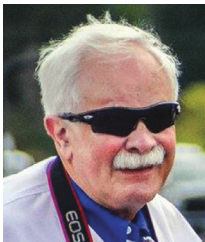
Watson's sons Chuck Watson Jr. and David Watson will continue to run operations for Watson Engineering and Watson Racing.

INDUSTRY VETERAN & MENTOR BILL MCKNIGHT, 71

Longtime motorsports professional Bill McKnight, who previously served in management positions at MAHLE Motorsport and Dana Corp., has died. He was 71.

As owner of McKnight Family Photography Adventures based in Whitehouse, Ohio, McKnight also was a fixture photographer at race tracks.

After joining MAHLE in March 2007, he was promoted to team leader, where he remained until his retirement in 2019. Prior, he had spent 25 years as a training manager for Dana Corp.



Bill McKnight

"Everyone at MAHLE Motorsport North America loved working with Bill. He was a friend and mentor to many racers, engine builders, and tech students," according to a company release. "His contributions to our industry will live on, but he will be missed greatly."

McKnight was awarded PERA's Lifetime Achievement Award in 2019.

HOLLEY TO BECOME PUBLIC COMPANY AFTER MERGER

Holley, the performance automotive aftermarket company based in Bowling Green, Kentucky, will become a public company as part of a definitive merger agreement with Empower Ltd., a publicly traded special purpose acquisition company. As a result of the agreement, Holley will be publicly listed on the New York Stock Exchange under the new ticker symbol "HLLY."

Holley President and Chief Executive Officer Tom Tomlinson and the current management team will continue to lead the combined company. Empower's management team is led by CEO Matt Rubel and President Graham Clempson. Rubel is expected to serve as Chairman of the Board of Directors. Holley is controlled by Sentinel Capital Partners, L.L.C., a midmarket private equity firm that will remain Holley's largest shareholder upon closing.

QA1 ACQUIRES GERST TUBULAR SUSPENSIONS

QA1 has announced the expansion of its classic Mopar suspension line with the acquisition of Gerst Tubular Suspension, a manufacturer of coil-over systems for classic Dodge, Plymouth, and Chrysler platforms.

The acquisition pairs Gerst's Mopar products with the manufacturing capability and distribution of QA1, the provider of suspension solutions for American muscle cars. QA1's facility in Lakeville, Minnesota, will allow for expanded and efficient production, the company said.

DPI ACQUIRES OWNER OF NITRO GEAR & AXLE

DPI Off-Road Brands has announced the acquisition of J.T.'s Parts & Accessories,

Inc., the manufacturer of the Nitro Gear & Axle brand. Both J.T.'s Parts and Nitro Gear & Axle will operate as a division of DPI Off-Road Brands.

Nitro Gear & Axle offers ring-and-pinion sets, semi- and full-float rear axles, C-Clip rear axles, front axles, full and mini spools, pinion yokes, and more.

DPI Off-Road Brands includes Daystar Products International, Performance Accessories, VooDoo Offroad, Tuff Country, Leveling Solutions, Revtek, MCE Fenders, and HCT.

MOUNTUNE RACING LAUNCHES CLASSIC ENGINES DIVISION

Mountune Racing, the designer and manufacturer of race engines and performance parts with locations in the US and UK, has announced a new division to support a range of historic race engine builds, component design services, and classic engine builds and restoration work.

Mountune Classic Engines will primarily work with Ford engines, along with several other makes, "whether it be a classic Jaguar XK or a Ferrari," company founder David Mountain said.

Engine rebuilds, redesigns, and remanufacturing of components will also be available, along with engine dynamometer tests and rentals.

MEYER DISTRIBUTING ADDS NEW DELAWARE LOCATION

Meyer Distributing, Inc., the automotive specialty products marketing and distribution provider, has added a new Bear, Delaware, location. The cross-dock will have a direct, next-day feed from Meyer's East Hanover, New Jersey-based distribution hub, which houses one of the largest inventories of automotive accessories, exhaust, and related parts in the region.

"With this new cross-dock," said Meyer Distributing Director of Sales Cody Ziegler, "we look forward to doubling the frequency to cities in [Delaware] and dramatically improving our service levels."

HURCO ANNOUNCES NEW APPRENTICESHIP PROGRAM

Hurco North America has launched a new apprenticeship program. The Field Service Apprenticeship (FSA) is a two-year program, beginning with a 12-week industry training that merges hands-on training and repair of CNC machines with classroom materials.

"The FSA program will allow [our service and support team] to transfer their knowledge to the next generation of service engineers with intensive training about the machine tool industry, how they are built, the technology that powers our CNC machines, how to diagnose issues, and service machines," said Hurco North America General Manager Cory Miller.

Field service engineers will ultimately be ambassadors for Hurco Companies, Inc. The FSA program will take place at Hurco's headquarters in Indianapolis, Indiana.

THE TUNING SCHOOL REVEALS BUILDING UPGRADE, NEW PROGRAMS

The Tuning School (TTS), based in Odessa, Florida, has announced new education programs and virtual training courses, along with a building upgrade, as part of its new rebranding initiative. TTS recently purchased the building that had been the company's headquarters for the last 11 years, and will remodel the interior and shop areas while renovating its classrooms and dyno tuning areas.

In addition, TTS is also developing live virtual training courses and fresh tuning education programs that cover new vehicles and tuning software, including courses for tuning Ford transmission using HP Tuners VCM suite and Ford modular engines using SCT's Advantage III software.

3D SYSTEMS ANNOUNCES SOUTH CAROLINA EXPANSION

3D Systems has announced a planned expansion of its Rock Hill, South Carolina, location, with plans to add 100,000 square feet to its existing headquarters campus.

The expansion allows 3D Systems to consolidate its materials manufacturing, quality, and logistics operations with new

and expanded materials development laboratories to improve operational efficiencies, accelerate solution development, and reduce time to market.

NASCAR HIRES NEW VP OF COMMUNICATIONS

NASCAR has named Eric Ryan to the position of vice president of communications. Ryan will provide leadership across strategic initiatives and day-to-day operations of the sanctioning body's communications and public relations units.

Ryan will be based out of the company's headquarters in Daytona Beach, Florida, and report to Chief Communications & Social Responsibility Officer Eric Nyquist. Ryan's experience in communications includes leadership roles at the New York Stock Exchange, AT&T, and most recently Nike.

PERMATEX PROMOTES NEW SALES DIRECTOR

Permatex, the provider of chemical technology for automotive maintenance and repair, has promoted Eva Pitts to director of sales. Pitts will manage Permatex's traditional and international businesses, driving growth through sales programs, new product initiatives, and customer partnerships.

Pitts joined Permatex's parent company, ITW, in 2015 as brand manager in Houston, Texas. She was promoted to group brand manager in 2017. In 2019, Pitts transitioned into operations with the engine repair division, where she served as quality and EHS manager at Permatex's Solon, Ohio, facility.

KELFORD CAMS NAMES US BUSINESS DEVELOPMENT VP

Kelford Cams has appointed Angel Robles as VP of business development in the US.

"One of the actions that Kelford has taken over the past 12 months has been to make it easy to source product. One of my key KPIs is to build on this network over the coming months," Robles stated. "I see this and the steady release of new and exciting products resulting in the Kelford brand becoming much more familiar to all US performance sectors."

Based in New Zealand, Kelford Cams recently established a warehouse operation based in Philadelphia, Pennsylvania, in 2020.

FORMULA AMERICAS ADDS KEY MEMBERS

Formula Americas Super GP has announced a pair of key hires. Ian Brown has been appointed as chief engineer, while C.M. Land will serve as technical director/crew chief. The Formula Americas Super GP Championship presented by Pirelli is a professional, arrive-and-drive, open wheel competition series.

Brown, a longtime engineer, and Land, a chassis and engine builder, have worked together in the past, winning the 1981 North American Formula Atlantic Championship for Ralt Race Cars.

KOOKS HEADERS & EXHAUST ANNOUNCES STAFF ADDITIONS

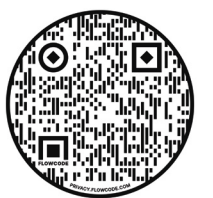
Kooks Headers and Exhaust has announced three new hires within its performance aftermarket and racing company.

Kyle Cook has joined the team as manufacturing engineer and will oversee the design and manufacture of fixtures while improving manufacturing efficiency.

Shelbie Huffman, who was named marketing coordinator, will implement social media programs, website promotion and development, digital marketing, and more.

In addition, Ryan Reed has been appointed sales rep/business development for Kooks Industries and the private label department. He will be tasked with managing existing businesses and growing future business.

For up-to-the-minute racing industry news, scan the QR code below or visit primag.com/industrynews.



ADVOCACY CORNER

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

Edited by Laura Pitts

PRI's dedicated advocacy team based in Washington, DC, works nonstop to protect motorsports. We are currently tracking several initiatives on the federal and state levels, including an update on PRI's challenge to the US Environmental Protection Agency (EPA) in response to its regulations on race vehicles, potential tax credits for businesses participating in trade shows, plus some positive news about the future of motorsports in West Virginia.

PRI CONTINUES FIGHT AGAINST EPA OVERREACH

As previously reported (see PRI Magazine, April 2021), PRI has intervened in an EPA enforcement case to protect the rights of racers.

The US District Court for the District of Arizona, while acknowledging the fundamental issue raised by PRI, has declined to make a ruling in the lawsuit between the EPA and Gear Box Z. Inc. (GBZ). While pursuing GBZ for tampering allegations, the EPA made statements in its court filings that the Clean Air Act (CAA) does not allow a motor vehicle to be converted into a racing vehicle used solely for competition, and that equipment installed to make the conversion is illegal. PRI has

challenged this flawed interpretation of the CAA first made by the EPA in 2015 and now repeated in the court filing.

The Court has ruled that the EPA produced evidence that the subject products sold by GBZ were being used on highway vehicles, with no evidence of use on motorsports vehicles. Therefore, lacking evidence of the converting of road vehicles to dedicated race cars, which would have necessitated the Court address the issue, the Court declined to rule on whether the CAA disallows conversions of street vehicles to dedicated racing machines.

"While not settling the street-to-race car conversion issue, PRI's filing of the amicus brief was impactful for several reasons. First, it demonstrates the need for the US Congress to enact the 'Recognizing the Protection of Motorsports Act' (RPM Act), a bipartisan piece of legislation to clarify that it is legal to make such conversions and to produce, market, and install racing equipment," said Vice President of Government and Legal Affairs Daniel Ingber.

"Second, the Court's opinion did offer some favorable language. The Court found that it is the EPA's burden to produce evidence that emissions-related equipment is being used illegally on highway vehicles

when making such a claim," Ingber added. "PRI will continue to work tirelessly to address the EPA's overreach by passing the RPM Act."

POTENTIAL TAX CREDITS FOR BUSINESSES PARTICIPATING IN TRADE SHOWS

A PRI-supported bill has been introduced in Congress that would provide tax credits to cover 50% of the expenses associated with exhibiting or attending a trade show, such as the annual PRI Trade Show in Indianapolis, Indiana.

The bipartisan Hospitality and Commerce Job Recovery Act of 2021 (H.R. 1346/S.477) would aid businesses that participate in trade shows and the millions of people employed in the tourism industry. The legislation would also provide comprehensive relief and recovery measures for the entertainment, travel, and hospitality industries and convention centers.

Trade shows are invaluable in developing business relationships, increasing sales, and creating new markets for products, especially for small businesses. Exhibition events are also crucial to the host region, fostering economic activity that helps support individuals, families, and communities.

"Sadly, COVID-19 made it impossible for most trade shows, including the PRI Trade Show, to take place in 2020. The pandemic has caused significant economic damage to many parts of the economy. However, no industry has suffered more from this crisis than the travel industry, which was reduced by over \$490 billion last year," Ingber said.

The in-person 2021 PRI Trade Show will take place December 9–11, in Indianapolis. For more information, visit performanceracing.com/tradeshow.

WEST VIRGINIA REINTRODUCES BILL TO AID CONSTRUCTION OF MOTORSPORTS COMPLEXES

Legislation (S.B. 554) has been introduced in West Virginia to provide tax relief that may help incentivize the construction of motorsports complexes. The bill was part of the previous legislative session but failed to pass prior to adjournment. The new bill was passed by the Senate Economic Development Committee and currently awaits consideration by the Senate Finance Committee.

"The goal is to spur the construction of new race tracks in West Virginia, which would create jobs—both construction jobs and at the eventual facility—plus provide economic stimulus to local communities," Ingber said. "Having more tracks in West Virginia would translate to more racers and teams based in and visiting the state. This would lead to great opportunities for the industry to sell parts and services."

LEGISLATION (S.B. 554) HAS BEEN INTRODUCED IN WEST VIRGINIA TO PROVIDE TAX RELIEF THAT MAY HELP INCENTIVIZE THE CONSTRUCTION OF MOTORSPORTS COMPLEXES.

The legislation recognizes the important economic and civic value that additional motorsports competition can provide. Plus, it provides tax exemptions for certain building materials and equipment used in the construction, repair, or improvement of a racing entertainment complex. We will continue to update the industry on this bill.

West Virginia is home to about a dozen race tracks, including Jackson County's I-77 Speedway, a 3/8-mile clay oval that sanctions the American All-Star Series Pro Late Model Weekly Series and features Saturday night weekly racing, and Summit Point Motorsports Park, home to three road racing circuits as well as a drift program, driver's club, and more. **PRI**

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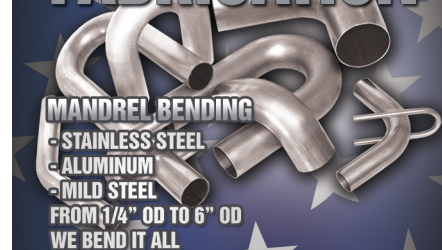
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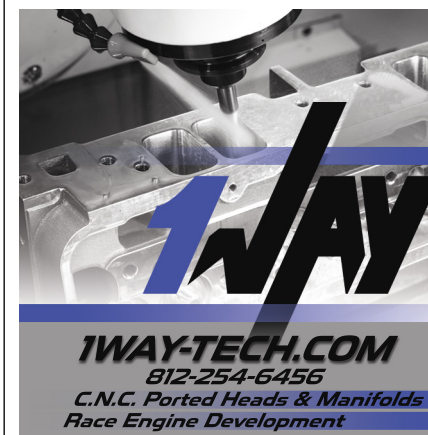


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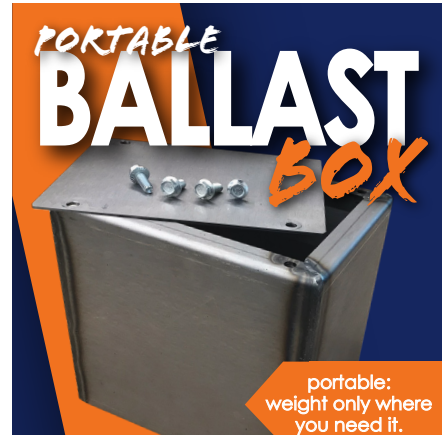
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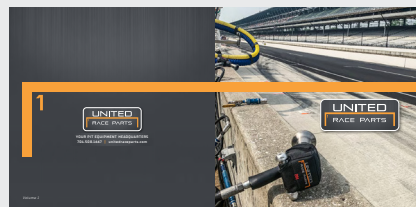
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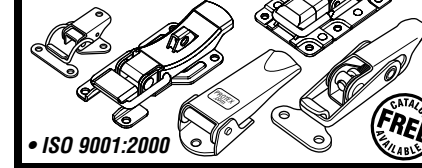
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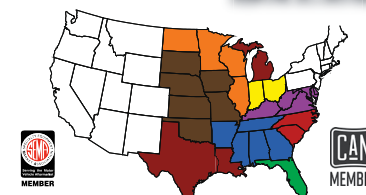


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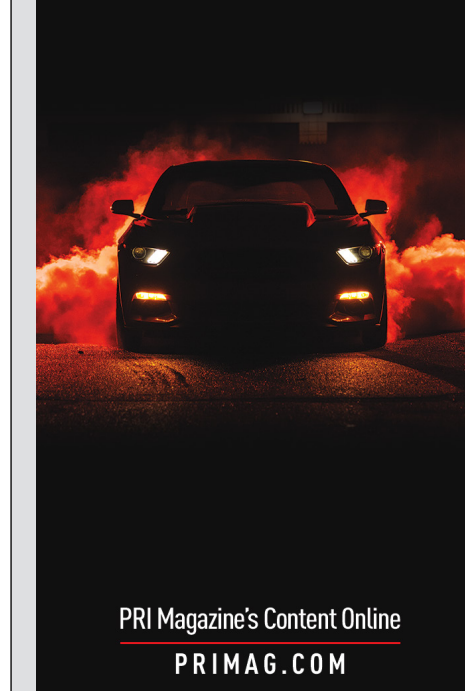


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SOCIAL STATUS

A closer look at racing and performance companies worth following on Facebook, Instagram, LinkedIn, etc.

LinkedIn's mission is to connect the world's professionals to make them more productive and successful. It focuses on professional networking and career development. Businesses can use the platform for recruiting new hires, highlighting important company information, and more. Recently, LinkedIn has also been used to showcase human interest content.

Not long ago we connected with a representative from Lincoln Electric, based in Cleveland, Ohio, to find out how the welding products manufacturer uses LinkedIn and how this social media option benefits their company.

"At Lincoln Electric, we focus on delivering general welding information, knowledge, and successes to all of our audiences, but we understand that each platform is a little different relative to audience expectations and style of communication," explained Julie Obery, digital marketing specialist. "On LinkedIn, we largely focus our content on commercial stories that engage customers and professionals in OEM and manufacturing organizations. We also share corporate news and special interest stories that reinforce Lincoln Electric's culture and values. Our human resources team also uses LinkedIn

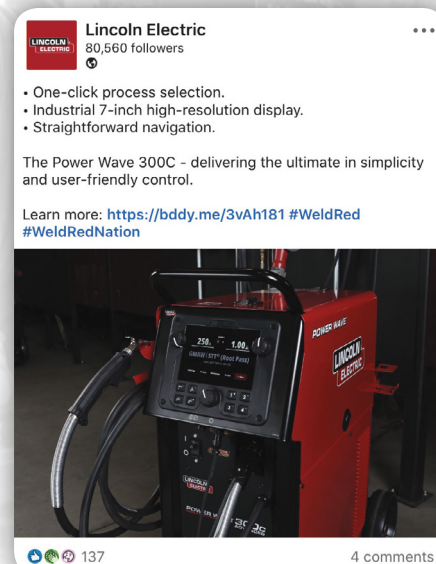
for recruiting, job postings, and generating awareness of new hires, trainee sessions, and job fairs. It's a great resource for candidates looking to join our industry-leading team."

While Lincoln Electric's LinkedIn audience is smaller than its other social media platforms, "it is comprised of decision makers who are seeking solutions that drive greater productivity, quality, and value-added features in their operations," Obery noted. "This allows us to hone our communication strategy around our most innovative industrial solutions such as automation, additive manufacturing, and our Power Wave platform, which deliver measurable improvements in customers' operations."

Lincoln Electric has a process for creating and approving posts that will go up on all of its social platforms. For LinkedIn specifically, "we work with our marketing communications team to create content for new product launches, campaigns, and promotions so that the messaging is correct for an industrial audience," Obery said.

"There is certainly a place for day-to-day welding applications, light-hearted content and info for the DIYer," she continued. "Posts showing real-world applications of our equipment always perform well. Variety is critical to maintaining an engaged audience on LinkedIn. But, we feel the best posts for LinkedIn are the ones that contain content that is meaningful to larger industrial customers and the personas that are associated with them: professional research, design, manufacturing, engineers, quality control, business owners, and production management."

Knowing your audience is key to selecting the right content to post, but a few other factors to keep in mind include the time of day your post will be most effective (by consistent reviews of social media analytics), according to Obery, as well as engaging with your audience whenever there are comments. Additionally, "we post twice a day on LinkedIn; sometimes more, depending on what is going



on in the company and industry," she noted.

Although hashtags are more prominent on Instagram and Twitter, Lincoln Electric incorporates them into their LinkedIn posts for broader exposure. "We have two primary hashtags that we use on almost every post (#WeldRed and #WeldRedNation), which helps group our content together and are easy to remember when our customers post and want to be recognized."

Finally, consistent evaluation of social media metrics (as mentioned above) is vital. "We regularly review our audience demographics on all of our platforms so that we can better understand our customers, communities, users, and audience," Obery concluded. **PRI**

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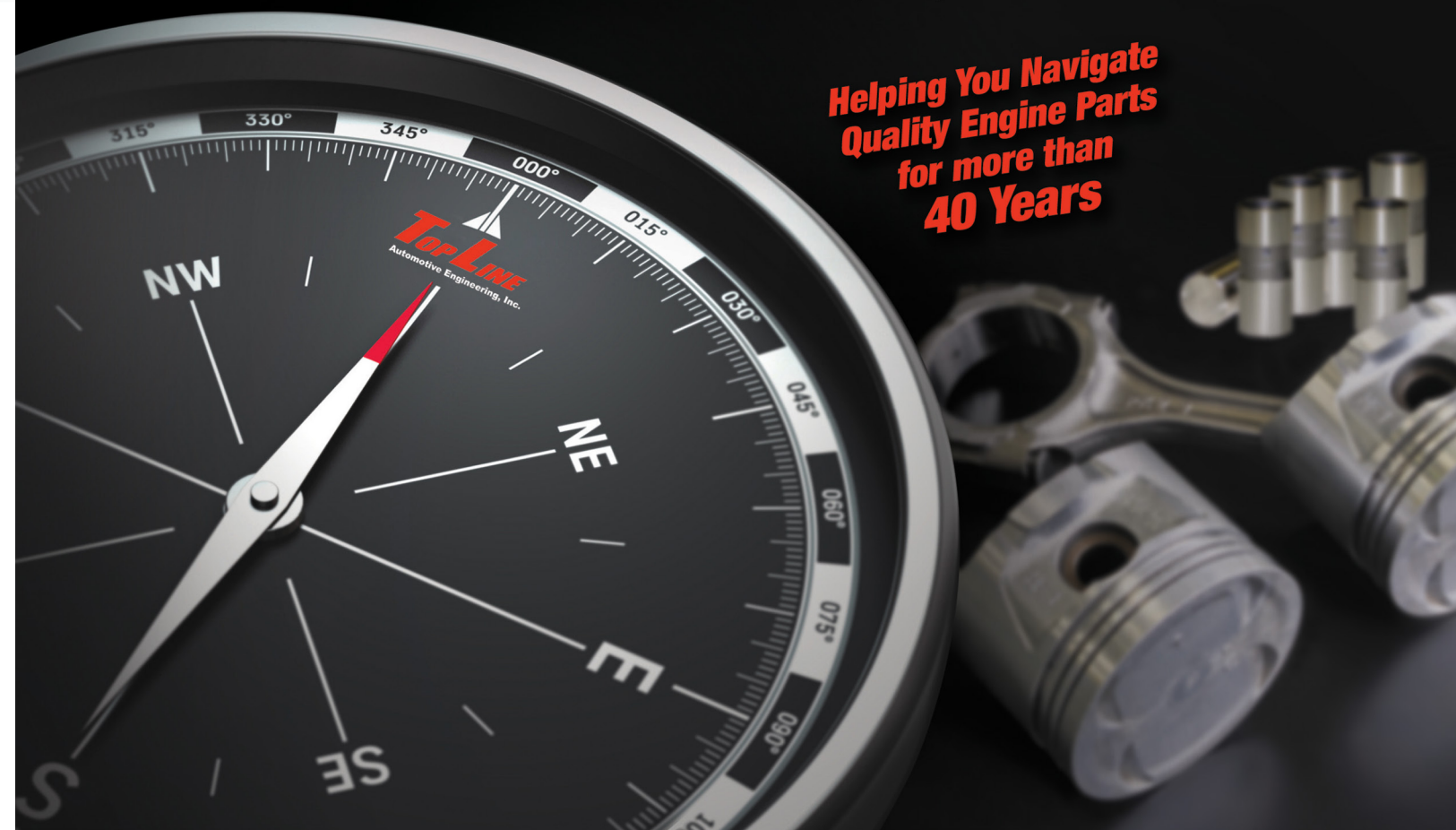
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