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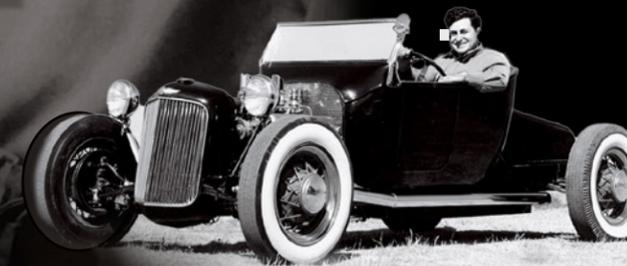
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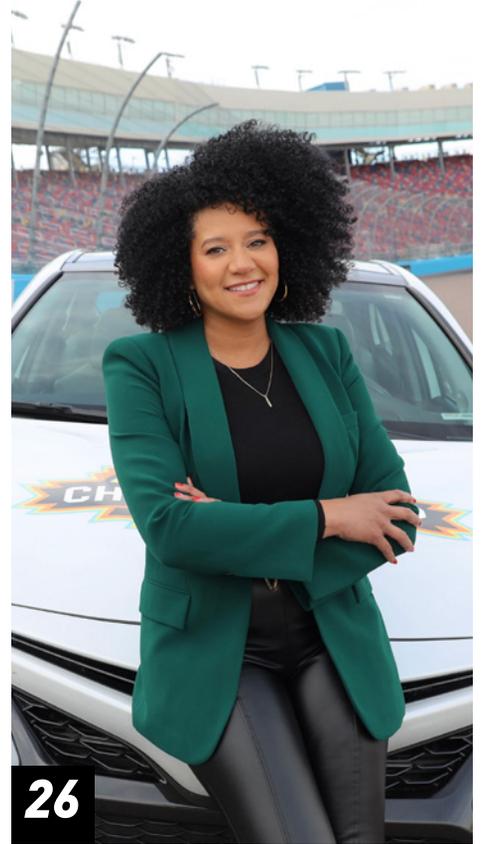
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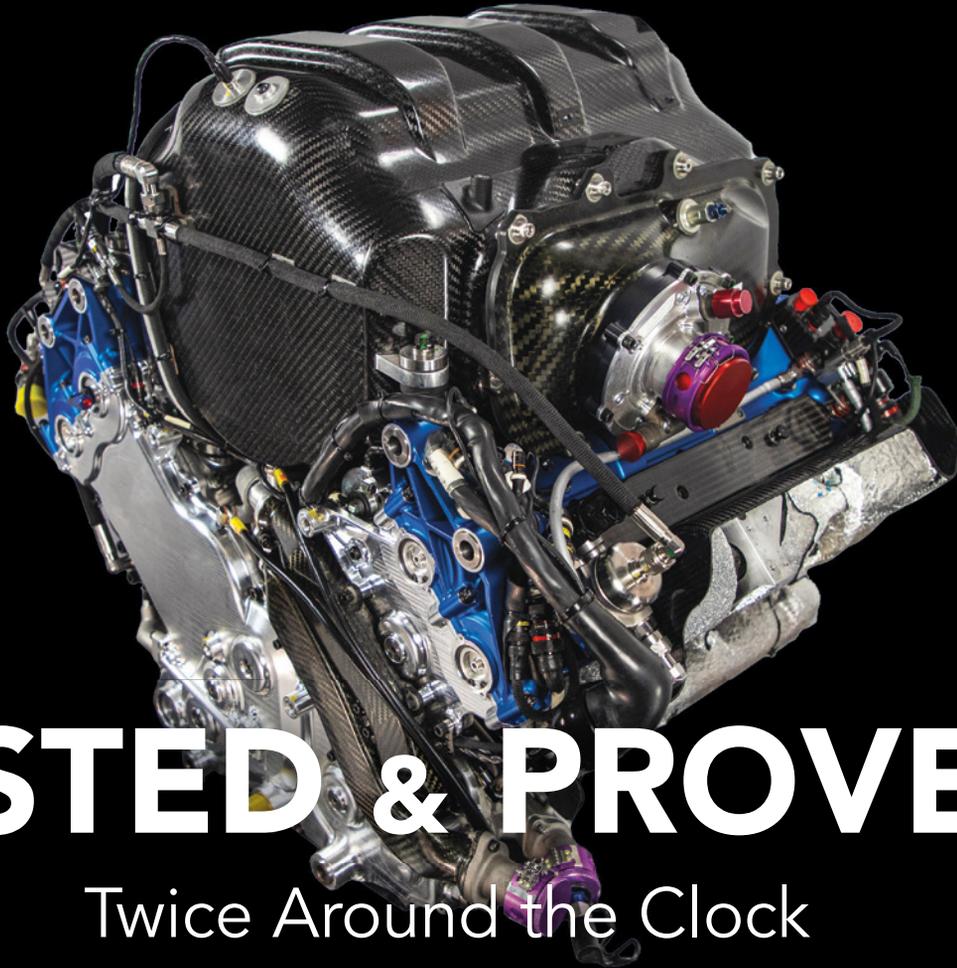
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FROM THE EDITOR

Two things I think as the PRI team heads to Anderson Speedway for the ThunderCar 100 later this month:

1) I THINK THAT ANYONE WHO'S BEEN on the hiring side of a 'now hiring' situation in the last few years will relate to our Special Report in this month's issue. For the piece, titled "Help Wanted," writer Steve Statham spoke with small- and mid-sized retail shop owners, as well as experts in the field and in academia, to identify the unique challenges faced by today's employers and offer advice on how to effectively navigate this new "candidate-driven marketplace." That often begins by abandoning outdated approaches to the hiring process itself, recruiter Mark Osmundson explained: "I think there is still an inclination for the employers to do things the old way, which is, first of all, post a job on a job board. And I think the 'post-and-hope' strategy is not the best strategy to attract the best candidates. It doesn't mean that they won't, but it means that their percentage of success is decreased." Instead, Osmundson and others share guidance—as well as firsthand experience—on how and where to find good personnel fits for your performance business. If you or someone you know is, or will be, in the market for a new employee, I encourage you (or them) to reference this story first. It may just help streamline those efforts and save valuable time and energy that could be better spent on more compelling endeavors.

2) I THINK THAT A PERFORMANCE connecting rod doesn't know—or care—if it's going into the engine of a Pro Gas Jet boat or an NHRA Pro Stock car. And therein lies one half of the intriguing tale behind this month's feature article "Making Waves." In his report, contributor Bradley Iger details the powerplants



DAN SCHECHNER
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behind some of today's quickest (read: record-breaking) straight-line vessels, noting where they both share and diverge from the principles of their land-based brethren. It starts off with a bang, tackling Kjell Adams' class-topping 19-foot tunnel boat, which puts out nearly 1,400 horsepower on a 513ci Chevy big block-based platform, naturally aspirated. How this boat set a new quarter-mile standard at Lake Ming in California's Central Valley 12 months ago is due in part to "the incorporation of technologies like data loggers," Adams revealed. "It has allowed teams to make significant strides in this type of racing—we now have all of the information. I think we have 26 channels of data on this boat. It really allows you to pinpoint things and figure out how to make it perform even better." From there, Iger visits with Joey Grose, whose Pro Gas Flat boat holds a class record ET under the National Jet Boat Association banner, followed by the team at Carroll-Haas Racing and their Top Fuel Hydro propelled by a 500ci Hemi-based V8 that produces a colossal 10,000 hp. ("It blows the minds of NHRA crew chiefs when I show them a run on this boat," team owner Todd Haas told us.) Full coverage of these crafts, along with some intriguing insight on where additional drag boat gains are still very much on the table—particularly in the power adder classes—begins on page 62. **PRI**

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ACCOUNTING

PAYABLES
Lily Huang

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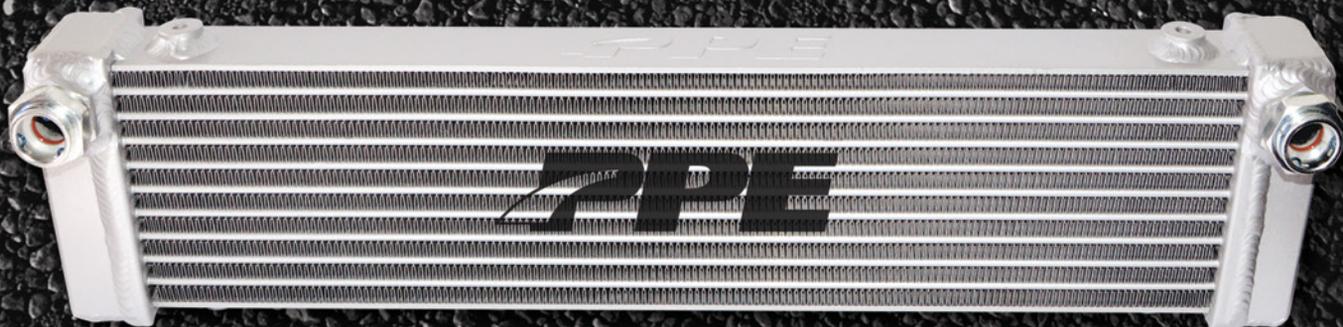
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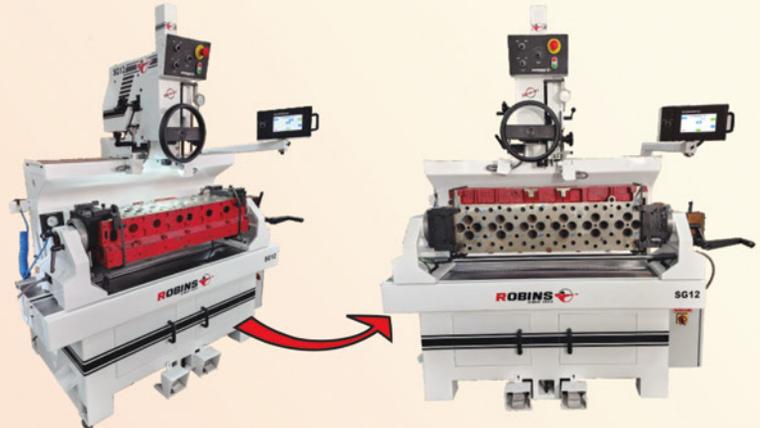
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FEATURED VEHICLES

Whether on dirt or asphalt, purpose-built or modified, a race car must be put together using parts that work in harmony—with each other as well as the driver—to achieve optimal performance.





2007 HONDA S2000

MARTIN TAGLIAVINI | MORGAN HILL, CALIFORNIA

RACE SERIES/CLASS: NASA Super Touring 4 and SCCA ITE

ENGINE: Supercharged Honda F22C built by Blacktrax

CAR: Built by TC Designs and Blacktrax

FEATURES: New cylinder head casting by Endyn with a complete range of Supertech Performance products to showcase the importance of having the correct parts that all work together.

FACTS: This car was purchased from the dealership as a fun, getting-around-town vehicle that turned into a full-blown race car build as the owner's passion for the sport grew. From weekend driving to casual track days to only race weekends, it's a never-ending project squeezing the most out of this chassis and engine.



2022 LONGHORN CHASSIS DIRT LATE MODEL

DANNY YARBROUGH | DENVER, NORTH CAROLINA

DRIVER: Adam Yarbrough

RACE SERIES/CLASS: Super Dirt Late Model and Carolina Clash

ENGINE: 438 wide bore all-aluminum small block Chevrolet built by Clements Racing Engines

CAR: Built by Longhorn Chassis and Danny Yarbrough

FEATURES: Bilstein shocks, FK rod ends, Weld wheels, Winters Performance rearend, Wiles driveshafts, Falcon transmission, various All-Star Performance products.

FACTS: Adam won two races in this car last year along with numerous top-five finishes. It's his favorite race car to drive of all his past cars because "it just fits me," he said.

ASK THE EXPERTS

SELLING YOUR RACE CAR ONLINE

It may seem straightforward enough, but the process can be made simpler—and more profitable—by selecting the right site and optimizing your listing.

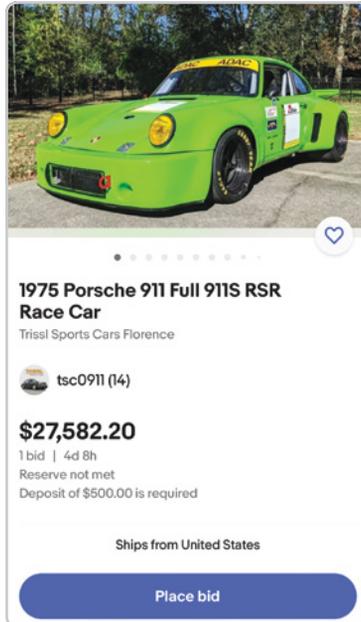
By Drew Hardin

Whether a racer is stepping up—or down—to a new class, clearing out the shop, or just ready for a new adventure, there are many places to sell his or her no-longer-needed race car. The worldwide reach of the World Wide Web makes it a popular marketplace, and options there tend to fall into two categories: ad sites and auction sites.

AD OR AUCTION?

RacingJunk, founded in 1999 as a drag racing website for grassroots racers, now reaches millions of users with ads in more than 40 different categories. In many ways, RacingJunk functions like a 21st century version of newspaper classified ads. The seller posts an ad, potential buyers reach out, and the deal is closed between buyer and seller without any intervention from the site itself. At RacingJunk, that process is free to private party sellers and buyers, unless the seller chooses to pay for upgrades, like a featured position on the site, a photo gallery, or visibility upgrades to make the listing stand out.

Online auction site eBay got its start in 1995, and its eBay Motors division “is home to more than 7,000,000 unique monthly vehicle shoppers,” said Kevin Considine. As with an ad site, the seller posts information about the car for interested buyers, but on eBay the sale can take place in one of two ways: via the traditional auction system of increasing bids over a set time frame, or through the Buy It Now process “that allows sellers to send or accept offers,” Considine



said. Either way, the auction site is involved in the transaction and the transfer of funds, and it takes a commission from the sale.

“The main difference between a site like ours and an auction site is that you get to control what the car sells for,” said RacingJunk’s Ian Downey. “At an auction site, it will sell for what it sells for.”

But that can also be a good thing. “Auctions can initiate a burst of bidding activity that may drive the price higher than anticipated,” said Considine. Many auction sites also allow the seller to set a reserve or minimum price, so the car won’t sell unless the bids reach that threshold.

MAXIMIZE THE LISTING

Getting the most out of an online sale begins with the listing itself. Downey advised sellers to start by doing some research to determine their car’s value. “There’s the price the

“Listings should be as detailed as possible to clearly outline the vehicle’s history and intended discipline,” said eBay’s Kevin Considine. On an auction site, setting a reserve price ensures the car won’t sell unless bids reach that threshold.

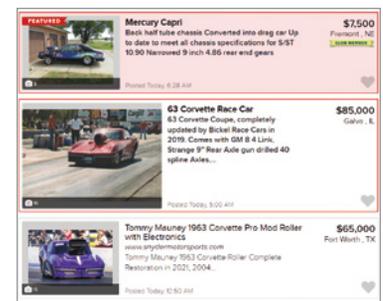
Listing a car on RacingJunk.com is free, though sellers can pay for upgrades to make a listing stand out. Upgrades can include a RacingJunk Club membership, featured status, a red border, and bold text, as seen in the top ad, and a larger thumbnail photo, seen in the middle ad.

seller thinks the car is worth, but then there’s the market price. Go to our website, and others too, and search for cars like your vehicle that others are selling. See what they’re selling it for. Do some compare-and-contrast to see if your car should be listed for more or less than what other vehicles are listed for.”

It’s important to have photos of the car before starting to post the ad, Downey said, or the whole process—which can take just minutes—will come to a stop until the photos are ready.

There’s also an art to writing the ad, Downey said. “You know your vehicle. If you wanted to sell your vehicle to yourself, what would you say?” Because RacingJunk has specific categories for race cars—from Dirt Oval to Truck and Tractor Pulling—“a lot of times your vehicle will be placed next to vehicles that are similar, so you need to find ways to make it unique.” Detail is good, “but don’t write a novel about every single thing on the car.” In fact, he said, leaving some details out will encourage prospective buyers to contact the seller, who can then use that personal interaction to help sell the car.

“Taking basic steps like providing detailed listing titles and vehicle descriptions is important for boosting searchability and buyer confidence,”



Considine said. "Listing specific modifications and upgrades is particularly important when selling a race car. For example, if the listing is for a rallycross car, take the time to specify suspension upgrades and ride height, differential types, and brakes. Listing a stock car? Highlight engine specs, chassis and body work, and anything else that may be relevant to the buyer."

SELLING SAFELY

Scammers are "all over the Internet," Downey pointed out, but in his experience the less-than-honest have traits that reveal them. "Scammers don't want to talk to you on the phone; they want to email or text you because they know nothing about what you're selling." Get a potential buyer on the phone, he recommended, "and build some type of relationship with this person so you feel like they're trustworthy."

When the deal is closed, "don't get scammed out of the money," Downey added.

Banks may make money available in the seller's account within 24 hours of receipt of funds, "but the bank can have a seven- to 14-day process to make sure the check is not fraudulent. I've seen situations where the check came in, money went into the account, the item was shipped, and 10 days later the bank said that check wasn't valid and took the money back. If you sent the car out and the person took ownership, now you have to go through the legal system to get the vehicle back." Sellers should find out from their bank how long this vetting process will take for various types of payments, including electronic transfers, and then be up front with the buyer about the time frame before the car will be transferred.

Considine said eBay Motors "offers tools to protect both sellers and buyers. If sellers opt to auction their car, setting a reserve price is a great way to hone in on serious buyers." The site also offers third-party inspection services through WeGoLook "so sellers and

buyers can confirm the vehicle is exactly as described. At the transaction phase, Escrow.com is another valuable service that enhances safety and security by vetting both the buyer and seller, and holding funds until the vehicle has been shipped, inspected, and accepted by the buyer."

Downey offered this final piece of advice: "When you want to sell something, be committed to selling it. Answer the phone, call people back, have conversations. If you don't, you might miss the person who might have been the sale for you." **PRI**

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RACE CAR PLUMBING

Following these simple yet crucial best practices can help prevent complications, as well as additional expenses, down the road.

By Bradley Iger

It's all too easy to find yourself with tunnel vision on a new project. Hardware that increases horsepower, adds grip, or reduces weight can certainly yield a competitive edge, but all the performance in the world isn't worth much if a racer can't actually make it to the finish line. Even though well-thought-out plumbing won't dramatically reduce lap times, it can prove to be a crucial factor in overall reliability. And nothing's slower than a DNF.

"If you go into this blindly, you're asking for trouble," said Kevin Fitzgerald of Redhorse Performance, Bridgeview, Illinois. "We just got a call from a guy who told us he wanted 'the biggest, the best' fuel lines for his car. But when it comes to race car plumbing, bigger doesn't necessarily equate to better—especially with fuel systems. So much of this comes down to doing your research and choosing the appropriate components for the application."

He often sees teams choosing inexpensive plumbing components to help keep costs in check, but that approach can ultimately end up being more expensive in the long run. "Folks who're using a pump gas setup will go with the cheap option because it'll work with what they have at that moment," Fitzgerald explained. "But builds can change very quickly. If you suddenly decide you want to run E85 or some other exotic type of fuel, you now have to replace all of those fuel lines because they're not compatible



with that new fuel you want to use. It's important to consider your long-term goals in a situation like that. Even if something isn't in the immediate future, it's wise to spend a little more for the high-quality stuff that can grow with the build."

Fitzgerald said that with fuel systems, the choice typically comes down to two options: synthetic rubber lines that are compatible with pump gas and race gas, and Polytetrafluoroethylene (PTFE) hose. "PTFE generally has a wide range of fuel compatibility. Our PTFE lines are like a hard polymer, and it doesn't break down like a rubber hose will over time."

He also said that ignoring material compatibility can lead to some pretty serious problems down the road. "If you're running the wrong inner liner, or you're just using the wrong type of hose material in general, the material will decay over time, and that's going to cause contamination downstream that could potentially clog up your injectors," he said. "Suddenly the system goes lean and the engine is toast. Even if you catch it before that happens, it's going to send you down a rabbit hole of trying to figure out what's contaminated, and what parts of the fuel system need to be flushed out."

When selecting fuel lines, the choice typically comes down to two options: synthetic rubber lines and PTFE hose, said Kevin Fitzgerald of Redhorse Performance. "PTFE generally has a wide range of fuel compatibility" beyond just pump and race gas.

"Synthetic hose is eventually going to dry out over time," regardless of whether it's compatible with the fuel being used, said Brint Mclellan of Fragola Performance Systems. He said it would be wiser to invest in lines, like this PTFE hose, which will last longer.

Brint Mclellan of Fragola Performance Systems in Southington, Connecticut, said it's a mistake that can also be triggered by other factors. "Maybe they don't want to smell fuel in the car, or in the garage, so they'll plumb it using synthetic rubber hose when they really should have used a Teflon or PTFE product to begin with. Regardless of whether or not it's compatible with the fuel you're using, synthetic hose is eventually going to dry out over time. It's something you're inevitably going to have to replace down the line, so it might be worth the extra expense up front to get something that will last for a longer period of time," he advised.

Mclellan emphasized that simple installation errors can also cause big headaches. "One of the things we commonly see is folks getting stainless braid, or a nylon weave, caught up in the socket as they're mating two components together," he said. "That can cause galling, and some people will push it to the point where they break the hose end apart. It's important to make sure the braid isn't in the way of the threads and the components themselves. It seems simple, but we see it a lot."





Our source from Fragola Performance Systems said simple installation errors can cause big headaches. A common one to avoid "is getting stainless braid, or a nylon weave, caught up in the socket as they're mating two components together. That can cause galling, and some people will push it to the point where they break the hose end apart."

Filters can be another problem area in the fuel system, according to Fitzgerald. "People call us all the time asking what kind of filter they should be using, and I always refer them back to the manufacturer of their fuel pump."

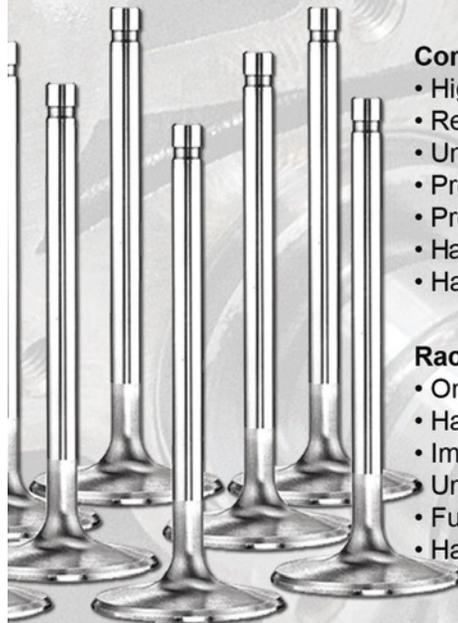
He added that the requirements are usually very specific, and often include using a filter of a specific micron level before the pump and another type after the pump. "They are going to be able to tell you what degree of filtration is needed at what point in the chain, and disregarding that can have a significant impact on the longevity of the pump. If you're running a filter that's too restrictive before the pump, for instance, it can starve it. On the other hand, if you're running a filter that's not fine enough, you could be allowing debris to get through, and that can also damage the pump. The manufacturer is always going to have the most comprehensive knowledge of what pre- and post-pump filters you should be using in order to maximize the life of the pump," Fitzgerald concluded. **PRI**

SOURCES

Fragola Performance Systems
fragolaperformancesystems.com

Redhorse Performance
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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 April.

DIRECT-FIT ROLL/CONTROL, LINE/LOC KITS

HURST

holley.com/brands/hurst/

GM F-body and Ford Fox-body Mustang drag racers can reduce the chance of rolling out of the staging lights with a direct-fit Roll/Control, Line/Loc from Hurst, part of Holley Performance Products in Bowling Green, Kentucky. This control also helps produce more effective burnouts by locking up the front tires.

"Hurst's new Roll/Control, Line/Loc kits are designed to be a platform-specific answer for older platforms, in the same way that newer models have benefitted," said Bryan McTaggart. "These kits come ready to install, with brackets and brake lines designed for your platform. No more worrying about bending brake lines—just install, hit the button, and start warming up the rear tires."

These kits cover 1979–1983 5.0-liter Mustangs, 1979–1986 2.3-liter Mustangs, and 1987–1993 Mustangs—all without ABS. For GM vehicles, these kits cover 1970–1981 F-body and 1978–1988 G-body.

The control has an extra threaded port for a separate bleeder or a



brake line-pressure gauge. The valve assembly is constructed from stainless steel to avoid corrosion, and there's a 150-micron filter to prevent contamination. There's also a finned aluminum housing to help dissipate heat.

The control is not recommended for use as a parking brake, or to be used longer than 60 seconds at any one time. —Mike Magda

VRS-4150 CARBURETOR

EDELBROCK

edelbrock.com

The new VRS-4150 carburetor from Edelbrock in Olive Branch, Mississippi, is available in 650-, 750-, 850-, and 950-cfm models. Although street friendly, the VRS offers plenty of race-ready features, and it can be bolted directly to any manifold with a 4150 or 4500 footprint.

"This carburetor will pick up around 10 horsepower, typically on smaller engines," said Brent McCarthy. "Depending on the engine size, operating range and configuration, all will play a factor when comparing this unit with others in the industry."

The carb is based around a one-piece, cast-aluminum body. Other features include PTFE-coated throttle shafts, larger capacity fuel bowls, and built-in provisions for a standard GM three-wire TPS mount.

"The four circuits of fuel trim result in an extremely flat WOT air-fuel ratio curve from low rpm to high rpm," explained McCarthy. "The customer can easily move the entire curve up and down to match their engine horsepower with just a main jet change."

The half-inch-taller main body has longer taper lengths on both the



entry and exit sides of the venturi for improved fuel mixing. Users will likely see better cylinder-to-cylinder distribution when back-to-back tested against other carburetors.

The VRS carbs have one of the most comprehensive feature lists on the market, with everything from pinned throttle shafts to jet extenders, bowl drain screws, borosilicate sight glass, vacuum provisions, etc., and an excellent price point. —Mike Magda

AZ850DR DRAG RADIAL TIRE

ATTURO TIRES

atturo.com

There will be 11 sizes available in the initial release of the new AZ850DR drag radial tire from Atturo Tires in Waukegan, Illinois. The AZ850DR is DOT compliant for rear-axle applications and complements the AZ850 line that fits on the front of modern high-performance cars.

"As the ultra-high performance AZ850 gained popularity with muscle car owners, the excitement about further pushing the performance potential in our tires grew. We developed the DR version to pair with the standard AZ850," said Michael Mathis.

The current lineup has one size for 18-inch wheels, two sizes for 19-inch wheels, and eight sizes for 20-inch wheels. The AZ850DR features extra-wide shoulder blocks and a solid center rib to emphasize high grip at launch and stability throughout a run. It's designed to support the weight of a late-model vehicle while allowing low-pressure launches under high horsepower.

"In our testing, the simple change from the original equipment tire on a Challenger Hellcat to the AZ850DR resulted in a 0.70-second improvement in quarter-mile elapsed time," added Mathis.

Constructed from a sticky compound, the tire also features dual wide channels to reduce noise on the road, and it has directional shoulder grips. —Mike Magda



ALUMINUM 5.0- AND 5.2-LITER REPLACEMENT COYOTE ENGINE BLOCK

BEAR BLOCK MOTORS

bearblockmotors.com

Seven years ago, Bear Block Motors in Chatsworth, California, developed a race version of the Ford Coyote cylinder block with improved A356 T6 material, extra ribbing for strength, and a different main-cap design. However, there were problems using this block in production vehicles.

Now the company has released a production version with all the same performance qualities of the race block, but at a \$2,000 lower price, and it will fit in any 2011–2024 production vehicle using a Coyote engine.

"Racers who used Coyotes didn't have this option before," said Jim Ronzello. "They either had to buy the race block or put sleeves in a Ford block, which doesn't have the structure of the race block."

Unlike the race block, this new block has provisions for knock sensors and an oil filter adapter. Some features on the race block interfered with the production alternator mount, but now there are no restrictions, so it's easier to mount the block in a production vehicle.

The new production replacement utilizes the factory 12-mm head bolts/studs, and there are modified water jackets for increased sleeve support. Other features include oversized reinforced motor-mount bosses, screw-in plugs for oil galleys, and provisions for piston squirters.

"Just a few subtle changes to the race block, and voila, there's a production replacement," added Ronzello. "All the strength factors carried over, and it will fit in any vehicle with Coyote in it, from a pickup to a Mustang." —Mike Magda



BILLET SCALE-PAD LEVELER

INTERCOMP

intercompcompany.com

Getting accurate chassis weight-balance numbers is now easier with the new billet-aluminum scale-pad leveling fixtures from Intercomp in Medina, Minnesota.

"It allows you to scale the car on an uneven surface," said Matt Hursch. "A shop floor may have a level surface, but if you're at a race track, it may be more difficult to get a level surface for the scales."

The leveling feet provide up to 2 inches of vertical adjustability. The product is constructed from 6061 T6 billet aluminum and will support 15x15 scale pads with either a 2.5- or 4.0-inch profile.

"It offers virtual zero deflection when you're scaling the car," added Hursch.



Intercomp also offers a 2.5- and 4.0-inch billet levelers with roll-off pads. This design allows the car to be rolled off the scales with little effort. And the company has a steel model without the roll-off option at a lower cost. —Mike Magda

SIAG TRANSMISSION

PURE DRIVETRAIN SOLUTIONS

puredrivetrainsolutions.com

What could be the most versatile transmission ever developed for high-performance and racing applications, the SIAG (Super Intelligent Adaptive Gearbox) is being released by Pure Drivetrain Solutions in Medford, New York, on April 1.

This new transmission can be configured with up to eight speeds, works in RWD and AWD setups, and is rated for 2,000 lbs.-ft. torque and 10,000 rpm. It features seven internal clutches, an external clutch, and a torque converter. It can be a paddle-shifted sequential six-speed gearbox, a four-speed H-pattern with a clutch, or a fully automatic eight-speed.

The SIAG was developed by Chris Miller, who started with an idea to design a transmission that would shift faster than a DCT but keep the planetary concept. Then a couple of drag-and-drive racers asked about alternatives to an auxiliary overdrive.

"I asked them, what if there was a transmission that could support 2,000 lbs.-ft., and it could be an eight-, six- or even two-speed. You pick from eight different ratios. They thought I was in fantasy land," recalled Miller.

The gearbox control module is fully programable, from the number of speeds to the "feel" of the clutch pedal. The GCM can store five full tuning files that can be toggled through using a remote button panel. An app will also be developed to make minor adjustments from a cell phone. —Mike Magda



CTR55-110 AIR-COOLED, OIL-LESS TURBOCHARGER

COMP TURBO TECHNOLOGY

compturbotechnology.com

Rated at 2,650 horsepower, the new CTR55-110 air-cooled turbocharger from Comp Turbo in Pomona, California, fills a void in the company's lineup of high-end turbos.

"Nobody really has a 110 available. It's a new size option," said Joe Delgado. "It's designed to fit between a 105 and 120. Distributors and users were asking for something in the horsepower range and not have to run oil or water."

This turbo features a 110-mm inducer and 140-mm exducer on the compressor side. The housing has a 6-inch inlet and a 3.5-inch outlet. The R-line of compressor wheels are 7-14 vaned and have a small-diameter hub to maximize air intake.

By eliminating the need for oil and water lines to the turbo, there is more flexibility in mounting the turbo or turbos in the vehicle. For example, if oil return lines can't use gravity back to the engine, then complicated scavenging systems are needed. Also, any engine-oil contaminants won't find a way into the turbo.

Comp Turbo relies on a patented ceramic ball-bearing assembly where the bearings are lubricated by a proprietary grease. There are Zerk fittings that allow easy servicing at the required intervals. The



billet aluminum bearing housing incorporates an internal air passage for cooling in place of a water jacket and can save up to 12 pounds over competing turbos. —Mike Magda

FAST MOVERS

A look at some of the country's (and Canada's) in-demand motorsports products and services by region and segment.

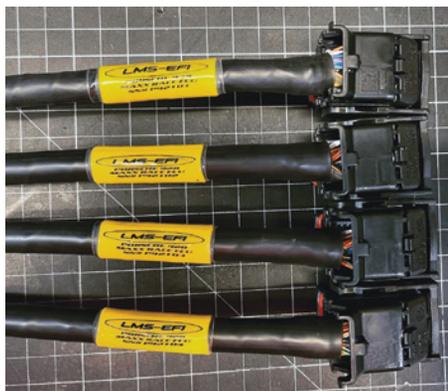
Edited by Laura Pitts

Motorsports retailers and service providers are constantly tracking the newest parts and trends to give their customers a competitive edge. For the latest on which products and services are moving the retail needle, we present the following sales snapshots from shops across North America.

LMS-EFI

Floyds Knobs, Indiana

LMS-EFI customers—mainly running Japanese production-based road race cars in Sports Car Club of America (SCCA), National Auto Sport Association (NASA), and Gridlife—“consistently” buy power distribution modules (PDMs) and dash loggers from brands ECUMaster, Haltech, and Syvecs. “We also have domestic and European vehicles as well,” said owner Chris Ludwig.



“[Racers] are learning the benefits of PDMs. We can do some neat strategies [with those] that we would have a really hard time doing with a conventional fuse and relay setup. Good data systems are a thing we’ve been working to teach our customers about to show them the benefits; how data can make them a better driver or highlight issues with the chassis, for example.”

Ludwig pointed out that he also supports some drag racers and street enthusiasts—and that costs have increased, even on “simple things like Tefzel wire and mil-spec

switches.” Available stock and back orders have also been a challenge for the company since 2020, but savvy purchasing has helped negate long lead times.

PERFORMANCE CELLAR

Hamilton, Ontario, Canada

It was building season when we asked Canada’s Performance Cellar about its fast movers, so DIY customers were purchasing more engine components from brands like King Engine Bearings, Total Seal Piston Rings, Jesel Valvetrain, Precision Products Performance Center, Manton Pushrods, Morel Lifters, and Cam Motion Camshafts.

“I have a primarily drag race following, but we do have some sprint car customers, some neat hot rodders, and a dash of pro touring clients,” said owner Venice Perno. “My customers have been trending toward better-quality products. I help liaise the relationship between the end user and some of these higher-end parts and make it easier for the customer to understand the ‘why’ and ‘how’ of these more complicated purchases.”



Customers compete across the gamut of classes but include NHRA Stock and Super Stock, Can/Am Stock and Super Stock, and the Race Cayuga Sportsman Series (RCSS) brackets. “I’m also seeing a lot of participation in the No Prep arenas, which is encouraging,”

Perno said. “Toronto Motorsports Park is within 40 minutes of us, and they’re constantly moving forward with improvements and cater to a wide range of disciplines.”

SNYDER MOTORSPORTS

Fort Worth, Texas

Mick Snyder of Snyder Motorsports pointed out that his customers could also be considered competitors—on the drag strip. The company markets its offerings by proving them on the track in Top Alcohol Dragster, Top Alcohol Funny Car, Pro Mod, and Top Sportsman classes, in addition to referrals, social media, and targeted online advertising.



Customers of the retailer range from locals competing at Texas Motorplex (Ennis, Texas) and Xtreme Raceway Park (Ferris, Texas) to racers as far away as Sweden, France, Finland, Belgium, England, and Australia.

“We specialize in a small niche of a much bigger industry. Specializing has allowed us to make a name for ourselves in high-horsepower drag racing,” Snyder said.

When we connected to discuss his bestselling items, the company was pushing more consumables like blower belts, rod bearings, and spark plugs as teams worked on new builds, updates, and restocks for their vehicles. Its Snyder Motorsports-exclusive line of products also account for some big movers, including 13-pound Hi-Per 12-volt batteries that “pack a punch and are inexpensive compared to similar options.” **PRI**

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NEWLY APPOINTED

TOMMIE ESTES

With its Silver Crown championship enjoying a growth spurt, USAC names a veteran racer and track manager as its new competition director for circle track racing.

By Jim Koscs

The USAC Silver Crown Championship has enjoyed a growth spurt in recent years, and for 2023 it gets new leadership. In early November 2022, Tommie Estes, a name well known in dirt track racing for 45 years, was appointed competition director for USAC's Circle Track division. Estes will lead the USAC Silver Crown National Championship, which has 13 events scheduled for 2023—seven on pavement, five on dirt, and one to be announced. The series kicks off April 16 at Lucas Oil Indianapolis Raceway Park.

Estes knows the landscape well. Starting out of high school in 1977, he competed extensively in sprint car and midget racing, including with USAC's National Midget and Silver Crown divisions. He was a frequent competitor at the Chili Bowl and the Belleville Midget Nationals. After 22 years, Estes retired from driving.

"A week later, I went to work with ASCS doing their scheduling, and it snowballed from there," he told PRI. He served as the competition director

for both the ASCS National Sprint Tour and the Chili Bowl Nationals, and he oversaw racing operations at Dodge City Raceway Park for more than 10 years before moving to I-70 Speedway for 2021–2022.

PRI: What made you decide to take the position with USAC?

Estes: The Silver Crown is on an upswing but needs someone to give it full attention. I had done race directing and tech work for ASCS for 14 years, and I enjoyed being on the road for that. I felt the time was right to go back on the road.

PRI: What are you most looking forward to in this new role?

Estes: The challenge of keeping it growing. Back when I raced, if you got to race a Silver Crown car, that was a really big deal. Races were events. I want to bring back that special event feeling.

PRI: Can you share your vision for the Silver Crown championship going forward?

Estes: The Silver Crown races used to be tied in with Cup races or IndyCar races. My long-range goal is to connect them to bigger races. That's where you get the event atmosphere to draw more people.

PRI: What do you see as the most pressing concerns for open wheel racing today?

Estes: Live streaming. That has hurt a bunch of race tracks. When I was at Dodge City, we'd have 3,000 people in the grandstands for World



TOMMIE ESTES

TITLE:
Competition Director,
Circle Track division

ORGANIZATION:
USAC

HOMETOWN:
Ada, Oklahoma

FAST FACT:
As a hotshot pitcher in high school, Estes attracted baseball scholarship offers from three colleges. "I could throw a lot of junk. I made it hard to hit," he said. "But I decided to go racing. I already had my car purchased." When his mother passed away in March 2022, in her home Estes found the ball he threw to strike out 17 of 21 batters in one game.

of Outlaws. I'd be trying to sell a \$40 ticket to basically just break even. But when you have streaming services selling a \$39 monthly subscription, you could have 50 people over at your house watching on a big screen and have a party. That can be hard for promoters to compete with.

PRI: Do you see that situation changing?

Estes: Promoters must be able to get a little piece of that pie. There's room for everybody to grow in this deal. Some groups doing the streaming are starting to understand what the promoters are talking about, especially at the smaller tracks.

"I WAS RAISED TO BELIEVE YOU GET OUT OF SOMETHING WHAT YOU PUT IN."

PRI: What is one professional or personal accomplishment for which you are most proud?

Estes: Probably the thing I'm most proud of is, if I tell you I'm going to do something, I try with all my ability to get it done. I was raised to believe you get out of something what you put in.

PRI: What is one recent mistake you've learned from—it could be

"THE SILVER CROWN IS ON AN UPSWING BUT NEEDS SOMEONE TO GIVE IT FULL ATTENTION."

“BACK WHEN I WAS PROMOTING, I PAID ATTENTION TO OTHER SUCCESSFUL PROMOTERS, TRYING TO WATCH WHAT THEY DID.”

yours or someone else's?

Estes: I've made plenty of mistakes, but I learn every day. I'll tell racers the reason I do things the way I do them is because somewhere on the road behind me it bit me in the tail, and I learned from it. Once they see that side of it, they listen.

PRI: If you could have a conversation with anyone in racing, living or passed, who would it be?

Estes: I grew up the first 10 years of my life in Albuquerque, New Mexico, and there was a driver there, Buddy Taylor, that nobody in the Southwest could beat. He was basically my hero. He kept his car in his local gas station, and I'd always go over to look at it. He died at Manzanita Speedway in 1978, the night I went to pick up my new race car. I named my daughter, Taylor, after him.

PRI: Who do you look up to and why?

Estes: Anybody who's been successful in my business—any aspect of it. Back when I was promoting, I paid attention to other successful promoters, trying to watch what they did. I've seen plenty of guys come in and try to reinvent the wheel, and they don't last very long. **PRI**



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A black and white portrait of Latasha Causey, a woman with voluminous curly hair, smiling warmly. She is wearing a dark blazer over a light-colored top and a necklace. The background is a soft, out-of-focus light color.

INDUSTRY INSIGHTS

LATASHA CAUSEY

NASCAR looked outside the racing world for its new president of Phoenix Raceway. What it found was a passionate, homegrown professional focused on creating and building relationships for the benefit of racers, fans, sponsors, and the motorsports community at large.

By Jeff Zurschmeide

It's rare for a racing organization to select someone outside the racing scene for a critically important position, but there's method to NASCAR's madness. To carry Phoenix Raceway forward, they selected Latasha Causey, who brings a wealth of experience from the Phoenix business community to the job. The racing industry is increasingly aware of its interdependence with the larger business ecosystem, and along with her organizational and management chops, Causey brings a comprehensive network of contacts to connect the track to the greater Phoenix business circle.

Causey's career has focused on business outreach, from her time as an executive director with USAA insurance to her most recent position as VP and community development officer with Bell Bank. Through it all, her specialty is bringing businesses to the table to commit resources to the greater benefit of the Phoenix metro area. That's a key skill for any track manager in the 21st century. It builds relationships and understanding of a track as a key player in the vitality of a city or town.

Causey is also the second woman in a row to run Phoenix's racing operations, succeeding Julie Giese, who has gone east to manage the NASCAR Chicago Street Course event. As a Phoenix native, Causey has deep roots in Arizona and a passion to see the city and the racing facility thrive.

"I'M LOOKING FORWARD TO INTEGRATING A MORE DIVERSE FAN BASE."

She started that process as a member of the NASCAR Accelerators, a collective effort to promote NASCAR activities at the raceway. We sat down to ask her how she's putting all this experience to work in taking the raceway to the next level in partnership with other stakeholders in the business community.

PRI: Let's dive right in. After a career in insurance and banking, how did you find yourself working in racing?

Causey: My background is more as a community development type of person and a relationship person. But more personally, what you don't see is that I'm a huge sports advocate. I love everything that's associated with sports and motorsports. I just love the energy! You go to a race, and it's all about the experience and the people. I think that motorsports probably has the most committed fans, as well as momentum.

I'm definitely a fun, energetic type of person. But also at the same time, I am a business person. I have the ability to continue the momentum that has been going on here at Phoenix Raceway.

PRI: Coming in from the outside, has anything really surprised you since you took over the job?

Causey: No, nothing seems odd or confusing. You know, I think the one surprise has been the relationships across the board. When you really get to know the teams, you get to know the people that are involved in racing. It's such a family sport, whether you're related or not.

It has been such a nice surprise to see the number of people in NASCAR and racing who

want to make sure that we're all successful together. That's not something that you normally see in everyday business. You have competition, but while there are competitors in the racing world, everyone wants it to be fun, wants it to be a great experience, and wants everyone to continue to thrive.

PRI: Have you felt well-supported by the NASCAR organization as you transition into this job?

Causey: Yes, absolutely. Everyone from [NASCAR President] Steve Phelps all the way to my peers and individuals who work alongside me, it has been such a great welcome. You mentioned at the beginning that I didn't have a ton of motor racing in my background. And there are a lot of people at NASCAR who do. But the excitement and the welcome from individuals to someone with a different perspective and a different lens and a different light has been amazing. They have all been very welcoming and collaborative working with me as we continue to do great things.

PRI: Speaking of great things, what do you most want to achieve there at Phoenix Raceway?

Causey: Well, you know I've been in my job for a whole six weeks, right? [This interview took place in January 2023.] The first thing I want to do is get to know the fans. I said a little bit earlier that the fans are different with NASCAR. They are so committed to the sport. If you come to a race in Arizona, you're traveling. They're not necessarily from Arizona. They come from all over the place to see the races that they'd like to see. I think that's special.

"I KNOW THIS MARKET BECAUSE I'VE LIVED IT AND EMBRACED IT MY ENTIRE LIFE."

I want to ask them, what else can we do? What can we do to keep the fans coming? Also, for me to be the first African American woman in this type of leadership role, I can't miss the opportunity to say that I would love to be able to get young kids of color involved in the sport. To get them to a track and get them to see the sport early. I'd like to create some partnerships there because we know that representation matters, and so when they see someone like me in this role or at a race track, maybe they will want to come along, too. So I'm looking forward to integrating a more diverse fan base. To keep the fans that we currently have and integrating others so that they know that they are welcome in the sport, welcome at the track.

PRI: Are you planning any physical changes like repaving the track or building new garages or anything like that?

Causey: We just reimaged the facility back in 2018 to make sure that it is state of the art. I'm not saying that there isn't an opportunity to do more, but right now we're just getting started. So I can't say that I have a plan to redo, knock down, tear down, or add anything additional at this time. But we will continue to make sure that we keep up with what has been happening over the past few years.



"I would love to be able to get young kids of color involved in the sport," said Latasha Causey, seen here speaking at a Beyond the Finish Line program at Arizona's West Point High School.

PRI: Let's take a step back and look at your previous experience. What are you bringing from your career to your new role that maybe somebody who came up through racing wouldn't necessarily have?

Causey: I think we all have our unique talents. What I bring that is unique, first and foremost, is that I'm a Phoenix native, and that makes a difference in knowing the community. I was born and raised here in the

West Valley, not too far from the race track. Then from an experience standpoint, being in business for so long, I came from a human resources background as well as banking, and then community development.

So being able to bring all of those things and all of those talents together allows me the ability to be able to see people differently. Whether that's my HR experience or building relationships, I have a unique and diverse network of individuals. It takes people to make all sports go. If we don't have fans, if we don't have people in the seats, then we don't have racing. So it's really about me

"RELATIONSHIPS ARE KEY, BOTH INTERNAL AND EXTERNAL."

being able to bring my business networking experience and all of the things that I have done over the last 20 years in this market. I know this market because I've lived it and embraced it my entire life.

PRI: Do you have goals that have been set for you by the NASCAR organization or that you have set for yourself for the next five years and into the long term, whether that's fan growth or more events or anything like that?

Causey: Being six weeks into the job, when I think about year one, it's about getting to know the people, not just the fans, but the people that are here and within NASCAR on my team. Relationships are key, both internal and external. It's really about that. I'm a very curious person, so if you interview



Phoenix Raceway went through a major track reconfiguration in 2018 "to make sure that it is state of the art," and recently named track president Latasha Causey said she will "continue to make sure that we keep up with what has been happening over the past few years."

me one year from now, while I won't be a motorsports expert, I will have some pretty good knowledge about motorsports because for me it's important to get out there to see it and touch it.

I will be traveling to some key races and meeting the key players within the industry. It's really about me getting to know what I can do and how I can put my stamp on this role and on Phoenix Raceway. I can't just come in and say, 'Here's what we're gonna change.' I don't know what needs to be changed, and I don't know what we need to add without listening. So I'm going on that 'year of listening' tour. I'm definitely going to make sure to do that.

The other thing is making sure that I welcome people into the raceway. I've been here for six weeks, and I've already had six tours of individuals who had never been to the raceway, and some of them are pretty heavy hitters within the community. That's just from that network where people are really excited

“WITHIN THE FIRST YEAR, I WANT TO BE BRANDING US WITHIN THE COMMUNITY SO THAT PEOPLE CAN GET VERY, VERY EXCITED ABOUT MOTORSPORTS.”

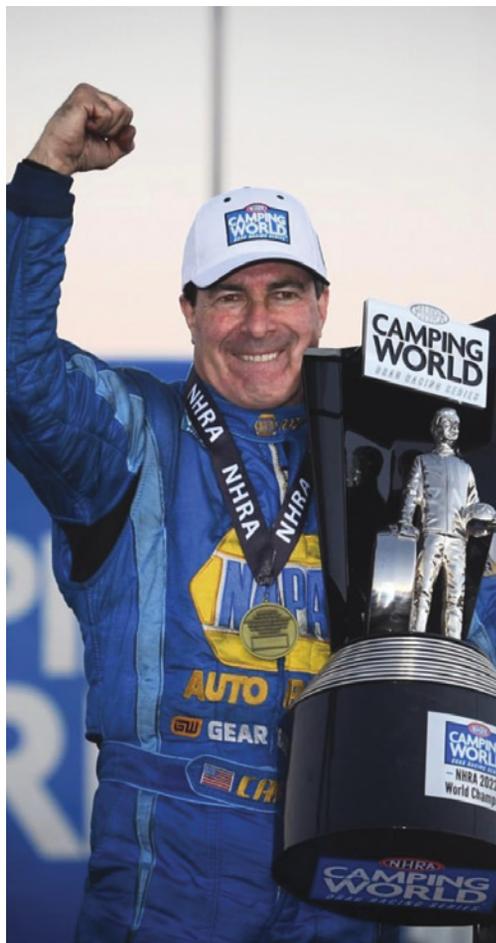
about me being in this role. They tell me they forgot about Phoenix Raceway, but they'd love to come and see what we have going on here. There doesn't have to be a race going on for them to see the track, and I want them to know that. I want them to know that we have other events going on 12 months of the year.

I also want the community to know that they can have events at Phoenix Raceway as well. I want to open up our home to this market, to the community, and to the fans. Within the first year, I want to be branding us within the community so that people can get very, very excited about motorsports. In the first year I would love to be able to say that we got some really cool new fans to go

alongside the really great fans that we already have.

PRI: What are those events other than auto racing that you plan to have there at the track?

Causey: We already have some really great events. We have at least 13 Electronic Dance Music concerts planned for the year. Then we have sports competitions that are here, and some nonprofits host their events at the track. We have a great partnership with Luke Air Force Base. They have some events here as well. So it's making sure that both the for-profit and the not-for-profit communities know us, and we want to have some entertainment here. Who knows, maybe in a couple of years we'll have a really big music festival here?



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“Representation matters,” said Latasha Causey, the first African American woman in this type of leadership position, “so when [young fans of color] see someone like me in this role or at a race track, maybe they will want to come along, too?”

in front of those groups and make sure that they feel really comfortable when they come here. NASCAR as a whole has done things like getting rid of the Confederate flag, and that helps.

Those types of things open up doors for other individuals to feel comfortable to come into a track, any track, not just Phoenix Raceway. NASCAR led from the front doing that, and our team here in Phoenix will continue to do that.

PRI: Do you have any plans or programs to get tickets into people’s hands who might not be able to afford them otherwise?

That’s just on my dart board somewhere. We are open to all events that make sense.

PRI: What are the two or three most pressing concerns that you have at Phoenix Raceway?

Causey: Honestly right now I can’t say that we have any pressing concerns. I mentioned that we redid the facility back in 2018, and we have had really, really great experience with being able to sell out. Like, last year we were sold out for the championship race in May. So we have really high expectations. I guess if there are any concerns or things that we have to keep up with, it’s our high expectations. How do we make sure that we keep that momentum?

PRI: Getting back to some things we talked about earlier, what do you think the motorsports community can do to reach out and encourage people of color and underserved communities to get involved, whether as fans or participants?

Causey: It’s about starting early. There are a couple of organizations, like the Urban School of Racing, that are in motorsports. We can make partnerships with local schools and nonprofits to let kids know about motorsports. One of the things that kids know really well is video games, and we know that we have tons of simulators in the racing space. So we want to make

sure that we introduce kids early. It’s also doing things like having conversations with certain organizations to let them know what we have here. We want to get the word out

A Phoenix native, Latasha Causey brings some 20 years of local business connections to her role as Phoenix Raceway president. “Whether that’s my HR experience or building relationships,” she said, “I have a unique and diverse network of individuals.”



"I'M A SERVANT LEADER. IF I NEED TO GET OUT THERE AND SWEEP THE RACEWAY, I'M OUT THERE SWEEPING THE RACEWAY WITH THE TEAM."

Causey: We do that now. We partner with organizations like the Phoenix NASCAR Accelerators, which is our nonprofit space where we raise money from various avenues, and we can gift those funds out to nonprofits. We partner with organizations like the Boys and Girls Clubs and other organizations. Through those partnerships, they're able to get discounted or free tickets through the nonprofit.

PRI: My next question was about the NASCAR Accelerators. Let's dive into how that got started and what it does.

Causey: Absolutely. This was something that Julie Giese created when she moved here to Phoenix. One of the things Julie

worked on was creating a committee of business leaders, individuals in the community who could serve as ambassadors for NASCAR. Really it was the ability to create this group who would talk to other people about motorsports.

The Accelerators helped raise some funds to invest into the community as well. I plan to continue the Accelerators. Right now, there's about 30 people, anywhere from small business owners to some large business leaders and a couple elected officials. We have a wide variety of individuals who are interested in motorsports and in making sure that the raceway is successful.

So not only do they donate money or in-kind donations themselves, but they go out and raise awareness. A lot of times those business leaders can get people to open their checkbooks, who maybe wouldn't otherwise.

PRI: Are there any people, individuals or organizations, who you particularly seek to emulate personally and professionally?

Causey: I've had a lot of mentors throughout my career, and I have picked up something from each of them. One of the things that is key for me is making sure of the values that I have and the way that I lead. I'm a servant leader. If I need to get out there and sweep the raceway, I'm out there sweeping the raceway with the team. It's about making sure that I am in there doing the job that the team is doing.

PRI: Is there anything else you want to talk about?

Causey: Just this—for the latest news and information, go to phoenixraceway.com. **PRI**

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HELP WANTED

It's probably not exaggerating by much to observe that "Now Hiring" signs appear to be as plentiful as sponsor decals in today's motorsports world. How will that play out for the industry in 2023?

By Steve Statham

In some ways, the act of hiring employees doesn't change much over the years. Sifting through applications and resumes, checking qualifications and references, face-to-face interviews, are all part of a process that would feel familiar to any employer from 20, 40, or 60 years ago.

But in other ways, the process of hiring employees is undergoing a constantly churning evolution. The job market is influenced by numerous outside factors—recessions, wars, shifts in immigration policy, government regulations, technological breakthroughs, even changes in generational attitudes.

The most recent disruption to turn the act of hiring people upside down was the COVID-19 pandemic and the response to it from governments around the world. In many important ways, the motorsports industry is still dealing with the fallout from that global shutdown, not least in the area of hiring employees.

The top echelons of the sport will probably always have more job applicants than openings, so for this article we reached out to a sample of small and medium-sized retail shops, employee relations experts, and automotive-oriented schools for a view on the current state of the hiring process closer to ground level. Based on our conversations, it's not a part of running a business that many look forward to in today's market.

"No one shows up for interviews," said Tina Bitner Nardo of Bitner Automotive, a shop in Trenton, New Jersey, that does repair, restoration, machining services, and dyno tuning. "If they do show up for an interview and you get lucky that you even think they are going to fit and you hire them, then they might not show up on the day you hire them for."

For Rick Hall at Rick's Performance Center in Las Cruces, New Mexico, finding qualified candidates for parts counterperson openings has been a constant battle. He has hired four full-time people and one part-timer in the last year, primarily for entry-level parts store positions such as checking in freight, sweeping floors, and stocking and pricing inventory. "Two-and-a-half didn't make it," he said.

"You can't just pick this auto parts stuff up through osmosis. I would get people who would come in and drop off a resume, and in the interview I'd ask them



what their qualifications were. ‘Well, my grandfather had a service station,’” Hall said. “That actually happened a couple times.”

Wade McGowan with Race Part Solutions in Maysville, Georgia, a shop that specializes in forced induction components, has added one machinist position and a part-timer in the past couple of years. “The biggest challenges are finding good reliable people who want to work and have the experience,” McGowan said. “Previous experience is absolutely preferred. We are just slammed busy and really need somebody who doesn’t need to be trained too much. We need someone who can walk in and go to work.”

Mark Osmundson is an agency recruiter with Jamison Search International in Orem, Utah, who focuses on finding candidates for sales, marketing, product management, and operations roles in the automotive aftermarket. He believes qualified candidates are out there to be found, even if it is a challenge to uncover them.

“I talk to thousands of potential candidates a year, and those conversations generally take one of two forms. One of which is just a general discussion about what might compel that individual to make a change. The other direction is a conversation about a specific opportunity,” he said.

“What I’m hearing is, there are great people who are open to something new, but they don’t advertise that, for good reason,” Osmundson continued. “If they are gainfully employed, they’re not going to publicize that they are looking for something else or even open to a discussion. So I think there are people out there, but the asterisk to the whole answer is that it is still a candidate-driven marketplace. There are still more open jobs than there are candidates to fill them, generally speaking. Because it is a candidate-driven marketplace, it means that employers have to really employ different tactics to find the people for the positions. The process itself has to be candidate-centric. I don’t think most employers have embraced that. And so from a cultural standpoint, employees look at the hiring process and think, ‘You know what? This company is not for me because the hiring process is more about



Rick Hall of Rick’s Performance Center said finding qualified candidates to hire has been a constant battle. “You can’t just pick this auto parts stuff up through osmosis.”

the employer rather than it being a two-way street.’ The best people have options. It’s a unique dynamic, and it’s more unique now because during COVID, people reassessed their careers and many are saying, ‘Here’s what I really want.’”

WINS AND LOSSES

Pleasant or not, hiring is a necessary part of doing business, even more so following pandemic disruption. In normal times, companies like to keep turnover to a minimum, but those days seem a long time in the past.

“It should be zero,” Nardo said. “What happened to us, was about half-way through COVID, the labor force went into a bidding

war. So we lost one technician that we had trained from high school, and we had lost our shop front-end customer service manager, and the machinist. We normally keep eight people on staff, and that includes me and Mark (Bitner, her brother), and our mom, who is the president. Mark is in the assembly room and a machinist, and we have a machinist as well. We have two mechanics, and normally we would have a front-end manager, and a couple of guys part-time.”

To the frustration of the companies we spoke with, many conventional sources for finding employees yielded few successful candidates. “I use Indeed, which costs a lot of money for someone who is a small business,” Nardo said. “I got a lot of butterfly catchers from Indeed. In the summer of 2021, we turned over six mechanics. It was bad, and the ones who were coming through here either ghosted us, didn’t show up on the day they were supposed to start, or stayed for two weeks and were useless. It was horrible. I’ve used WrenchWay, but I got nothing from WrenchWay.”

It was a similar story for Hall. “We pay for Facebook ads to expand the area that it reaches and just don’t get many people looking for a job. Very few applications, and most of those who do apply aren’t qualified,” he said. “We used Indeed, and we received a lot of resumes from people just sending out blank resumes to anybody who will take one. It doesn’t cost them anything, they just click a box and send a resume out. I had people from two states away that were more qualified as a meat cutter than a parts person. That doesn’t work out so well.”



Bitner Automotive’s Mark Bitner sees potential in up-and-coming technicians. “A select amount of the next generation is more in tune to what we’re doing here, not just fixing cars but working on hot rods and the engine room and the dyno. That appeals to more of the younger crowd.”

Fortunately, there are avenues for finding employees that yielded better results, including trade schools and colleges. "What we ended up doing was hitting the trade schools," Nardo said. "Automotive Training Center in Pennsylvania reached out to us as a machine shop because they wanted to give a tour. They brought a group of their soon-to-be graduates in for a tour to see what a working machine shop was like. It turned out that a lot of their equipment was the same as our equipment, and so when our machinist left, that's when we took one of their graduates, and he's still here."

Clay Harshaw is an associate professor of Motorsport Management at Winston-Salem State University, an Historically Black University in Winston-Salem, North Carolina. The Motorsport Management program is small but growing, and Harshaw said most of his students are aiming for marketing, sales, and media relations positions in the motorsports field. He reported that a



"We are all car guys here," said Wade McGowan of Race Part Solutions, "and they are always encouraged to attend events that interest them. A few employees on our team now came from meeting them at the race track."

substantial part of his program is centered around preparing students for the realities of the job market.

"At the university, we do a lot of development of critical thinking skills. And I think what employers are looking for is people who will take action and take risk. Sometimes you have to do that with the way you think, and be willing to be wrong," Harshaw said. "I tell my students that I tend to give vague instructions, because that's what they're going to get in the workforce."

"I think there's a mentality or a mindset for people who work in motorsports, that they want to do whatever it takes to win. That translates to their business management and their marketing plan," Harshaw added.

Business-oriented social media can also widen the pool of prospective hires. "I'm a big believer in LinkedIn," Osmundson said. "Whether you're an employer or an employee, or a hiring manager or somebody who is an individual contributor who is

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Enthusiasm for racing can flare up quickly among university students. Rajah Caruth, who has just begun his NASCAR Craftsman Truck Series career, came through the Motorsport Management program at Winston-Salem State University in North Carolina.

just grinding every day, LinkedIn is a key because there is no better professional networking platform. There is no better professional personal branding platform, and the more you give through the platform the more you get back.

"If an employer has a critical role to fill, my advice would be to get on LinkedIn and start looking at your feed," he added. "Start connecting with people at companies that you like, that have products that you like, that have cultures that you like. Because the people will espouse that as well. Start connecting with people. It's amazing how that kind of outreach can pay dividends."

Networking at ground level, through personal referrals—aka "word of mouth"—also yields good results, according to our sources. "I think there is still an inclination for the employers to do things the old way, which is, first of all, post a job on a job board. And I think the 'post-and-hope' strategy is not the best strategy to attract the best candidates," Osmundson said. "It doesn't mean that they won't, but it means that their percentage of success is decreased. I'm a big believer that whether you are an employer looking to fill open positions or an individual looking to make a change, who you know is going to be a catalyst toward achieving that objective. So as employers, I think that post-and-hope is part one of what they need to do. Part two is engage their existing employees to get referrals. Dangle a nice financial carrot, put a referral program together that will encourage their employees to dig into their networks to recommend somebody for any particular job. Generally

speaking, those employees are going to refer somebody who they want to work with or know well enough to understand they can do the job."

A well-thought-out word-of-mouth plan can also be a cost-effective method of finding employees. "The challenge often becomes a financial one. How much is enough? The financial realities of filling an open position are such that it's costly," Osmundson continued. "It takes time, it takes effort, and there's an opportunity cost because you're devoting time and effort away from other things that need to be done. But the other option is employing somebody like me for a targeted search. Well, my service fee, their investment, is 25% of the candidate's first year compensation. For a \$100k gig, that means \$25 grand. On the flip side, if you're offering \$1,000 to your team, you've just saved yourself \$24,000."

"Word-of-mouth probably works better than anything. We ask our customers, 'Hey, do you guys know anybody you'd like to talk to across the counter that might be a good fit here?'" Hall said. One of his all-time best hires was a former customer who raced in an entry-level circle track series. "He was a customer of mine and I saw potential. I asked him if he'd ever thought about being a parts guy. He came back a couple days later and said, 'Are you serious?' That was a home run, he was with me 23 years. He was my store manager."

McGowan has seen similar results in Georgia. "In today's times, for us anyway, social media is a huge way to reach people not only in our local market but all over the country. That combined with just good ol' word-of-mouth referrals have worked out the best for us so far and have put together a great team we have in place now."

PRESSING THE ADVANTAGE

If there's one thing the motorsports market has going for it, it's that racing is considered cool and exciting in a way that other industries are not, and therein lie opportunities for recruiting employees.

Mark Bitner of Bitner Automotive reported promising results in hiring high school-age part-timers versus full-timers. "I think it's easier because the younger kids are at school and they are more excited," he said. "A select amount of the next generation I think is more in tune to what we're doing here, which is not just fixing cars but working

CONSIDERING FACTORS

When searching for a new employment opportunity, Mark Osmundson of Jamison Search International in Orem, Utah, explained, "Every individual is assessing essentially six different factors when they are looking at a new opportunity. Those six things are universal, although each individual will define and rank them uniquely. Those six things are challenge, location, advancement, money, people, and security. Benefits is a part of that, but for some candidates, they're looking for the challenge and willing to sacrifice on the compensation or benefits if the challenge is spot-on for what they are looking for. Or any number of those other factors." —*Steve Statham*

on hot rods and all the atmosphere that's here with the engine room and the dyno running, and all that. I think that appeals to more of the younger crowd right now."

Harshaw has also witnessed how enthusiasm for racing can flare up quickly among university students. "Rajah Caruth is getting ready to start his NASCAR Craftsman Truck Series career with GMS Racing. He's one of our students. Through him I've been getting more phone calls and interest in the program, and the university in general, from all across the country."

Encouraging employees in their motorsports endeavors is not only a morale booster but an advantage in attracting new hires. "We are all car guys here at RPS and are heavily involved in all forms of the automotive hobby as well as motorsports," McGowan said. "Racing is definitely our bread and butter, but we have guys here into motorcycles, street and sport trucks, classic muscle cars, etc., and they are always



Tina Bitner Nardo has seen interest in technical schools rising among young people in her area. The local high school used to use just one bus to take students to visit the technical school nearby, but when her son graduated, "they had to hire four buses." One such school that trains future automotive industry professionals is Universal Technical Institute, seen here.

encouraged to attend events that interest them. A few employees we have on our team now came from actually meeting them at the race track. So, yes, I would say getting out and getting involved and getting to know the people who share the same interest as you is a huge benefit to landing both customers and employees."

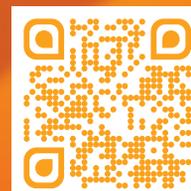
"We're in an enthusiast industry. It's one of those few industries where people are just jazzed to be a part of it," Osmundson explained. "The additional benefits manifest in several ways. For one, employees just want to be part of a cool company. They want to be part of a company that makes a product they believe in, or makes their car perform better. That's a piece of it. The employee discount might be a part of it, or the ability to go to events.

"Because it's an enthusiast industry, there are opportunities for employers to keep compensation at a slightly lower level. I think it's not that much less, but they rely



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on people's passion to attract them to the company," he added.

Anyone who has walked through a racing paddock has noticed fans happily wearing T-shirts and ball caps with their favorite brands on them, which also elevates the image of a company. "Some of these motorsports or automotive aftermarket products are lifestyle brands, too," Osmundson said. "I think the lifestyle element of some of these brands is also an effective way to attract people."

For Hall, a second storefront at a

25%

of retail business owners/operators planned to hire additional employees in 2022-23, according to PRI's 2022 Motorsports Retail Business Survey.

local track has worked as a way to keep employees engaged with racing. "We have a little store at Vado Speedway Park about 15 miles south of us. It's three years old, a very nice dirt track. It just had the Wild West Shootout there with all the Late Models," he said. "It's quite a facility, and I have a little store there. Anytime there's a race car on the track we've got somebody down there. I consider it a perk. If I was a 20-year-old guy into cars, I think it would be a perk to get into races free and get paid to do it."

The recent breakdowns in the hiring process won't last forever. It's only one anecdote, but Nardo, as the parent of a recent high school graduate, has witnessed recent hopeful signs around the annual field trip to the local technical school. "They used to hire one bus a year to take the kids over to tech school to visit to see if they wanted to do that, and last year when my son graduated, they had to hire four buses

to take all the interested kids to tech school," she said.

For many motorsports businesses, those kids can't graduate fast enough. **PRI**

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SPEED TRAP

Promoters, sanctioning bodies, and racers alike are exploring options to make sure open wheel racing remains a vital and flourishing part of American motorsports.

By Drew Hardin

It's a story we've heard several times, this particular version from Jerry Gappens of Eldora Speedway in Rossburg, Ohio: "In 1979, I bought a brand-new-everything, pan-to-injectors engine for the sprint car I raced in high school from Earl Gaerte for \$10,000, ready to bolt in the car."

Today, a competitive sprint car engine "is in the \$60,000–\$65,000 range," Gappens said. "Same thing with midgets. If you want a Toyota or another front-running engine, it's going to cost \$45,000–\$50,000.

"It seems like technology just drives costs up," he said. "This has been part of the industry for a long time, but it seems more magnified now. It's getting up to where a sprint car or midget engine is close to what it would cost for a NASCAR Cup-series engine. It doesn't make sense why we do that to try to win a \$1,500 feature on a Friday or Saturday night, or even a \$3,000 or \$5,000 feature. Somebody's going to have to figure out how to get their arms around it."

Getting that genie back in the bottle will be challenging, Gappens acknowledged. "Racers are going to be racers. They're going to find what Roger Penske called the 'unfair advantage,' anything you can do from a technology standpoint to make your race car go faster than the next guy's."

What, then, can be done to make sure the open wheel show goes on in the face of what seems like ever-increasing costs?



“The cost of racing, like everything, will continue to go up,” predicted POWRi’s Kenny Brown. “A small percentage can make a living off of it, but racing is a hobby for a majority of the racers. We have to figure out what can we do to help save racers in the future.”

LONGTIME PROBLEM

“It’s the engines, there’s no doubt about it, and we’ve been fighting this for a long time,” observed John McCoy of Knoxville Raceway, Knoxville, Iowa. There was a time, he explained, “years ago, when we would get the engine builders together at the Nationals or at the PRI Show” to discuss rising costs. “The same engine builders are around today, but there’s no consensus. Nobody would agree on any one area. Everything was discussed, and everything was shot down, so it’s kind of disheartening.”

Still, McCoy said he’s “not all negative. About seven or eight years ago we started noticing, talking to the teams, that engines were just getting better, the materials that they use in the engines was a lot better. I just heard today from a guy who has a team and builds his own engines that the blocks in the 410 world are heavier, beefier than they used to be. I’ve never been told that by anybody before. I think that’s for the better.”

McCoy also said some of the sprint car racers running at Knoxville “have built their engines a little looser. They’re not

making quite as much horsepower, so they last longer.”

“In midget racing 10–15 years ago we used to have four or five engine builders, and a lot of teams built their own engines,” said Kenny Brown of POWRi, Belleville, Illinois. “Today, very few build their own engines, and we only have two engine builders out there right now.”

Brown recalled that “back in 2005, Esslinger had the ST motor that you could run 50 nights. The speeds of that motor were off a little bit, 10–20 mph on a bigger track, but on a short track like the Chili Bowl you couldn’t tell. As a matter of fact, that’s all Sammy Swindell ran was the ST short track motor and won all those races with it. We as a sanctioning body failed to hold that motor down there, failed then to limit horsepower,

limit cubic inches, limit everything back then. If we could back up time, that motor would still be \$25,000, and we’d have more people in the sport.”

LOWER-COST ALTERNATIVES

The rising cost of racing engines isn’t new, and neither are the efforts to come up with lower-cost options.

“Here in the last few years, they’ve had sealed crate engines, both in sprints and in late models,” said Gappens. “I think it’s great to have a company like General Motors that can sell you an engine, and you just have to put a few bolt-on parts on it and drop it in the car and race. A crate engine is about \$8,000; you might have to put a couple more in it, but for \$10,000 you can run a crate series. Most people in the

“WE ALLOW OUR COMPETITORS TO BUILD THEIR ENGINES WITH PERFORMANCE PARTS TO INCREASE LONGEVITY AND PERFORMANCE.”

grandstands can't tell what kind of engine is in a race car when you're on any track that's a half-mile or under."

At Knoxville "we have an all-aluminum Chevy 525 class that goes within three seconds of the fastest car on the race track that night," said McCoy. "It's a great class. Other than the engine, every other rule on the car is the same." The Chevrolet Performance CT525 "is an entry-level engine, at \$18,000, and we have guys who have been running them for three years. At Knoxville, that's 45 races. They don't have to do anything to them. Just change the oil, take them to the car wash, and learn how to set up their race car." The class had "20-22 cars for a couple years, and it did exactly what it was supposed to do: Six of them moved up into our 360 class."

There are also midget racing series enjoying success with a production-based engine format. One is the USAC Midwest Thunder Speed2 Midget Series, based



"It seems like technology just drives costs up," said Jerry Gappens of Eldora Speedway. "It's getting up to where a sprint car or midget engine is close to what it would cost for a NASCAR Cup-series engine."

in Troy, Ohio, which arose in the wake of USAC's waning Ford Focus series in the Midwest, Greg Watson explained.

"After the 2015 season, my partner, Chuck Taylor, and I approached USAC and proposed opening the motor package rules to allow the Chevy Ecotec and Honda A24 motors, but still use the stock OEM internal guidelines that the Focus series had followed." That means "everything internally in the engine is required to be OEM parts in their original places. The intent is to have an OEM long-block you can bolt aftermarket parts to."

Engine costs vary, depending on who's doing the building. Watson told us junkyard long-blocks can be found for as little as \$600, to which a racer would add "\$7,000-\$8,000 of bolt-ons" such as injection, ignition, pumps, header, crank adapter, and oil pan. Remanufactured engines are available "from \$2,500-\$3,000. Or you can go to a number of engine builders and

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The use of production-based engines, as with the USAC D2 Midgets, makes midget racing “more affordable and enables others to experience just how much fun midget racing really is,” said Shannon Mausteller of the ARDC.

get a race-ready Honda or Ecotec built to comply with the series’ rules for around \$12,000–\$14,000.”

The Midwest Thunder midgets “are slightly slower than the national cars,” Watson pointed out. “They’re 400 horsepower, we’re 225–240, so the cars behave differently. I don’t know if the casual fan picks up on it unless they see them side-by-side, but we’re talking two- to three-tenths per second slower than the national cars on a quarter-mile track. But we are known for close, competitive racing, which a lot of times makes up for that slight speed differential.” Car counts last year averaged 23 per race, with a high of 32.

“These midgets are exactly the same from a chassis/body specification standpoint as national midgets,” Watson said. “Somebody could buy a used national midget, and it wouldn’t require anything from a fabrication standpoint to run with us. There are a lot of midgets across the country that are just sitting or only come out for the Chili Bowl. This is a way for someone to buy those cars at a reasonable price, put in an affordable engine, and go racing.”

The Badger Midget Auto Racing Association (BMARA) in Sun Prairie, Wisconsin, began as a production-engine series and transitioned into purpose-built

SESCO engines. “In 2015–2016, we looked back at that production-based program, what used to work, and realized if we could utilize production engine parts, we could drastically reduce the cost of the engines,” said Robbie Ray. “The predominant three engines we utilize are Honda, Chevrolet, and Mazda, all roughly 2.4 liters.”

The BMARA engines “only use three parts of those engines: the engine block, crankshaft, and cylinder head,” Ray said. “We allow our competitors to build their engines with performance parts to increase longevity and performance.” For example, “you can do whatever you want with compression, because regardless of what style of piston you’re going to put in it, you’re spending about the same amount of money. Piston manufacturers don’t change price based on what the compression ratio is, they only change their price based on how many you buy and what size they are. So why would we not allow the performance gain you’d get from having the domed piston for the same money? We want them to go fast. It’s still auto racing, still a sport that requires fast cars, right? We want to get the most performance for the least amount of money.”

Ray said a BMARA engine “costs \$25,000 or less,” while a rebuild is in the \$3,000–\$5,000 neighborhood, “so we have

drastically reduced the costs” compared to the Toyota or SR11 engines used in national midget series, “and we did not reduce overall speed. We are virtually turning the exact same lap times today at Angell Park Speedway, our home track in Wisconsin, as we were turning when we were utilizing purpose-built engines.”

Car counts for BMARA events “have averaged in the mid- to upper 20s over the past three to four years,” Ray said. He noted that the number of people purchasing cars has grown so much “that we’ve expanded to two series in 2023. We just launched a new series called MARA, the Midget Auto Racing Association, which will be based in Illinois, as a second division for the Badger Midgets.”

The American Racing Drivers Club (ARDC) changed its engine rules in 2020 to align with BMARA’s production-based engines. “The cost of these OEM-based engines makes midget racing more affordable and enable others to experience just how much fun midget racing really is,” said Shannon Mausteller. “The only difference between what they’re doing and what we’re doing is we are grandfathering in Gaerte and Fontana engines. We have a good group of members with Gaerte engines, so we’re not going to get rid of them.”

Mausteller said he had a recent request from a racer who wanted to run an SR11 engine, “but I turned it down.” He explained that in the past, “we had two or three racers who could afford high-dollar engines, and that cost us the guys who couldn’t afford them, so we’re not going down that road.

“Racers are their own worst enemy,” Mausteller continued. “When you try to control costs, there will be somebody who wants to spend more money. So it’s a constant battle to appease that person and still bring in somebody who doesn’t have a lot of money. I believe as a club, coming out and having a good time is a key to bringing more race cars. I don’t always agree that it’s a money issue.”

NOT JUST THE ENGINES

Engine costs are not the only reason open wheel racing has become so expensive.

“One of the biggest costs right now is fuel for your truck to get to the track,” said Brown. “You can spend \$600–\$800 round trip with a toter home or a diesel truck. When fuel stays up, that makes it difficult to get to the track week in and week out.”

“When the cost of gas or diesel goes up, it significantly impacts our participation,” agreed Ray. To keep travel costs down for BMARA racers, “we drew a circle around our home base, and we try not to travel more than 150–200 miles beyond our home base,” he said, “except maybe once a year for a special race.”

The cost—and availability—of tires is another concern. “Unfortunately, Hoosier got caught off guard,” said Brown of the tire maker’s pandemic-related shortages. “The cost for materials has gone up like everything else, and then there’s the labor issue. It’s tough to get labor to produce tires when you have companies like Amazon out there offering \$20 an hour.” Yet he believes



The cost and availability of tires remain a concern for open wheel racers. Some series are loosening their tire rules to make it easier for traveling racers to join them.

“Hoosier has rebounded really well, by getting it down to one tire in sprint car and one tire in late models. We’re working with them, as are all the other sanctioning bodies, to get down to one midget tire, which should be coming this year as well.”

Different series have different strategies

to cope with tire costs. For 2023, BMARA “is going to disallow the [Hoosier] SP2 tire that we have used previously and go to the SP3 to try to get more longevity out of the tire,” Ray said.

At ARDC, “we opened up the tire compound rule, so it’s any Hoosier, no

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BMARA's Robbie Ray credited Angell Park Speedway promoter Gregg McKarns with doing "a fantastic job of promoting the race track and enticing people to come to the race track. He's done a very good job of making sure the grandstands are full of people when we go to race there."

compound restrictions," Mausteller said. "We have people who have run the Chili Bowl, and they want to be able to run those tires. People have tires from other groups. That's fine, run them."

Watson told us the Midwest Thunder Midgets worked a deal with some of the national midget teams in their area to be able to go through their discarded tires, which are often used only once, and "take what we thought we could use, and sell them to our guys." That not only significantly reduced the number of tires those national teams had to dispose of, "but a right rear tire that sells new for \$250, we sell them for \$50, and that \$50 goes into our points fund and is returned back to our members at the end of the year. Guys might get two to three runs out of those, which is a heck of a deal. We don't prohibit new tires, but there are people winning races on those tires that we sold them for \$50."

HELP FROM THE OTHER SIDE

Purses and points funds payouts are another way to help defray the costs of racing, but are they rising in line with the costs? In a few cases, yes.

In July, Eldora Speedway will host its third Eldora Million, offering a winner's purse of \$1,002,023. "This will be the first time a sprint car driver will race for a winner's check worth \$1 million," said track owner Tony Stewart.

"And it's not just a million to win, but the

preliminary nights will be more inclusive to where we're going to have more features," Gappens added. "More cars will be able to run a feature and make money than a normal one-off special normally showcases."

Gappens realizes "the bench racers will say, 'Instead of paying a million, why don't you pay \$500,000 and take the other \$500,000 and put it down through the field?' That would be great, and it would benefit a lot more teams, but the truth is, from a ticket selling standpoint, and to get the national attention that you need, the million dollars does that trick. If it's \$500,000 or \$200,000 to win, people in the industry know about it and appreciate it, but it doesn't make that spectacle. When you're going to Eldora, and it's paying a million to win, you can feel that throughout the evening. There's electricity in the air. Those people don't want to be anywhere else in the world."

Knoxville Raceway also announced that the purse for the 2023 Knoxville Nationals/360 Nationals in August is going up. The winner's purse grows from \$175,000 to \$185,000, and McCoy said "we also added some money all through the features on Saturday night. Saturday night we added approximately \$150,000 to the purse on the 410 Nationals. On the 360 Nationals we moved it up from \$15,000 to win to \$20,000 to win, plus we're doing \$500 per lap. So if you were to win the race and led all 30 laps, that race would pay \$35,000."

The purse increase was paid for by raising the ticket price "a little bit," McCoy said. "But all the money we raised went into that purse."

That strategy doesn't apply just to the big-name specials. "You have to either increase the price of a ticket or increase the number of people coming to races," Ray said. "That can be extremely hard to do." BMARA is "slowly increasing our purse over time to help, but there's so much competition for the entertainment dollar today that it's very hard for promoters to raise ticket prices."

Ray credited Gregg McKarns, the promoter of Angell Park Speedway, with doing "a fantastic job of promoting the race track and enticing people to come to the race track. He's created value packs for families, and he's done a very good job of making sure the grandstands are full of people when we go to race there." Ray acknowledged that "purses have not gone up at the rate we'd like to see them go up, but we believe over time we'll see them increase, as long as promoters stay at it and continue to increase the number of people in the stands."

Some track promoters are getting creative about how they spend—and raise—their purse money.

"In our 410 series that we started last year, rather than putting tow money and pit passes in there for the top 10, we took all that money and put everything into the

purse so it would pay good," Brown said. "For example, our wing series is \$5,000 to win, \$500 to start. We felt it was more important to give it back to everyone."

"When I ran Gas City," Gappens recalled, "I did a thing called the Twin 20s, which were twin 20-lap features. I increased the pit pass by \$5, but the teams were getting two purse payouts that night with no additional travel and for one admission. Fans were getting two features, and I increased the front gate \$5. But then, instead of an \$8,000 payday that night, there was \$16,000, and everybody had a chance to race in both features. That was the first time drivers came up and said, 'Thanks for doing this. This was a good idea.'"

At Knoxville, there are two organizations that help put funds into racer payouts, McCoy said. "Our Knoxville Raceway Charitable Organization does all of our 50/50s, and every dime of it goes back to the racers. This year they bought all of them

who were in our points fire bottles."

Knoxville also has a 360 Booster Club, made up of local businesses, which augments the 360 purses. "You know, it's easier for individuals to find money sometimes from brands and fans than it is the track," McCoy said. "People think the track is going to pocket half of it, but that's not true here." McCoy said club organizer Al Dehaai "has

really worked his butt off. This group is adding probably close to \$2,000 to the purse every week. We immediately put it all in the races. We pay now \$2,000 to win and feather it back to about half of the 410s, \$600 for 10th and back to \$350 to start the race. That's unheard of for any weekly 360 show, I believe. That's what you have to do—figure out other ways to get the purse." **PRI**

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ardcmidget.com

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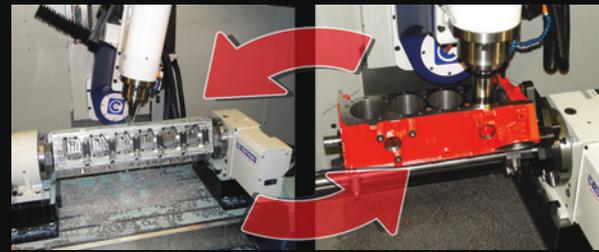
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RETURN OF THE 410s

Increased purses and new promotional strategies are helping to revitalize sprint car racing's premier division.

By Bradley Iger



Like so much in motorsports, 410 sprint car racing has seen its fair share of tumult in recent years. Beyond the inherent challenges associated with the pandemic, the division was already hampered by a continued rise in running costs, and a general sense that many organizers had shifted their energy elsewhere.

“Five years ago, 410 racing wasn’t doing so well over here on the West Coast. It felt like things were headed in the wrong direction,” noted Peter Murphy of Skagit Speedway, Burlington, Washington. “Back when I was racing, I chose to go to 410 because the money was pretty good, but unfortunately it got stagnant for a number of years. Eventually it became tough to get people interested in it—it just wasn’t bringing in enough cars when they turned up to a track. But over the last few years, we’ve seen people putting in a little more effort, and things are starting to change again. It’s not a simple task, but we’re seeing positive results. At the last race that we put on at Hanford, we had more than 30 racers running 410s. So, something seems to be working.”

Nick Graziano of the World of Outlaws series in Concord, North Carolina, agreed that the 410 division is now on the upswing. “Even through the COVID-19 years we progressed, and I think we actually came out ahead,” he said. “Between the iRacing events that we did and our connection with NASCAR, I think it brought a lot of new eyes to the sport, and a lot of new interest. We’re seeing the social numbers and the amount of viewers grow, along with the number of fans at the tracks, and even just the sheer number of sponsors that have come on in the last couple of years has increased.”

The rise in interest isn’t attributed to a handful of sweeping changes, but rather an array of refinements in approach and overall strategy. Those revamped tactics have not only made the division more attractive to racers and fans, they’ve also improved communication between various series, and that has helped to strengthen 410 sprint car racing on the whole.

BUILDING MOMENTUM

“When I came back in 2017, the series was in serious trouble,” said Sacramento,



California’s NARC Fujitsu Sprint Car Series averaged more than 28 cars per show last year, up from fewer than 20, five years ago, said Jim Allen. He attributed much of the improvement to the concerted efforts of those who are running events at tracks like Skagit Speedway in Washington State and Silver Dollar Speedway in California.

California’s NARC Fujitsu Sprint Car Series general manager Jim Allen. “We were averaging a whopping 19 cars per show, and the 360s were just killing it in California. But those racers were spending about as much money as the folks running in 410s, so we had to sit down and figure out what the problem was. For us, part of it was about firing up the old PR machine and building our brand.”

NARC averaged more than 28 cars per show last year, and Allen attributed much of the improvement to the concerted efforts of the folks who are running events at tracks

like Skagit Speedway, and Silver Dollar Speedway in Chico, California.

Those efforts also resulted in an expanded race calendar that provided racers and fans with more options to get in on the action. The series had 16 races on the schedule when Allen returned to the fold in 2017; last year they ran 25. He said that sprint car teams collectively now have between 45 and 50 reasons to go race a 410 for more money as compared to the 360s that they may have gravitated toward in the past. While the year-over-year improvements have been incremental by his estimation, they appear to



The World of Outlaws’ Nick Graziano has seen renewed interest in 410 sprints. “Even through the COVID-19 years we progressed, and I think we actually came out ahead. Between the iRacing events we did and our connection with NASCAR, it brought a lot of new eyes to the sport.”

be setting up the division for sustained long-term growth.

Steve Sinclair of the Interstate Racing Association Outlaw Sprint Series in McHenry, Illinois, told us that the increased interest seen at the upper echelons of 410 sprint car racing has had a tangible impact on his series as well. "When Tony Stewart comes to race with us, or Kyle Larson, they bring a NASCAR fanbase with them. That definitely helps, and I think we've gotten a trickle-down effect from the growth that World of Outlaws has seen. When NASCAR was on hold during the pandemic years, some of those guys got more involved in sprint car stuff, and I think it helped a lot."

Meanwhile Andrew Morfier, the director of operations at Attica Raceway Park in Attica, Ohio, pointed out that while the expense of campaigning a 410 remains a challenge for many teams, organizers are actively attempting to address the issue. "Costs are up, but that's true of everything right now. The owners, teams, and drivers are absorbing that, so that's where we try to help out with the purse. And I think we've got a really good point program for the 410s—we're over \$20,000 on the point fund."

Improving purses and points funds have been one main focus for organizers at all levels of the sport in recent years. It's another aspect of the collective challenge that can't be solved overnight, but the trend is encouraging.

"We've got to give them what they're worth," said Murphy. "We've got a double-header this year that pays \$1,000 to start and \$11,000 to win. I think one of Chico's events is up to \$25,000 now, and Dirt Cup was \$50,000 to win last year. Things like that naturally change peoples' thought processes in a variety of ways. It gets the teams excited for the races, and that's our job as promoters."

IRA's series has made similar improvements in recent years, but Sinclair said there's still more work to be done. "The purses haven't gone up at the rate that I would like them to, but we have a travel package for the teams that are full-timers with us, and a portion of our sanction fee goes into additional toll money for the teams. We've also got a pretty solid point

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With 25 races a year in its series, NARC offers its racers more reasons to race a 410 for more money as compared to the 360s that they may have gravitated toward in the past.

fund for a regional series, and we've got a good contingency program as well. We give a couple of cars away at the banquet, along with wings, wheels, and some other things. Some of it has become tougher to get since the pandemic, but we work hard at it because it really helps the teams out."

TOP-TIER ATTRACTION

While the bigger payouts are certainly part of the allure of 410 racing for teams, there are other aspects of the division that add to its inherent appeal. "Beyond events

like Huset's High Bank Nationals, which will pay \$250,000 to win, 410 is where the big names are, and where the big stories are being told," said Graziano. "This is where the greatest talents are competing. When you see big names coming in from other disciplines, they're hopping in 410s." That's an exciting prospect from the perspective of fans and racers alike.

"One of my goals is to turn our top 15 drivers in the point standings into household names," said Allen. "If you want to see someone who can beat the Outlaws when



"410 is an incredibly competitive division, so the racing is incredible," said Andrew Morfieri of Attica Raceway Park in Ohio. "When the All Stars and Outlaws come in, we have strong showings from our locals that prove it."

“ONE OF MY GOALS IS TO TURN OUR TOP 15 DRIVERS IN THE POINT STANDINGS INTO HOUSEHOLD NAMES.”

they come out, then you need to come to a NARC King of the West show. That’s something that the 360s just can’t give you.”

In 2018, a group of tracks, sanctioning bodies, chassis builders, and drivers created the Sprint Car Council. Along with collaborative discussions on cost containment and safety concerns, the council also helps to keep regional and national series on the same page when it comes to potential rule changes. Thanks to improved communication between the various series brought on by initiatives like this, the 410 has become a much more unified division across the country.

“Whether you’re regional or national, our rules are all essentially the same,” said Sinclair. “I think 410 racing, specifically, has done a really great job with that. One of my guys can race with the World of Outlaws, or the All Stars, or pretty much anywhere else they may want to go, and they’ll be legal.”

A big part of the appeal of 410 racing is the cars and the competition. “The thrill of the speed and the noise—people still love the noise of a 410,” said Morfier. “And 410 is an incredibly competitive division, so the racing is incredible. When the All Stars and Outlaws come in, we have strong showings from our locals that prove it.”

GETTING THE WORD OUT

Marketing and promotion are another aspect of the division that’s seen significant development over the past few seasons. The changes not only heighten awareness for longtime fans and veteran racers, they’re also grabbing the attention of a new generation of would-be spectators and competitors.

“At the end of the day, I can’t ask for more money if they can’t get it through the front



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"410 is where the big names are, and where the big stories are being told," said Nick Graziano of World of Outlaws. "This is where the greatest talents are competing. When you see big names coming in from other disciplines, they're hopping in 410s."

gate," Allen said. "So we're tackling this from all sides. On the social media side, we set an annual target for how many followers we've brought in and how many likes the content is getting, and we've brought someone in to help us out on that side. Our Twitter account is blowing up, and we're not done yet. We also have two Facebook pages—one's a history page, and the other's more focused on current events—plus Instagram, TikTok, and our YouTube channel. It's all updated on a regular basis. But we've told our promoters that our PR efforts—the stories, the press releases, the profiles—everything we're doing is designed to complement their efforts rather than replacing them. Old habits die hard, and I think some of these guys would rather place an ad in the newspaper like they used to, but that mindset is starting to change."

Morfier said that there are situations where a localized approach can be particularly effective, but social media has largely taken over as medium of choice for Attica Raceway Park's marketing efforts. "Some of the Outlaw races we'll put on the radio," he explained. "That generally stays within the local market, maybe a hundred miles or so. But when so many people tell us that they saw this or that on social media, it makes sense to focus most of what we're doing there."

Graziano also said that social media has become an integral part of World of Outlaws' marketing and promotional strategy, but he's quick to point out that each platform requires its own unique approach.

"I think the biggest thing for us is just getting those stories out there—the drivers, the crews, the events—and making sure that those stories are told properly. Facebook is still just as important as ever, and Twitter is good for race days when we're doing a lot of live tweeting of the races. Instagram Stories have become a big deal, too. And we have a World of Outlaws TikTok as well. It's one of the biggest social platforms for the younger generation, so that's a world that we need to be in. Along with entertainment, we try to bring an educational aspect to what we post there by showing people the sound and speed of sprint cars. You never really know what's going to go viral there. You just have to have fun with it, and people will pick up what they like."

If you want to hit the ground running in that regard, Sinclair suggested bringing in someone who already speaks the language. "I'm old school when it comes to this sort of thing, but we have this kid who has been helping us out tremendously," he explained. "He works at MyRacePass, so he's up on all of this stuff. It's been great to have young

“WE’VE TOLD OUR PROMOTERS THAT OUR PR EFFORTS—THE STORIES, THE PRESS RELEASES, THE PROFILES—EVERYTHING WE’RE DOING IS DESIGNED TO COMPLEMENT THEIR EFFORTS RATHER THAN REPLACING THEM.”

ideas in the mix—it has benefited us a lot.”
Murphy pointed out that it’s not only about reaching fans where they already are, it’s about bringing a new audience into the sport. “We, as promoters, have to adapt to what’s going on in the world. We can’t do what we were doing 10 years ago—or even five years ago—and expect to get the same results. The world is constantly changing, and it’s our responsibility to keep up. We’re using every avenue that we have available to us. You don’t have to do a dance on TikTok, but if you want to get new people involved, you need to be where they are in order to connect with them. Reaching the diehards isn’t enough.” **PRI**

SOURCES

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**Interstate Racing Association
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BUSINESS PROFILE

MWR TECHNOLOGY

THIS ENERGETIC MIDWEST SHOP IS BUILDING A BIG REPUTATION FOR SMALL POWERPLANTS THAT ARE LEADING THE FIELD IN DIRT COMPETITION.

By David Bellm

Success in any business is largely a matter of balance. Although it can be difficult to achieve, knowing what to focus on and how much attention it warrants can mean the difference between a thriving shop with constant work and a company that's struggling to keep the lights on.

One company that's truly mastered this art is northern Illinois-based engine builder MWR Technology. The company works with a wide range of engines, from pretty much all mainstream manufacturers. These powerplants are winning races throughout the US, particularly on dirt. While that may sound about as general as an engine builder can be, MWR's specialty is four-cylinder engines, which it builds with the vast expertise of company founder Mike Wallace.

This 45-year-old business owner has a history with four-cylinder performance cars going back decades, beginning with youthful years hopping up Honda sport compacts in the Chicago suburb of Berwyn, where

he grew up. From there, he went on to field circle track cars in a number of different series. But it was his time running USAC midgets on pavement that proved especially vital in steering him toward his current specialty. After experiencing an engine failure and cutting a check for about \$15,000 to the engine builder, he told himself, "There's got to be a better way of doing this," and I started really looking at the production-engine thing."

Wallace launched his shop "sometime around 2010," with the aim of bringing affordable race-winning performance to teams fielding four-cylinder cars in all types of racing. The move proved to be well-timed, as many dirt series began moving toward production-based powerplants as a means of controlling costs and keeping car counts high. As series after series in Illinois and Wisconsin switched to production-based engines, plenty of work began coming his way. Fairly soon, this led to



MWR Technology builds a wide range of engines, but its specialty is four-cylinder engines for all types of racing. Typically, 20 to 30 engines are in various stages of construction at any given time.

impressive on-track success, with Patrick Bruns scoring three successive Illini Racing Series championships in 2014–2016. The accomplishment added further luster to the MWR brand, bringing steady year-round demand for Wallace's services.

"We managed to knock down a few championships, which obviously added to the viability of what we were doing," said Wallace. "So then we started branching out. IMRA [Illinois Midget Racing Association] was running production motors with injection, which we really hadn't done before—the injection thing was kind of new. So we hopped onboard with Kinsler, had some injection systems made, and started doing IMRA.

"And then POWri also got involved with production-motor midgets for a time, which actually took off," continued Wallace. "That's when Badger [Badger Midget Racing Association] took note. They were having issues with car counts. So then Badger jumped onboard the low-budget production thing. And they actually allowed a lot of changes to the engines, which brought us a lot of R&D opportunities."

At the same time, racers from other series began to seek out the services of MWR. As a result, the shop has seen the entire spectrum of contemporary production-based four-cylinder engines, including Honda, Toyota, Nissan, Mazda, Chevrolet, Subaru, and Volkswagen.

BIGTIME BOW TIES

Of all the many types of four-cylinder engines that come through MWR's doors, by far the shop's bread and butter is the Chevrolet Ecotec. Although a relative late-comer to the four-cylinder performance scene, the Bow-Tie brand has recently come on strong as racers discover the competitive potential of this relatively low-cost unit now that it's being developed extensively.

MWR has led the Ecotec's burgeoning popularity from the beginning, with a number of proprietary parts and processes that bring these units up to competitive power levels. "There's probably nobody in the country that knows more of the ins and outs of this engine or is at the forefront as much as we are with the Ecotec," said Wallace. "Nobody really makes any performance stuff for it, so everything is R&D'd and designed here in-house."

With Wallace's innovative parts and development, these budget-friendly engines are winning races and championships season after season, including back-to-back USAC Engler Illinois Midget Racing Association Speed2 Midget championships with Mark McMahill in 2021 and 2022. Topping it off, Wallace is proving that a well-prepared Ecotec can survive and thrive far beyond what's generally expected for a

racing engine. "We had a car with one of Mike's Ecotec motors in it, and it was five years old," said Daltyn England, who races in the Badger Midget Racing Association. "It had at least 50 races on it, and it was still running strong. It won three features this past year. That's totally unheard of."

While Ecotec has proven to be a fruitful sub-specialty for the shop, MWR continues developing other four-cylinder engines, adding new possibilities to offer its customers. Recently, the company has started working more extensively with Nissans, in particular the venerable SR20 series of engines.

"The SR20 motor has been around forever—they even mention it in the first 'Fast and the Furious' movie," said Wallace. "We started working with the SR because it has quite a few aftermarket parts already available for it. The other cool thing about the SR is its exhaust orientation. On an open wheel car, the exhaust comes out on the left side. On the Honda and the Ecotec, the exhaust ports are on the opposite side, so you have to use a header that goes up over the motor. But the SR's exhaust ports are actually on the left, so it's more conventional-midget looking."

WHERE THE ACTION IS

The MWR shop is located in Elwood, Illinois, approximately 50 miles west of downtown Chicago, making it an excellent location to serve a wide range of



MWR's Mike Wallace takes a holistic approach to car preparation. "You can always find another 50 horsepower in the chassis, so we also help our customers with chassis and setup," he said.

“WE STARTED WORKING WITH THE SR BECAUSE IT HAS QUITE A FEW AFTERMARKET PARTS ALREADY AVAILABLE FOR IT.”

motorsports. Besides being just minutes away from the dirt oval and major-league drag strip of Route 66 Raceway in Joliet, MWR is situated right in the middle of the thriving Illinois and Wisconsin dirt-track scene. And for the road-racing crowd, the twisty, 3.5-mile circuit of Autobahn Country Club is just four miles away. MWR's home track is Sycamore Speedway, which is about an hour's drive to the north, with Kankakee Speedway and Grundy County Speedway a similar distance from the shop.

Built on roughly three acres of commercial property, the MWR facility has plenty of room to bring in customer trailers and drop off their cars if necessary. That extra space, along with the relatively remote rural location, gives them an additional luxury that many engine shops don't have. “The cool thing about this property is that we can push midgets off and drive all the way around the building,” said Wallace. “That's nice because midgets don't have a starter. We can actually fire them off



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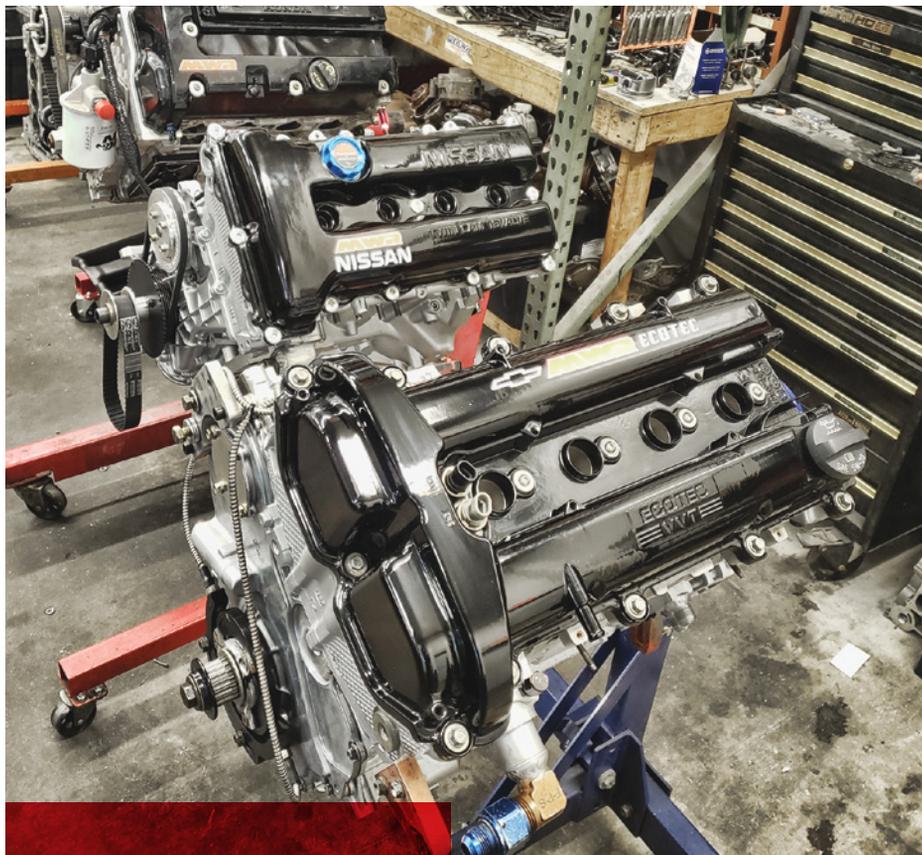
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While the Ecotec is MWR's bread and butter, the shop has recently been working more extensively with Nissan engines, particularly the SR20. It has robust aftermarket support, and its exhaust port orientation on the left side "is more conventional-midget looking," Mike Wallace said.

at our shop to troubleshoot or work on them."

The MWR Technology building itself is a relatively compact 2,200 square feet. It makes for tight quarters, considering the high volume of work that goes through the shop—typically 20 to 30 engines are in various stages of being built at any given time. For this reason, Wallace is looking forward to adding the unit next door to the shop this spring, which will bring a welcome 1,500 square feet to his working space. He plans to take advantage of the extra room by upgrading his parts cleaning equipment and getting a new engine dyno, which is currently on order.

These new pieces of equipment will complement the workhorse tool of his shop—a Haas VF-3 CNC vertical machining

center. Wallace uses this for everything from cylinder boring to building custom-designed engine parts, applying skills he acquired decades ago as a teenager. "Back in the day, our high school still had a machine shop," said Wallace. "So I learned AutoCAD in high school. I'm still using that knowledge to this day—we use Fusion 360 and AutoCAD. We can write our own programs and make our own parts."

MIKE AND COMPANY

Keeping work flowing through the shop is a lean staff of three employees: Mike Slabenak, Mike Smith, and one known simply as "Kenny G." It takes a lot to handle the shop's heavy workload and race-winning expectations with such a small crew, but Wallace is fortunate that his trio of hard-working, dedicated individuals has stuck around for the long haul. "We usually work 12 hours a day," said Wallace. "I'm very lucky—everybody's been here five-plus years, and they're typically pretty self-sufficient."

Wallace's wife, Hayley, handles the books

and takes care of their family of seven children. The oldest of them is 14, and although none of them is employed in the business yet, it seems likely they'll join their dad at the shop at some point.

With a steady flow of work filling the shop to the brim, Wallace doesn't feel the need to market aggressively to attract new customers. Instead, he prefers to let the work speak for itself, with results on track being the best testament to the effectiveness of his engines. "I'm not out on social media pushing our stuff or forcing the issue," explained Wallace. "Do I want to get bigger? Yeah, absolutely. But I don't need to. We've got plenty of work to keep us busy. We're very comfortable."

He does, however, put a little time into posting on Facebook, mostly to give his customers and their race teams some credit and recognition. "I try to give props as much as I can to guys. I put things up online and give them their moment in the sun."

Despite the obvious demands of his large family and a shop full of work, Wallace never seems to run out of time for his customers. And that's perhaps his biggest secret weapon of all.

SATISFACTION GUARANTEED

Obviously, most of MWR's success comes down to results. If its engines weren't winning races, customers wouldn't be lining up for its services the way they are. But it goes beyond that, too. Many businesses boast about the strength of their customer service. Wallace, however, goes way above and beyond, entirely redefining what it means to care for customers.

It begins with a holistic view of race-car preparation. While some engine builders are focused mainly on the powerplant, Wallace looks at the car as an interconnected whole. It goes back to his days fielding his own race cars. And, alongside his thriving engine shop, Wallace also rents midget cars to customers, with a fleet of three race-ready cars to choose from, two for dirt and one for pavement. "I got into this business by renting cars, and I do the same thing still."

With that part of the business, Wallace once again walks the fine line between being too specialized and too general. In this case,

he finds that car setup and chassis work complement his engine work in a manner that's both unique and highly effective. "You can always find another 50 horsepower in the chassis," said Wallace. "So we also help our customers with chassis and setup. Every engine builder does machine work, but we're also well-versed in car setup. We can obviously help you get the best power, but we can also show you how to put that power to the track."

Whether he's working with customers on their whole car or just the engine, Wallace has a level of involvement that's rare in any business these days. "When I went to get parts from Mike for my next engine, we ended up chatting for about four hours on what to do and how to put it all together," recalled Michael Gilmore, who races front-wheel drive compacts on dirt. "I had my girlfriend with me, and she was bored to tears. I thought I was just going to pick up everything and take off. I had no idea!"

Of all these things, Wallace seems most proud of how accessible he is to customers who are in a jam. It's a 24/7 proposition. Although his shop has set working hours, he knows that his phone can ring anytime, and he's ready to help. "Everybody has my cell phone number," explained Wallace. "I'm on call. My wife absolutely hates it. But it's one of the things that sets us apart from guys you can't get ahold of after five o'clock or over the weekend."

Without prompting, all of the customers we spoke to backed up this assertion, telling story after story of how Wallace saved them



A lean staff of three employees keeps work moving through the MWR Technology shop. "I'm very lucky," Mike Wallace said. "Everybody's been here five-plus years, and they're typically pretty self-sufficient."

with a phone call just minutes before the green flag dropped, or got them out of a tough spot when the rest of the world had long gone to bed.

"I was working late at night on my car, installing a wiring harness to an ECU," said SCDRA racer Paul Cosman. "But none of the 72 wires on this harness were labeled. So I called Mike. He happened to be on a nine-hour road trip. I called him probably 15 times through the night, and he always knew exactly what to do and how to do it. It took me 13 hours to get it all done. But thanks to Mike, I only had two small mistakes—I had the positive and negative on the crank sensor and TPS backwards, which he could tell right away."

In other words, just another day's work for Wallace. **PRI**

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MAKING WAVES

While the similarities between these powerplants competing on the water and combinations found in the automotive drag racing world might surprise you, some fundamental differences still distinguish them from their land-based counterparts.

By Bradley Iger



Competing in the upper echelons of drag racing is an already incredibly sophisticated and demanding business, but it gets even more challenging when you swap out prepped pavement for H₂O. Although drag boat engine combinations share plenty with their land-based counterparts, there are also many elements that are uniquely tailored to the demands of the discipline. Those deviations provide some insight into what it takes to perform at the top of the class.

KJELL ADAMS **NJBA PRO GAS JET**

In April 2022, Kjell Adams set a new NJBA Pro Gas Jet class record of 7.248 in the quarter-mile at Lake Ming in Bakersfield, California, in Fluid Motion, a 19-foot tunnel boat that weighs about 1,400 pounds. The jet boat gets its motivation from a 513-cubic-inch V8 with an architecture that's loosely based on a Chevy big block. Running on Q16 race fuel, the mill makes 1,380 horsepower and 850 pound-feet of torque

without the aid of power adders, as the Pro Gas Jet class requires competitors to use naturally aspirated engine combinations.

"The incorporation of technologies like data loggers has been huge for the jet boats and the top-end stuff like Top Alcohol Hydro," Adams said. "It has allowed teams to make significant strides in this type of racing—we now have all of the information. I think we have 26 channels of data on this boat. It really allows you to pinpoint things and figure out how to make it perform even better. Things like individual cylinder timing have really changed the game in terms of consistency, and the longevity of parts."

Adams told us that Pro Gas Jet shares many common traits with the technology found in NHRA Pro Stock. Along with the mandate for naturally aspirated engines, the class also limits displacement to 515 cubes,

Photo courtesy of Jace Maynard

“THINGS LIKE INDIVIDUAL CYLINDER TIMING HAVE REALLY CHANGED THE GAME IN TERMS OF CONSISTENCY, AND THE LONGEVITY OF PARTS.”

so toppling a record that had been in place since 2016 required some potent, high-winding hardware.

The DRCE (drag racing competition engine) billet engine block from GM, symmetrical billet heads, and intake came as a package from CFE Racing. The combination is outfitted with a gun-drilled and polished Bryant Racing billet crankshaft, CP-Carrillo rods and pistons, and a 70-mm custom tool steel camshaft with more than an inch of lift. A Jesel valvetrain keeps things under control at 9,200 rpm and beyond, while a dry sump system from Dailey Engineering ensures that everything stays well lubricated. A pair of 1,425-cfm carburetors from Holley Performance Products rounds out the combination.

The Pro Gas Jet class shares many common traits with the technology found in NHRA Pro Stock, Kjell Adams said, with displacement limited to 515 cubic inches and a mandate for naturally aspirated engines.

“The boat uses a gear reduction transmission—it allows the motor to spin up at 9,200 rpm while the jet drive is spinning at around 7,500,” Adams explained. “That gets the motor where it wants to be to make peak power, and we can use a larger impeller on the jet drive to make it more efficient. When you start cutting down impellers to get the motor up, it makes the impeller more inefficient because you’re creating more cavitation.”

As with automotive drag racing, getting a good launch is crucial in drag boat competition. “I bring the rpm up to about 4,400, and the jet drive enables the boat to send the water through the pump,” he said. “But instead of going out the back, it goes out the sides with a special bucket, which allows the boat to sit still but keep the rpm high enough to prevent it from bogging when you take off. It’s kind of like a trans brake. We can flip a switch, and the data logging starts, the ignition system releases the rev limiter, and that bucket on the back of the boat opens up.”

**JOEY GROSE
NJBA PRO GAS FLAT**

“This class is based off of NHRA Pro Stock,” said Joey Grose, who currently holds the NJBA Pro Gas Flat class record ET of 6.85 seconds at 155 mph. “Because we also currently run a Pro Stock car, it allows us to keep up on the technology and apply that to the boat program.”

Like Pro Gas Jet, Pro Gas Flat is a carbureted and naturally aspirated class that limits displacement to 515 cubic inches,



“The incorporation of technologies like data loggers has been huge for the jet boats,” Kjell Adams said. “It really allows you to pinpoint things and figure out how to make it perform even better.”

but the boats themselves differ significantly, so the combinations necessitate their own specialized approach. “There’s no weight limitation in this class, but lighter isn’t always better,” he said. “There’s a lot of different styles of flat-bottom boats for this type of racing. We use our own custom mold for the boats that we run, and we’ve made a lot of changes to the bottom of it over the years. Motor placement and V-drive placement play a big role in this particular class.”

Grose’s C25-fed, big block Chevy-based DRCE V8 is equipped with a Winberg crankshaft, MGP connecting rods, CP-Carrillo pistons, a Bullet camshaft, Jesel lifters, and Manton pushrods, among other go-fast hardware. “The cylinder heads are a GM casting that we created our own CNC program for,” he said. “And we build parts like the manifolds and rocker arms in-house as well.”

The engine is topped with a pair of





1,250-cfm carburetors that have also seen significant tweaking by his Lodi, California-based shop, Grose Racing Engines. “The carburetors are a big factor in getting these boats to run at this level, so we’ve spent a lot of time fine-tuning those,” said Grose. “They’re based on a Holley design, but it’s all our own work as far as the internals go.”

Grose said teams that use automotive engine combinations in drag boat racing will quickly discover the importance of fine-tuning the powerplant to the application. “In a car, you either have a converter or a clutch that allows you to bring the rpm up for the launch, but in this type of boat you’re leaving from a dead idle. So to get the boat moving initially—and keep it pulling all the way down—requires a very different approach. You have a propeller that’s not always hooked up all of the time like a tire would be on a car, so that kind of changes the rpm ranges and the curves that you’re working with. Most of these races are won in the first

half of the track, so you need to have that setup dialed in.”

CARROLL-HAAS RACING SDBA TOP FUEL HYDRO

As the name implies, the Southern Drag Boat Association’s Top Fuel Hydro class mirrors NHRA Top Fuel in a number of ways, and that means stunning horsepower paired with truly incredible speed. Team owner and crew chief Todd Haas tells us that the team’s 272.95-mph trap speed from a 3.41-second,

“MOST OF THESE RACES ARE WON IN THE FIRST HALF OF THE TRACK, SO YOU NEED TO HAVE THAT SETUP DIALED IN.”



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Fine-tuning the engine to the application is critical to success in NJBA Pro Gas Flat racing, said Joey Grose. "To get the boat moving initially—and keep it pulling all the way down—requires a very different approach" than tuning a drag car.

1,000-foot run during the 2022 Drag Boat Nationals in Phoenix, Arizona, makes their 21-foot outrigger the second-fastest drag boat in history. And they're not done yet.

"I think it could potentially run in the 280s," Haas explained. "It was running on seven cylinders for the last second of that pass."

"BECAUSE WE ALSO CURRENTLY RUN A PRO STOCK CAR, IT ALLOWS US TO KEEP UP ON THE TECHNOLOGY AND APPLY THAT TO THE BOAT PROGRAM."

Powering the 2,700-pound boat is a 10,000-hp, 500-cubic-inch, Hemi-based V8 that's similar to what you'd find underneath the bodywork of an NHRA Funny Car or Top Fuel dragster. The powerplant runs a compression ratio of 6.5:1 and consists of an Alan Johnson billet block with a Bryant Racing crankshaft, CP-Carrillo rods and pistons, forged Jesel rocker arms, and Alan

Johnson billet aluminum cylinder heads. Additional grunt is provided by a DMPE 14-71 Roots-type supercharger that delivers 60 pounds of boost, and the combination is fed a mixture of nitromethane and methanol by a mechanical fuel injection system with a pump that's capable of delivering more than 100 gallons of fuel per minute.

"The fuel pump is a crucial part of keeping these engines happy," Haas emphasized. "It blows the minds of NHRA crew chiefs when I show them a run on this boat, and how hard it tugs down when it leaves the starting line. If a car tugs down to 7,800 rpm or so, that's a pretty decent run. Sometimes this boat will tug down as low as 5,800 rpm, and that puts a serious load on it. If you don't have enough fuel in it when it drops that low because the fuel pump isn't big enough, it's on fire."

The delivery of that fuel—which is 88.5% nitromethane and 11.5% methanol—is managed by an Electrimotion Command Module. "The percentage of nitro that you use has a big impact on the tune," he said. "The higher the percentage, the more compression it makes." While the engine is very similar to what you'd find in NHRA Top Fuel, Haas said that there are some important distinctions when it comes to tuning. "In an NHRA car you'd use a rev limiter to regulate engine speed, but we don't have that—we can turn this thing to whatever speed we think it'll turn."

Team driver Kebin Kinsley, who also competes in NHRA Top Fuel, said that the drag boat engine will likely feel familiar to anyone who's worked on Top Fuel cars. "It's almost exactly the same—the motor's just in backwards. And we pull a lot of the

technology that we're using from the drag car side—the Racepak computer and the Electrimotion system are the same. When they make more power with the cars, we make more power with the boats."

CNC technology has also helped to elevate the game in top-tier drag boat racing, Kinsley said. "Machining propellers has been kind of a dark art for a long time. These were hand-made, and it was almost impossible to get two of them that were exactly the same. A 200-thousandths discrepancy can change the whole attitude of the boat, especially when you're working with this much power. So being able to get that consistency has been really important."

He said that the team has already identified what hurt the engine during their run at last year's Nationals, and they have some other upgrades in store for the coming season. "It's all about loading the motor

Joey Grose's C25-fed, big block Chevy-based DRCE V8 is topped with "cylinder heads that are a GM casting that we created our own CNC program for," he said. "And we build parts like the manifolds and rocker arms in-house as well."



Carroll-Haas Racing's Top Fuel Hydro outrigger made a 3.41-second, 1,000-foot run with a 272.95-mph trap speed during the 2022 Drag Boat Nationals, making it the second-fastest drag boat in history. "And we're not done yet," said Todd Haas.



when you're working with nitro, and it just went rich on the big end—we just weren't loading it hard enough," Kinsley explained. "There are different ways we can address that, like a big propeller or a larger gear ratio in the W-drives. We're also working with Revchem to develop a new carbon fiber Kevlar capsule for the boat. The goal is to make it both stronger and lighter than what we're using now."

Both Haas and Kinsley say that 280 mph is an achievable goal that they may reach this season, but right now the team is primarily focused on making the boat as consistent as possible.

The sentiment that there's still a lot left on the table is shared by Grose and Adams as well, not just within their own racing programs, but across the sport. "I think there's still a lot of performance to be found

in boat setup and V-drive stuff, and there's a lot of engine technology that can benefit these boats, especially when it comes to power adders," said Grose. "I don't think that will ever stop. They're always finding new ways to make more boost."

While Adams has his sights set on another record-setting run in the 7.0 range in 2023 thanks to some changes made over the winter that have bumped up the horsepower



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Powering the Carroll-Haas Racing boat is a 10,000-hp, 500-cubic-inch, Hemi-based V8 that's similar to engines found in NHRA Funny Car or Top Fuel dragster. "The percentage of nitro that you use has a big impact on the tune," Todd Haas said. "The higher the percentage, the more compression it makes."

in his naturally aspirated combination, he said that the biggest gains to be had in drag boat racing might be found in the power adder classes.

"I think nitrous stuff is really going to come into play for the heavy hitters," Adams observed. "When I held the record in the Unblown Fuel Jet class, we were closing in on 2,000 hp with a conventional 572-cubic-inch Chevy big block. Now that we're seeing teams getting into 700- to 800-cubic-

inch stuff, it's just going to raise the bar because they're not limited by displacement anymore. And as we see more and more teams consistently making 2,500 to 3,000 hp on nitrous, we're going to see more and more of the existing records get blown away." **PRI**

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RAPID EVOLUTION

AS ENGINE TECHNOLOGY CHANGES, OIL AND LUBRICATION TECHNOLOGY MUST CHANGE WITH IT TO KEEP UP WITH INCREASED PROTECTION DEMANDS, HIGHER TEMPERATURES, CLOSER TOLERANCES, AND A GROWING CALL FOR RENEWABLE RESOURCES.

By Drew Hardin



“We keep pushing the limits every year.”

That's how Josh Steinmetz of Lubrication Specialties, maker of Hot Shot's Secret in Mt. Gilead, Ohio, describes in a nutshell the current state of race engine technology, and the concurrent need to develop new lubricants for that technology.

“We keep finding more horsepower that wasn't there five years ago, in the same race class that had very similar rules,” he pointed out. Those engines are often “doubling horsepower, or at least adding 25%.” That's why “more and more people are going to synthetics and renewables as a steppingstone away from conventional oil, especially when it comes to the high-performance market. Conventional oil just won't take the abuse that these high-demand applications dish out.”

The shift from conventional, petroleum-based oil to synthetic has been going on for a while. But Steinmetz and other experts in the oil and lubrication industry noted some additional trends that point to a rapid evolution of the whole field.

GAS ENGINE LUBRICATION TRENDS

“Gasoline engine oils are evolving to accommodate the increasingly severe operating conditions of new engine designs,” said Chris Mileti of Klotz Synthetic Lubricants, Ft. Wayne, Indiana. “These designs frequently include direct injection, turbocharging, high compression ratios, and elevated combustion temperatures. Modern oil formulations must continue to offer traditional performance features such as wear protection and deposit mitigation, but these formulations must do so while also offering new features such as preventing low-speed pre-ignition, resisting oil thickening from high-temperature oxidation, protecting timing chains from elongation, and providing measurable fuel economy benefits.”

Engine oils for racing applications have traditionally been “boosted versions of top-tier passenger car oils,” Mileti added, but that, too, is changing. “Most premium motorsports engine oils are bespoke formulations designed for a specific type

of racing. They use additive packages and boosters that would damage passenger car emission systems. In general, motorsports engine oils are trending toward lower viscosity grades, especially in drag racing. They are also migrating away from mineral base stocks and toward higher performing synthetic base stocks.”

“The viscosity of oils is getting lower all the time,” Steinmetz agreed. “It used to be you never heard of a 0W-20, but now it's common, and now there are 10- and 8-weights out there as well.” With viscosity that low, the oil has “less cushion to work, so we have to find unique ways to mitigate the wear and the degradation of the oil itself.” Hot Shot's Secret's nanocarbon technology “has done a great job of that. We add it to any oil and see improvements in wear reduction.” The nanocarbon technology “also reduces temperature, so the oil is less likely to shear and break down from heat.”

Ultra-low viscosity oils aren't recommended for every drag race application. Danny Vaca of LAT Racing Oils in Orange, California, said he gets calls from customers “who say, ‘I have a turbo, with 50 pounds of boost, and I'm using a 20W-50.’ A 20W-50 can't handle 50 pounds of boost. There's too much pressure on the bearings and journals. In that case, they need a straight weight, like a straight 50. Sometimes people are misled on the difference between a straight 50 versus a 20W-50. A multigrade oil has a viscosity modifier in order for it to go from thinner to thicker, while a straight 50 has no viscosity modifier. It's that thick because of the base oil.”

DIESEL OIL TRENDS

“Diesel engine technology is changing just as quickly as gasoline engine technology,” Mileti said. “Traditional lubrication problems such as bearing wear, excessive soot, and poor low temperature operability are no longer significant issues with modern diesel engines. But these legacy problems have been replaced with new challenges such as high-temperature oil oxidation and more stringent efficiency expectations. As a result, new diesel engine oils are slowly migrating to lower viscosity grades to improve fuel economy. They are also being fortified with

more effective antioxidants and detergents to mitigate both oxidation and deposits over increasingly long oil drain intervals.”

Low viscosity oils may work in production-based diesels—“I believe the small Duramax runs a 0W-20,” Steinmetz said—but he sees some racers “going heavier. Not across the board, but we’re seeing people looking at a 60-weight compared to a 50, looking for more protection, more cushion in the oil.” The reason, he believes, “comes down to parts availability. The thinking is, ‘How can I make this thing last longer?’ They’d rather give up a couple horsepower to make sure it’s going to stay together.” Plus, he said, in the diesel drag racing and truck and tractor pulling worlds, “these guys are making a huge amount of horsepower that they weren’t making a couple years ago. They don’t have to find every single ounce of horsepower. So now they’re trying to make longevity part of their equation.”

At Hot Shot’s Secret, “we’re seeing some demand for even higher viscosity oils,” Steinmetz said. “Our 60-weight is already on the high end of a 60-weight, and I have people wondering about a 70.” There’s no such thing as a 70-weight oil, he said, since the viscosity designations developed by the SAE stop at 60. Should his company develop a heavier weight oil, “we’d probably call it a 60-plus, to try to stay as close to the science as we can.”

RENEWABLE RESOURCES

According to Mileti, “The next 10 years will bring unprecedented change to the lubricant industry. Environmental regulations will encourage oil marketers to formulate engine oils with environmentally friendly or recycled (re-refined) base stocks. This will eventually lead to the formulation of engine oils using renewable, bio-derived base stocks.”

Evolve Lubricants of Reno, Nevada, is there already. It has developed “a special process of creating pure high-performance hydrocarbon molecules from plants,” according to a company representative, and it offers several different oils and lubricants using that non-petroleum technology.

“We have the answer today to get

Klotz Synthetic Lubricants not only has a number of gas and diesel engine oils, it also has “a full line of hypoid gear oils with a formulation designed to be very shear stable and with robust corrosion inhibitors, all designed to protect the gears,” said Chris Mileti.



companies and people off of petroleum,” added Rick Lee. Motorsports is an important part of Evolve’s portfolio, but it’s just one component of a multi-faceted product lineup. Evolve has formulated diesel engine oils for over-the-road trucks that have shown a 4% mileage improvement, Lee said. “That’s a huge number

to a company like Walmart or

Penske that has hundreds of thousands of trucks and spends a billion dollars on fuel.” It also developed a small-engine oil, used by Home Depot, that in testing lengthened drain intervals four times more than normal. Evolve is now moving into a new category with a high-performance shock absorber oil that’s being tested by “some of the largest high-performance aftermarket and OEM shock manufacturers,” Lee said. “We are under an NDA so I can’t say who just yet.”

Hot Shot’s Secret is also doing some R&D with renewable formulations, Steinmetz reported, “in what we call the fleet line of diesel oils, the diesel oil most people use in their truck or hauler. We want to see if the renewable part can work in tandem with the synthetic base oil we already use to get longer drain intervals, and still maintain the wear resistance we like to see, and also if the detergency package will stay in solution with it.”

Mark Wheatley at TriboDyn Lubricants in Mooresville, North Carolina, has a different way of thinking about renewable resources and oil, “if you’re talking about reducing the carbon footprint. Using our oil can improve fuel economy by as much as 5–10%. An average car that goes 12,000 miles a year

puts quite a bit of carbon in the atmosphere, but if you can improve its fuel economy by 5–10%, you’re saving that much in carbon footprint per vehicle. We’ve always been doing that, but with today’s new focus on green, we’re changing the way we promote our product.”

CAN OIL MAKE POWER?

In 2021, Evolve took part in an engine oil test put on by Porsche AG in which its EvoSyn 0W-40 European Car Formula non-petroleum oil was run in a Porsche 3.0-liter MA203 turbocharged engine to examine engine wear.

“They ran over several hundred hours in all different conditions, including stop-and-go and full throttle at the Nürburgring race track,” Lee said. “They said our oil maintained its viscosity under this test better than any other oil they had tested.” Additionally, dyno testing of the engine “gained a positive variance of 12 metric horsepower,” he added.

“If I can deliver 12 metric horsepower in a



factory test, which is about 8 US horsepower, from a drop-in replacement oil change, that has to be the cheapest high-performance bolt-on in history. If I gave you a tenth of a second in every corner, would you take it?

"I can't promise everybody is going to have the Porsche result," he pointed out. "But everybody who's using my oil is reordering," including Bruce Canepa, "who's running the most expensive Porsche 917s in the world."

Wheatley could also cite tests that showed the use of TriboDyn oil increased engine power. "MAG Motorsports had the NASCAR Institute do a dyno test with our TriboDyn oil, and they picked up 4-5 horsepower on two

Hot Shot's Secret makes use of proprietary nanocarbon technology in many of its lubrication products, including its Adrenaline Racing Gear Oil. The technology improves wear reduction and also reduces temperature, "so the oil is less likely to shear and break down from heat," said Josh Steinmetz.

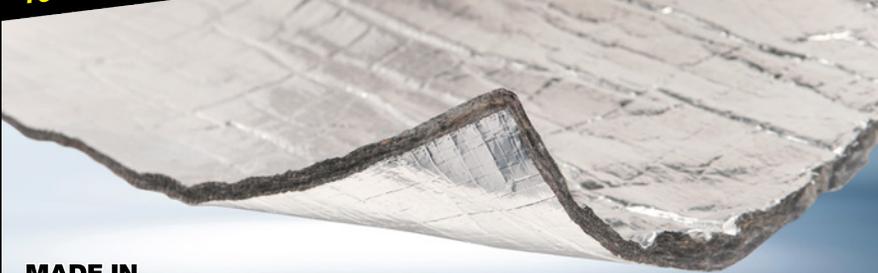


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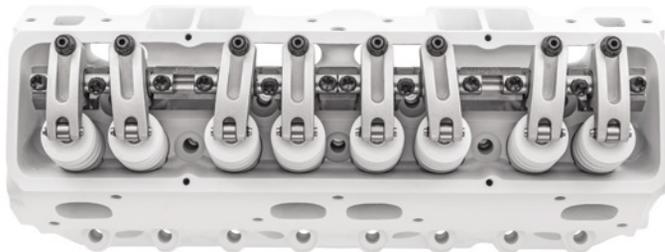
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different engines just by putting in the TriboDyn oil.”

In addition to the MAG Motorsports test, Wheatley recounted several anecdotes about racers and other users of TriboDyn oil who accidentally holed their oil pans or differential cases and went on to turn laps or drive miles after losing oil, with no damage to components. “When the oil or parts get hotter, the TriboDyn oil’s patented coating technology actually forms a dry lubricant film on the substrates to stop any micro welding or galling. It’s almost like powder coating the inside of the engine.”

THE UNAVOIDABLE TREND: COST

The high-quality base stocks and complex additive packages that go into racing lubricants come with a literal cost to the end user. That brings with it the inevitable questions, said Vaca. “They ask me, ‘Why is your stuff so expensive?’ They look at the cost, but they also have to look at the performance of the fluid. Once they’ve used it, they get it.”

For those who haven’t tried the LAT Racing lubricants, Vaca tries to “educate them on why its cost is so high, explain to them about all the components in the oil.” Not everyone is receptive, “and I get it. They’re probably thinking I’m a salesman trying to sell them something they’ve been sold before and it’s failed in the past, so it’s kind of hard for us to get our message across and really prove it. I work with them, be truthful with them, and sometimes I’ll give them a little discount for them to try it once. That’s the only opportunity I need is for them to try it once.”

Wheatley also sees the need to educate his customers about the benefits of TriboDyn’s oils, particularly racers who have been taught “by their family members, dads or grandpas that you need to change your oil after every race or every second race. The problem with that is, it’s expensive. If you feel you should change your oil 11 to 22 times because you race 22 times in a season, you’re spending \$8–\$16 a quart and you’re changing eight quarts before a race. That adds up to \$704–\$2,800 on

“WE KEEP FINDING MORE HORSEPOWER THAT WASN’T THERE FIVE YEARS AGO, IN THE SAME RACE CLASS THAT HAD VERY SIMILAR RULES.”

oil per season. But by using our TriboDyn products, you don’t have to change TriboDyn oil before every race or every other race. You can extend it, so TriboDyn can save people money and still protect their engine.”

Wheatley did a test with a team on the Carolina Sprint Tour last year where they put eight quarts of TriboDyn oil in the car and “every third race, because they raced on dirt, they changed the filter. Never changed the oil, but we topped off. At the end of the year, they only used 12 total quarts of TriboDyn oil, which only cost them \$144 for the whole year. When they took the engine apart, because of our film strength and because of the protection, the engine looked brand new.”



LAT Racing Oils formulated its new High Performance Supercharger Oil for customers who use ProChargers, said Danny Vaca. “It still follows our same focus on using higher end base oils with higher film strength, which provide better lubricity to keep the parts alive.”

Wheatley regularly offers discounts of 20–40% to racers, and at the recent PRI Trade Show he handed out 40% discounts to “anyone at the Show. If they bought it one time, they got that discount all year.”

BEYOND ENGINE OIL

Many of these companies have or are about to release lubrication products that go beyond engine oil. LAT Racing Oils recently developed a new drag racing automatic transmission fluid, Pro X, that’s a “much thicker ATF for heavier cars with lots of horsepower,” Vaca said. “It seems like there’s always a new class coming up, and we don’t hear about it until a failure occurs. So we worked with M&M Transmissions to develop an ATF with a lot higher viscosity for the heavier cars with a lot of power.”

The components in the Pro X ATF “are still like all of our other formulas,” Vaca explained. “Once we have a formula that works, all we do is raise the viscosity. We don’t change anything else. It’s still running the same high-end base oils” as LAT’s other transmission fluids.

LAT has also developed a new High Performance Supercharger Oil “for our customers who run ProCharger units,” Vaca continued. “They have needed something more robust, and we developed an oil that still follows our same focus on using higher-end base oils with higher film strength, which provide better lubricity to keep the parts alive.”

Hot Shot’s Secret has been prototyping new transmission fluids, “doing testing with racers with different viscosities to meet some of their different needs, especially in drag racing,” Steinmetz said. “Some of these guys are doing some really unique stuff with their transmission setup, and we’re working to provide fluids that meet their needs—whether that’s a little thicker fluid or a little thinner fluid—so they don’t have to make so many mechanical changes. By changing the viscosity of the fluid, they can make the torque converter lock up sooner or let it release at a different time.”

Klotz has “a full line of hypoid gear oils,” Mileti said, “with a formulation designed

to be very shear stable and with robust corrosion inhibitors, all designed to protect the gearsets.” As an addition to that segment, Klotz developed a Limited Slip Axle Booster that is “an extremely advanced high-end friction modifier, which reduces friction for better power transfer, and it will lower operating temperatures.” The booster, Mileti added, “doesn’t have to be used with Klotz gear oil. It can be used with any incumbent oil to provide an extremely advanced friction modifier.”

TriboDyn has formulated a new break-in oil that Wheatley was handing out at the PRI Show. “You don’t want to use our TriboDyn Tri-Ex or Tri-Ex2 as a break-in oil,” he advised. “They have chemistry that won’t break in the engine. It’s too slippery.” Instead, the new TriboDyn break-in oil is an exclusive formulation with 2,200 ppm of zinc, plus high-sulfated ash, phosphorous, and sulfur to provide critical protection to high-performance engines during the engine’s break-in period.

TriboDyn has also taken its grease blending in-house, and new product labels will mark the change-over. The company will offer four different grease products: a base

“TRADITIONAL LUBRICATION PROBLEMS SUCH AS BEARING WEAR, EXCESSIVE SOOT, AND POOR LOW TEMPERATURE OPERABILITY ARE NO LONGER SIGNIFICANT ISSUES WITH MODERN DIESEL ENGINES.”

grease with 5% moly, called TriboDyn Moly 5% Multi-Purpose Grease; and TriboDyn’s patented greases, a good-better-best offering of Tri-All multi-purpose grease, Tri-Max high-temp extreme grease, and Tri-Ex2 extreme pressure high-temp grease.

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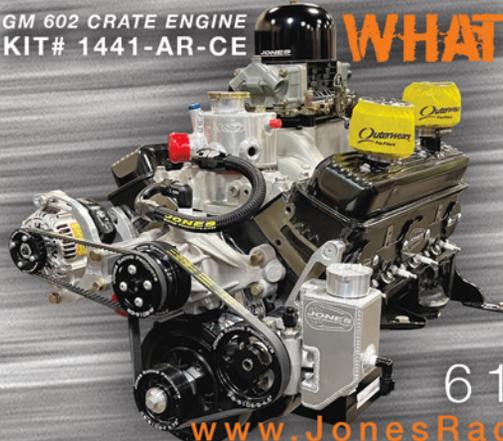
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This purpose-built gearbox came out of a buggy that College of Engineering students at Utah State University built for the Baja SAE competition. They used TriboDyn oil in the box—and were very happy with the box's performance and lack of wear, said Mark Wheatley.

The latter three represent “three different levels of extreme pressure, high-temperature patented technology, with the same coating technology in the grease as our oil product,” said TriboDyn’s Rick Pelfrey.

“We went with three levels of grease because it’s expensive to put the additives in there, and some of our customers may not need to go all the way to Tri-Ex2, which has a four-ball test over 1,000-plus kilograms. We have customers trying all three right now and finding they may be okay with the middle grade, the Tri-Max, and will go with that for their applications.”

WHAT THE FUTURE HOLDS

The use of lubrication products with renewable components is only going to grow, according to Evolve’s Lee, due to what he sees as “a convergence of public policy, public opinion, and consumer demand, interest in, and acceptance of renewable products. We have the talent to do just about anything, and we’re small enough to do that. We are already making renewable gear oil

and renewable transmission fluids. They’re not available to the general public, but we are testing with the US military in non-tactical vehicles.”

Lee’s plans aren’t limited to lubrication products. “We have the technology to make renewable fuel, jet fuel, and gasoline as well. It’s already part of our IP. We can take our feed stock and split it in two directions to make finished lubricants or fuel with our technology,” he added.

“THE NEXT 10 YEARS WILL BRING UNPRECEDENTED CHANGE TO THE LUBRICANT INDUSTRY.”

At Hot Shot’s Secret, Steinmetz foresees the company doing even more with its nanocarbon technology. “We’re looking at other sources of them, how they interact with newer oils, and how we can use them more efficiently.” By efficient, he means “better reductions in friction and wear, and also the treatment of the oil. Can we put lower amounts of additive in the oil and still get the same results? As base oils improve, we may not need as much additive. That’s something that’s continuously changing.”

Tolerances are “getting smaller in every engine,” Steinmetz added, “and as they do, there are opportunities for lubricants to step up to the plate and meet those challenges, whether that’s a better base oil, a better additive pack, or things we can add for wear resistance.”

Looking at the lubrication industry in general, Klotz’s Mileti said the next five years “will bring both logistical and technological changes to the engine oil market.” The logistical changes have already started, as “oil manufacturers are quickly restructuring their supply chains to deal with inflation, component shortages, shipping challenges, and rising geopolitical tensions.”

The technical changes, he said, “may be even more dramatic. Engine oil is increasingly being used as a hydraulic fluid, as in hydraulically actuated camshaft phasers, for example. Hydraulic fluids must be incompressible to function properly, so oil formulations will become optimized to prevent aeration.”

Other technical challenges will present themselves with “the increasing market share of electric passenger vehicles, along with a growing number of electric racing series,” Mileti said. “That will force oil marketers to redirect their formulating expertise to other lubricants in the vehicle, which could lead to drastic improvements in the performance of driveline lubricants, wheel bearing greases, and shock fluids.”

Mileti also said the trend to longer drain intervals will likely lead to “the adoption of oil condition monitoring technology in the transportation sector.” Already in use in industrial applications, these monitors “can measure basic oil parameters such as temperature, pressure, acidity, viscosity increase, wear metal content, and water dilution. In theory, oil condition monitoring will eliminate the need for scheduled oil drain intervals. The oil will only need to be changed when the sensor identifies a significant degradation in performance.”

Currently, these monitors are very expensive, but prices are dropping, Mileti said. “These lower costs, combined with the growing data transmission capabilities of cellular networks, have made the technology more feasible for transportation markets.



Evolve Lubricants has formulated pure high-performance hydrocarbon molecules from plants and is using the non-petroleum technology to make engine oils and other lubricants. In testing with Porsche AG, the use of Evolve oil in a 3.0-liter turbocharged engine saw a net gain of about 8 horsepower, which “has to be the cheapest high-performance bolt-on in history,” said Rick Lee.

In my opinion, it’s just a matter of time before it finds its way into professional motorsports—if it has not already done so. This technology would be another tool that crew chiefs and race engineers can use to monitor the health and performance of engines and driveline components during testing or competition.” **PRI**

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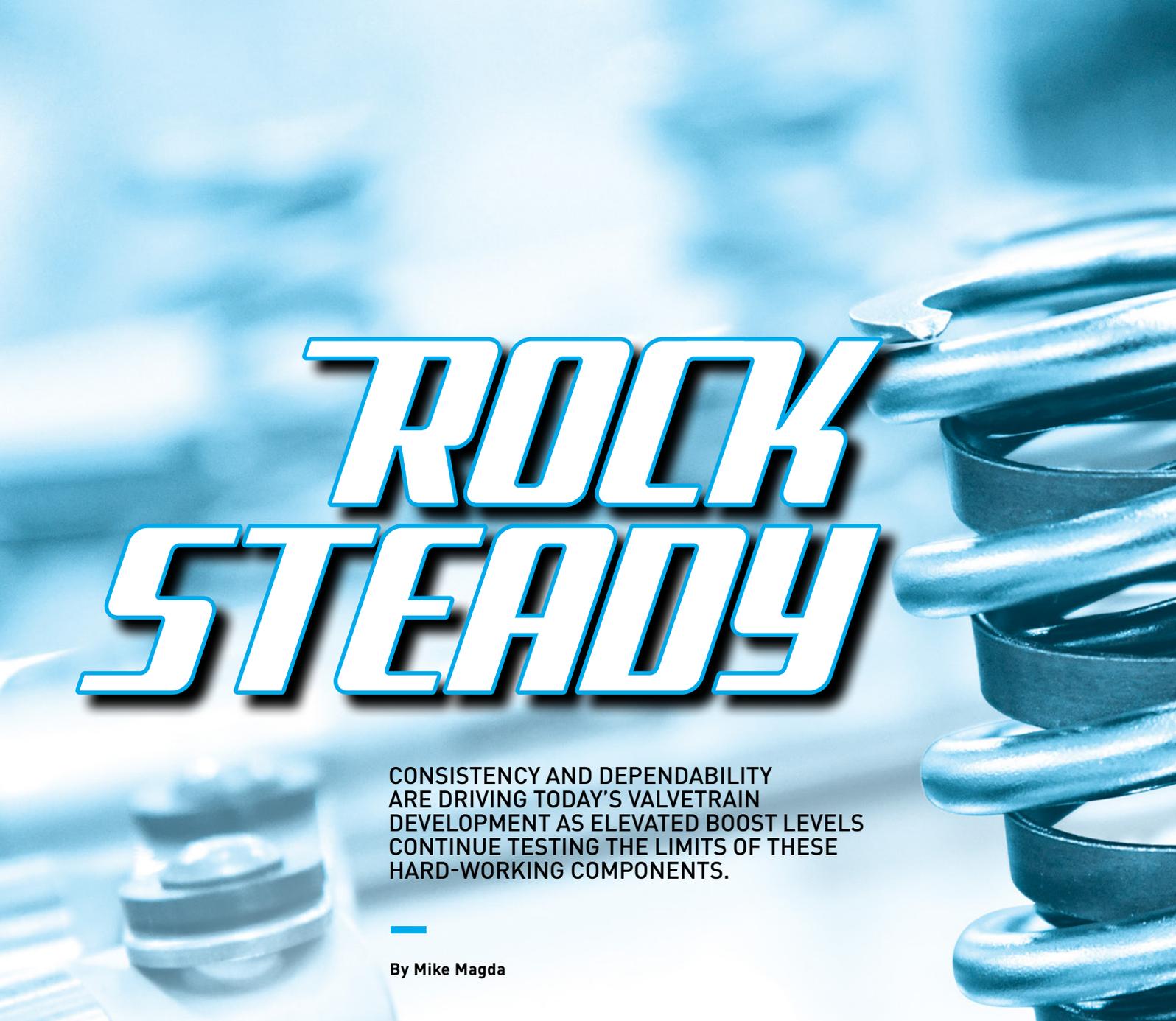
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—
By Mike Magda

Turbos, superchargers, and copious amounts of nitrous have been creating chaos within the pushrod engine's valvetrain for a couple of decades now—especially at the drag strip, where outlaw and small-tire classes have mushroomed in popularity under promoters who have written generous engine rules with few limits on boost.

Manufacturers of valvetrain components are rapidly diagnosing those problems with a great deal of success and responding with improved parts that not only survive in these high-stress environments but support engine builders who promote these high-boost strategies.

For example, the custom shop at Jesel in Lakewood, New Jersey, had a drag racing customer running a spread-port-style cylinder head on a big block Chevrolet with a pair of turbochargers.

“He wanted to improve the valvetrain stability. He was running a typical spread-port rocker system that consists of individual intake stands with aluminum rockers and individual exhaust stands with steel rockers,” explained Rob Remesi.

Jesel engineers determined that the top of the heads could be milled flat, then they designed a new one-piece rocker stand with additional mounting points that increased the overall clamping force on the stand.

“Along with the new stand, we re-engineered and optimized the valvetrain geometry by rotating the rockers slightly to take out some of the offset typically needed with the spread-port intakes,” added Remesi. “We anticipate this new setup will greatly enhance high-rpm valvetrain performance.”

This manner of problem solving and performance



upgrades for boosted engines has been in play for some time.

“Many years ago, NHRA Top Fuel and Funny Car ran 11/32-inch exhaust valves for years until they simply couldn’t any longer under the demands of these nitromethane beasts,” recalled Trip Manley of Manley Performance, Lakewood, New Jersey. “Then we came out with a purpose-built, 3/8-inch stem Inconel exhaust valve that has since set the gold standard for years.”

Finding new materials, especially from within the aerospace industry, has benefited racers and manufacturers.

“Everything we’re doing right now is to get a material that can not only take the heat that these engines are putting out, especially turbo motors,”

explained Ed Doyle of CHE Precision in Newbury Park, California, a manufacturer of valve seats, guides, retainers, and more. “But also making them not so much hard as tough. There’s a big difference. Everybody gets toughness and hardness misconstrued.”

EXHAUST SIDE

In sampling a wide range of valvetrain manufacturers about developing parts for high-powered engines, the exhaust side seemed to draw the most attention. With high boost, cylinder pressures are enormous, and opening the exhaust valve can be a tense operation—and it starts with the camshaft.

“With heavy boost or heavy nitrous, you can’t just



Because of the high cylinder pressures in boosted engines, many engine builders are switching from aluminum to steel rockers, as they “contribute to the biggest gains in valvetrain stiffness,” said a source.

smack that exhaust valve open,” said Lance Stillwell of Erson Cams, Louisville, Kentucky. “Really, you need less acceleration on the cam lobe. You want to creep it open to start letting the pressure out. That relieves the pressure on the rocker arm and the rest of the valvetrain.”

“The real valve event we are concerned about, the one that is impacted the most, is exhaust valve open (EVO),” concurred Chris Potter of Edelbrock, Olive Branch, Mississippi. “The worst offenders are nitrous and rev limiters. For the nitrous cars, especially closer to peak torque, they will run very little timing, which means max burn occurs that much further ATDC (after top dead center). They are usually softening the timing to keep that cylinder pressure from lifting head gaskets and/or trying to keep the rotating assembly alive. Softening the timing around peak torque is a way of reducing cylinder pressure to keep these parts alive.”

“It’s extreme applications like this where we can see the need for a 9/16-inch pushrod,” continued Potter. “It doesn’t necessarily have to do with spring pressure but trying to keep system stiffness at peak lifter acceleration as the camshaft opens the valve and begins to normalize the pressure in the chamber.”

In the early days of hot rodding, engine builders assumed that reducing the weight of all valvetrain components would benefit the engine and increase rpm. However, as valve lifts and spring pressures increased, the pushrods were flexing enough to dramatically disrupt valve events and introduce unwanted harmonics. In fact, when some engine builders installed larger and stronger pushrods, they had to completely

rethink their camshaft strategy because so much flex was taken out, and the reality of the cam design was exposed.

“We continue to see larger cubic-inch engines move to bigger diameter and heavier wall pushrods to help reduce deflection in the system,” said Mike Panetta of Race Winning Brands, which is the parent company for pushrod manufacturer Trend Performance in Warren, Michigan.

“Flex will always equate to a change in duration and overall lift. Flex is inevitable, therefore measuring it can be very important in a combination where you’re trying to get every ounce of power you can,” added Luke Brandt of Howards Cams, Oshkosh, Wisconsin. “You might find that the cam may need to be slightly bigger just to compensate for the flex. In a nutshell, flex is generally unwanted, but it’s more important to control it over trying to irradicate it completely.”

There are also schools of thought that



When some engine builders installed larger and stronger pushrods to compensate for flex under higher spring pressure and taller valve lift, they found they had to completely rethink their camshaft strategy because so much flex was taken out, said a source.

not only accept a little pushrod flex in the valvetrain but use it to an advantage.

“Unknowing flex is different than unwanted flex,” said Derek Dahl of Victory 1 Performance, Mooresville, North Carolina. “Sometimes, for longevity, a small amount of bend is needed. Beefed-up one-piece rocker stands, improved materials for stiffness in the entire valvetrain all add up hopefully to a recipe of success.”

Under the pushrod, the lifter has also gained weight and increased in size over the years to provide extra strength to the bottom side of the valvetrain.

“We advise the customer to go to the larger lifter-bore diameter. When you go from an .842-inch diameter lifter to a .937 in the same engine, you go from a .750 wheel to an .850 wheel,” said Guy Aguayo of Crower, San Diego, California. “We have a very strong American-made lifter to begin with, but going to the bigger lifter bore makes the body larger and gives you a larger pin and wheel for added strength.”

In the lifter market, bushings on the wheel axle are replacing needle bearings in many high-stress applications that use solid lifters.

“At any one time in the needle version, you’re running on three of the needles, at most,” explained Nolan Jamora of Isky Racing Cams, Gardena, California. “If you’re running a bushing lifter, you are running on the oil band, which you get about 300–400% more pressure load-bearing capability and it’s spread over a wider area.”

Jamora said many needle failures start with a crack in the outer race. “That’s because going up the ramp the race is vibrating up and down or going in and out and getting oval-shaped. The main pin will slide between the needles’ contact with the outer race and crack it.” He noted that Isky has offered a bushing style lifter for 15 years and is now on its seventh generation.

Perhaps no component in the valvetrain has received more improvements and design changes over the past couple decades than the valve spring. New materials and manufacturing tricks—along with new designs like beehive and conical—have given engine builders more options in helping stabilize the valvetrain by reducing valve float and other unwanted valve action.

Valve springs have also become much heavier in terms of load on the seat and “on the nose,” or at maximum lift. Springs can be rated at 400–500 pounds on the seat and well over 1,000 pounds at open load. They’ve also grown in size as total valve lifts are more than 1.2-inch in Pro Stock and other similar classes.

The formulas for selecting valve springs are different for boosted and nitrous engines compared to naturally aspirated. “It depends on the installed heights because we want to be in the coil-bind range,” said Jamora. “The sweet spot is .070-inch for most, or .060 to .070. Of course, we have racers that will be within .020 or .030 but, I mean, everything is going to go to coil bind. I was explaining to an engine builder, the spring just doesn’t stop at that line. It goes way past so that every spring is coil binding. What you’re setting at the coil bind is just basically the limit of where it’ll bounce off each other and not crack.”



“Boosted engine combos don’t need large valve lift,” said Luke Brandt of Howards Cams. “This has made it easier to get combinations to live, and in some situations, requires far less spring pressure.”

INTAKE SIDE

The amount of boost an engine builder is planning also plays a key role in determining the valve spring package, especially on the intake side.

“With real high-boost pressures, the backside of the intake valve is really important because that’s under a constant static pressure, no matter what. So it diminishes with the seat pressure but not a lot,” said Jamora. “What we’re trying to decide is, how much does it drop or diminish under that pressure? A typical valve diameter is around two inches. That’s about three square inches of area on the back side of the valve. If you have a spring that’s 300-pound seat pressure, a good rule of thumb is to deduct 10 pounds per square inch, which will be 30 pounds at maximum load. So that means that even though you put the spring in at 300 pounds seat pressure, it’s really only 270 because of that back pressure on the inlet valve.”

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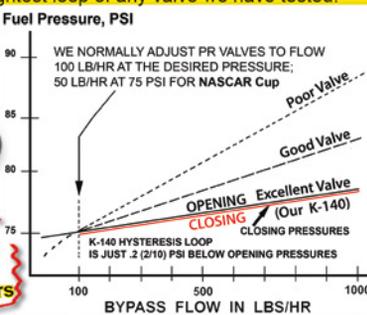
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“SOFTENING THE TIMING AROUND PEAK TORQUE IS A WAY OF REDUCING CYLINDER PRESSURE TO KEEP THESE PARTS ALIVE.”

Not only can boost slightly unseat the intake valve, it makes it more difficult to close the intake valve. “A lot of guys with diesel engines, they may not have a lot of spring on the seat but they’re running these huge turbos and 90 pounds of boost,” warned Stillwell. “So it’s hard to get the valves shut. When you’re bouncing valves, you’re bending valves.”

“Added boost can also absolutely require more spring seat pressure on the intake side in order to keep the valve controlled and closed,” added Manley. “To that end, we built some better springs for the domestic late-model markets knowing these customers would be adding turbos and superchargers.”

PACKAGE DEAL

Still, much of the concern when designing a valvetrain package is focused on the exhaust side, again because of the increased cylinder pressure. An unlikely culprit could be traction control. One method

of reducing wheel spin is pulling timing to reduce cylinder pressure, as opposed to closing the throttle.

“Late timing is like creating work or power and not taking advantage of it,” explained Potter. “Obviously, we can’t take advantage of that power, otherwise we wouldn’t need the traction control. Either way, the delayed timing creates a later burn that EVO must fight. In these cases, not only is EVO fighting opening, but in some cases, it also must fight a significant buildup of pressure in the exhaust, such as a backfire when unburnt fuel ignites. This is where a two-step rev limiter will make many valvetrain designers cringe. That explosion outside of the combustion chamber can force the exhaust valve open, creating separation between the valve, rocker, pushrod, lifter, and cam lobe. The crash when these come back together can be incredibly detrimental. We’ve definitely had to step up and design components that can handle this abuse.”

Because of the high cylinder pressures in boosted engines, many builders have already switched from aluminum to steel rockers on the exhaust side—and some use steel across the board. Again, valve size is critical to overcoming those pressures.

“Steel rocker arms obviously contribute to the biggest gains in valvetrain stiffness,” observed Remesi. “If you have a turbo engine that develops 1,500 psi of cylinder pressure and you are using a 1.800-inch diameter exhaust valve with a surface area of 2.54 sq./in., it would take about 3,800 pounds of force to start to open the exhaust valve. That is why steel rockers are so important on the exhaust side of turbo/nitrous builds. Our Pro Steel BBC 1.650-inch pivot rocker is approximately 20% stiffer than its Pro Aluminum solid-body equivalent.”

Increased spring pressures compel other equipment manufacturers to respond by improving their products, such as spring retainers and rocker-arm trunnions.

“We’ve made everything a little bit beefier, still trying to keep the weight the same, which is next to impossible. With minimal weight change, we’ve tried to make everything stronger. Our trunnions are proprietary material specifically for the LS,” said Doyle, adding that little race tricks



Turbocharged engines making large amounts of boost generate so much cylinder pressure that it could take thousands of pounds of force to open the exhaust valve. “That is why steel rockers are so important on the exhaust side of turbo/nitrous builds,” said Jesel’s Rob Remesi.

like 55-degree valve-seat angles can wreak havoc on valve seats. “We’ve especially worked on materials. When you start increasing valve angles, the unit pressure goes through the moon. Take your 1,000-pound over-the-nose spring and bounce on a 55-degree angle, and the unit pressure is astronomical. So, we worked on materials that could handle that kind of abuse.”

LOOKING AHEAD

Looking to the future, valvetrain manufacturers will be watching for problems and reassessing component strategy for the different racing disciplines.

“Honestly, it depends on the market. There really isn’t a one-shoe-fits-all answer for this question,” said Manley. “For instance, I would say that the domestic late-model market has seen high demand for twin turbos as a way to achieve big power. On the other hand, there are plenty of classes, from Pro Stock to dirt late model, that do not allow power adders. Engine builders putting together naturally aspirated motors must figure out creative ways to eke out more power without the benefits of a turbo, blower, or nitrous kit.”

“To state it plainly, turn up the boost,” said Brandt. “Combinations these days are going ridiculously faster with half of the cam. Rpm always makes power, but when you’re confined to a budget, like most guys are, making power to the point that rpm falls just



The formulas for selecting valve springs are different for boosted and nitrous engines compared to those that are naturally aspirated. “It depends on the installed heights because we want to be in the coil-bind range,” said Isky Racing Cams’ Nolan Jamora.

above peak torque on the shift is really all you need. Boosted combos don't need large valve lift. It's not uncommon to see very fast, boosted combinations running low .600 or less lift, and durations in the high 220s to low 240s at .050-inch lift. This has made it easier to get combinations to live, and in some situations, requires far less spring pressure."

One trend that is welcomed in the boost industry is that engines are being purpose-built from the ground up with turbos, nitrous, or superchargers in mind.

"Recently the term 'power adder' is used less and less as people are realizing it's difficult to add power to a combination and get the performance they need with the parts they have," said Dahl. "What most builders have now is a stable base that is consistent and trackable. If they start from the same point every time, it's easier to pinpoint the problems and find solutions. Every part has its frequency, and the difference between motor

carnage and winning is how far you're allowing the part to move versus how far it needs to move."

"We want horsepower," concluded Potter. "The easiest way to get us there will win." **PRI**

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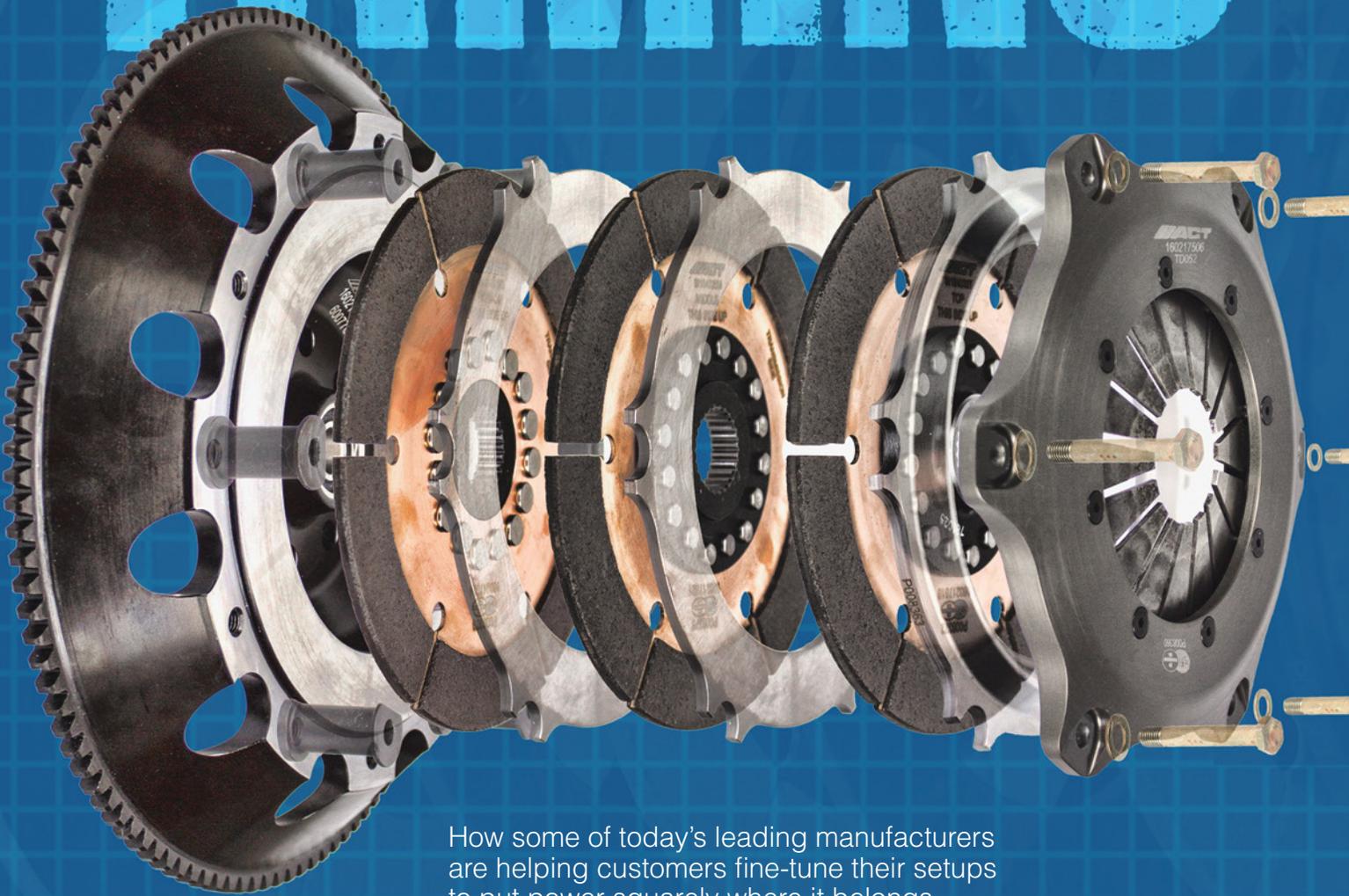
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TAMMING



How some of today's leading manufacturers are helping customers fine-tune their setups to put power squarely where it belongs.

By Jim Donnelly

| Photo courtesy of Advanced Clutch Technology

TORQUE

Regardless of the type of car, amount of horsepower, track surface, ambient conditions, or driver habits, the fundamental physics equation for any race car involves getting its engine's power securely to the track. Given the reality that a race car's driveline consists of major components, attempting to fine-tune the driveline in the work area at a speedway can involve swapping out those major mechanical systems. But procedures do exist that are less dramatic and more easily accomplished in the limited time available between racing events.

Among the performance racing companies that specialize in providing this sort of driveline solution is McLeod Racing in Anaheim, California, best known for its lines of specialty performance and racing clutches and flywheels. Will Baty observed, "It's not an easy change, and depending on whether it's a long track or a short track, that in turn determines what changes they might want to make to the vehicle so it's performing at its top level, and making sure the engine's in its torque band at all times."

It's important to draw the distinction here between horsepower and torque because while horsepower is the better-known measure of output, torque is what actually moves the car. Baty explained that in addition to clutch selection, picking the proper flywheel weight is crucial. "The same thing happens on an autocross, or a road course, as in drag racing," he said. "We sometimes want to kill that initial shock, so the guy isn't putting so much power to the ground. You can put in an ultra-lightweight clutch and

flywheel so that when you're coming into the turn, it's great once it's moving and it also gives you optimum compression braking once you let off the throttle, so you're not using the brakes as much.

"You can make the change at the race track, but you're talking about pulling the transmission down and such," Baty continued. "Some vehicles are equipped to do that. Some guys can do it in a few hours, but in between runs, that's going to be hard to do. Same thing with the converter, it's not an easy task. There are great things to do, depending on the event, but you prep prior. The most important thing is knowing how the car is going to react, knowing the weight and suspension. If you are going to be running at the top of the rpm spectrum on a road course, the tuning is going to be different."

Advanced Clutch Technology in Lancaster, California, offers a wide range of clutches, clutch components, and flywheels that can be selected to address particular launch or traction issues. Christopher Bernal noted, "A lot of the design and development work that goes into ACT products really tries to minimize the amount of changing configurations that one would have to do once you have it configured correctly for the type of racing, the type of vehicle, the torque of the engine, and that sort of thing. One of our goals is to reduce the competitor's cost and confusion, or the number of configurations they have to build."

In drag racing, ACT works with customers



When racers have questions about their driveline components, it's best to call the parts manufacturers, said Will Baty of McLeod Racing. "We're going to recommend our best product and dial you in once we know everything about that vehicle and how it behaves."



Here, Formula Drift competitor Matt Field installs an Advanced Clutch Technology clutch. "A lot of the design and development work that goes into our products tries to minimize the amount of changing configurations one would have to do once you have it configured correctly for the type of racing, the type of vehicle, and that sort of thing," said ACT's Christopher Bernal.

to develop adjustments or different versions of the traditional diaphragm clutch, where rules permit, depending on the amount of rubber laid down on the drag strip and the amount of prep the track operator does. "It can really change for small-displacement guys who risk bogging at the line if there's too much clutch grab. There are some things we can do to allow for some trackside adjustment because you really have to get that launch nailed."

Some drag racing teams, for example, will use clutch delay valves where it's legal, or vary the size and capacity of the clutch master cylinder, Bernal said. "It's really particularly difficult to get a small-displacement, high-rpm engine to launch consistently. We can tune some things or allow for a setup that can be tuned after working closely with the team."

Bernal said the "magic" found from this clutch manufacturer comes from building its own diaphragm springs in-house. "It's like building and tuning engines and using somebody else's camshaft," he explained. "If you're using your own camshaft grind, you can really get into the nitty gritty and make changes that work. That's pretty much what the diaphragm spring is to us. We do approach flywheel weight with a little bit of variability. For our high-performance street guys, we have what we call our Streetlite

flywheel, which is lighter than stock but not ridiculously light, very drivable. And then when we get to the track, we direct people to our Prolite flywheels, which are much lighter, one-piece forgings that are very safe and certified. We'll tune the flywheel for the engine and the use as well. Inertia is something that we'll work with to make sure the vehicle's working properly."

Total Transmissions Chicago of Bellwood, Illinois, produces and sells remanufactured torque converters for both street and strip applications. Justin Carlisle said the short turnaround between rounds in drag racing means that swapping out a converter at the track is impractical. "Most racers don't do that at the track because you've got to put the car in the air, take the transmission out, and most of them don't keep a spare torque converter in the trailer," he explained. "We're primarily street-strip cars and daily drivers. The torque converter determines when the

“WHETHER IT BE ON THE DIRT, THE STREET, ASPHALT, HOWEVER YOU WANT TO DO IT, YOU REALLY NEED TO KNOW THAT VEHICLE AND ITS POWER CURVE.”

vehicle is going to start moving. I had a guy who was working on an SRT-8 Jeep. We went into his converter I think four times, because each time he took it to the track, he wanted a little bit better response out of it, so it's playing with the stall speed of the converter as to where it's actually going to launch the vehicle. That's about the most that we can help him with, like a case where it's stalling at 3,000 rpm and I'd like to get it a little closer to 3,200. We can take it out, tighten the stall up a little bit, do a little machine work on the converter, to see if it helps them.”

EASY SWAP-OUTS

Cars with more basic drivelines can present more simplified tuning solutions. Winged sprint cars on dirt don't use a conventional powertrain since their engines are linked directly to the rearend via an in-and-out coupling. Dave Ely of Diversified



Dynamic Drivelines manufactures carbon fiber driveshafts with varying levels of twist rigidity that can be swapped to compensate for changing track conditions. “We have four different winds to them, so if the track is really slick, you can put the softer-twist one in, and that will help the car's traction,” said Mike Bennett.

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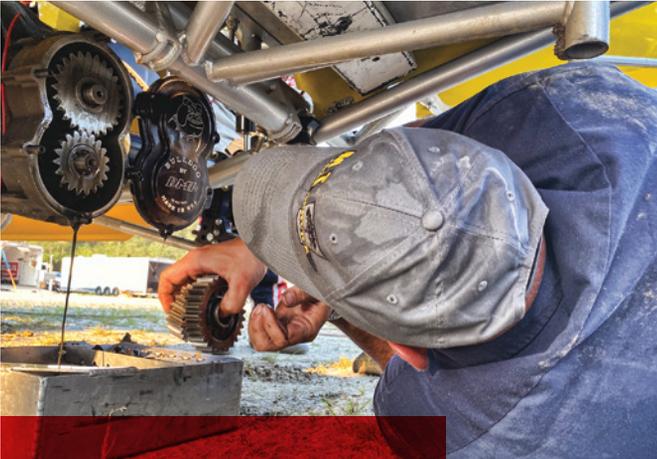
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The simplest tuning at an oval track involves switching the gears in a quick-change rearend, said Dave Ely of Diversified Machine. As track conditions change, the gears in a DMI Bulldog rearend can be swapped in as little as a minute-and-a-half to two minutes, he said.

Machine, which manufactures Bulldog Quick Change Rears in Lancaster, Pennsylvania, is a winning sprint car driver himself, and he said the simplest tuning at an oval track involves switching out the gears in one of his company's rears.

"Your track conditions, along with the size of the race track, are what determine the final drive ratio that's required," Ely explained. "A wetter, heavier race track that would have more grip to it is going to require more gear because otherwise, the car's going to get bogged down. A dry, slick race track is going to require less gear in most cases, because you don't want to spin the tires. There are some cases of guys on a dry, slick track who will actually plug more gear into it, and actually use the extra gear as a Jake Brake, which helps slow them down when they enter the corner."

Once a racer chooses a driving style, adjustment is a matter of following changing track conditions and adjusting accordingly, Ely added. "You simply lie down under the car, take the six rearend cover bolts off, take off the cover, slide the rearend gears out, install the new set of gears, put the cover back on, tighten the nuts, top off with fluid, and go back on the race track," he explained. "It's not uncommon where the

series officials use an eight-minute horn, or a four-minute horn. The gear ratio is one of those things that let you wait till the last possible moment to make that decision. You can change gears in a minute and a half to two minutes."

Driveline tuning can involve internal components such as these, but other solutions can involve feasible swap-outs, especially a comparatively straightforward single component such as the driveshaft. That's where Dynamic Drivelines of Des Moines, Iowa, comes in. The firm specializes in shafts for racing, off-roading, and even commercial vehicles. Mike Bennett explained that Dynamic Drivelines manufactures driveshafts with varying levels of twist rigidity that can be swapped to compensate for changing track conditions.

"The biggest thing to do is with our carbon fiber shafts. We have four different winds to them so there's a swift one all the way down to a soft one that twists, so if the track is really slick, you can put the softer-twist one in, and that will help the car's traction,"

Bennett described. "You can adjust on them for different track conditions. A lot of the guys down South will run the twist shaft more than up here in the Midwest, because just as the track gets slicker, you can put the twist shaft in to help absorb some of it. They use different steps when they wind the shafts so the shaft will actually twist, up to 45 degrees. You can actually see the shaft twist in the tester. Our stiff ones, they don't move at all. We do a lot of it with our drag race stuff. At the drag strip, you can do the twist shaft if the track is not treated, and then where there's a lot of traction in the track, you don't need the driveshaft to help absorb the shock. If it's real sticky or heavy, you don't need it, but as it goes slicker, you can put twist into the shaft to compensate."

TEST AND TUNE

Not every solution will be operative during a race meet because of the quick turnaround time between events. In such cases, Baty from McLeod recommends turning the event from a race into a test session and to get disciplined about collecting data. "It's just like our leader, Paul Lee, who was a Funny Car drag racer, said: You've got to take notes. You've got to take track temperature and everything else so you know that you can get the power to the ground," Baty stressed. "Whether it be on the dirt, the street, asphalt, however you want to do it, you really need to know that vehicle and its power curve. More than anything else, you need to know the torque curve, how it produces that power. The feeling of getting shoved into the seat isn't horsepower, it's

"YOUR TRACK CONDITIONS, ALONG WITH THE SIZE OF THE RACE TRACK, ARE WHAT DETERMINE THE FINAL DRIVE RATIO THAT'S REQUIRED."

“ONE OF OUR GOALS IS TO REDUCE THE COMPETITOR’S COST AND CONFUSION, OR THE NUMBER OF CONFIGURATIONS THEY HAVE TO BUILD.”

torque. So when you’re changing gear ratios at the rearend, or in the transmission, you’re changing the mechanical advantage of that vehicle over the weight and the horsepower that it develops.

“In a driveline sense, it’s a test session to see how the car reacts,” continued Baty, urging racers to start testing at the track if they can’t swap components. “When we’re talking about overall performance, you’re trying to get as much power to the ground as possible without breaking traction. There are things you can learn from other racers that have a similar vehicle. That’s where you get that knowledge, something that they’ve actually already experienced. The most important thing we tell people is when you don’t know, call the manufacturer. We like to know the overall intended use for this vehicle, and we’re going to recommend our best product and dial you in once we know everything about that vehicle and how it behaves.” **PRI**

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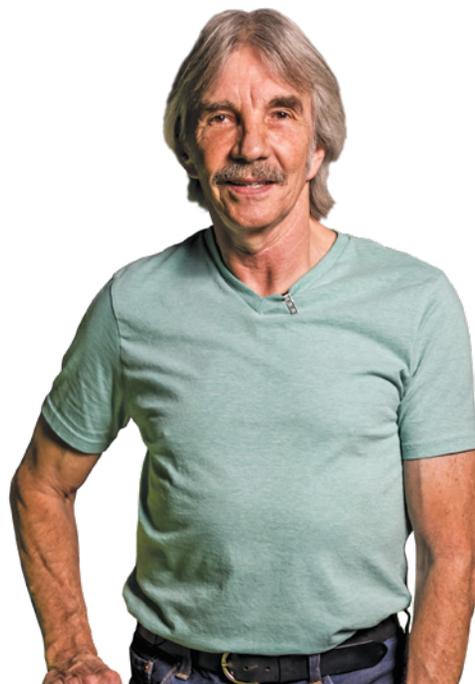
By Jim Donnelly

It's a given in the world of high performance, especially as it involves good old, American overhead-valve internal combustion: Going fast, whether in a straight line or around corners, requires a specialty oil pan designed from the drawing board for maximum efficiency under severe-service loads. That's still the essential stock in trade at Milodon of Simi Valley, California, a pioneer in the world of lubrication for extreme-performance engines for more than 65 years.

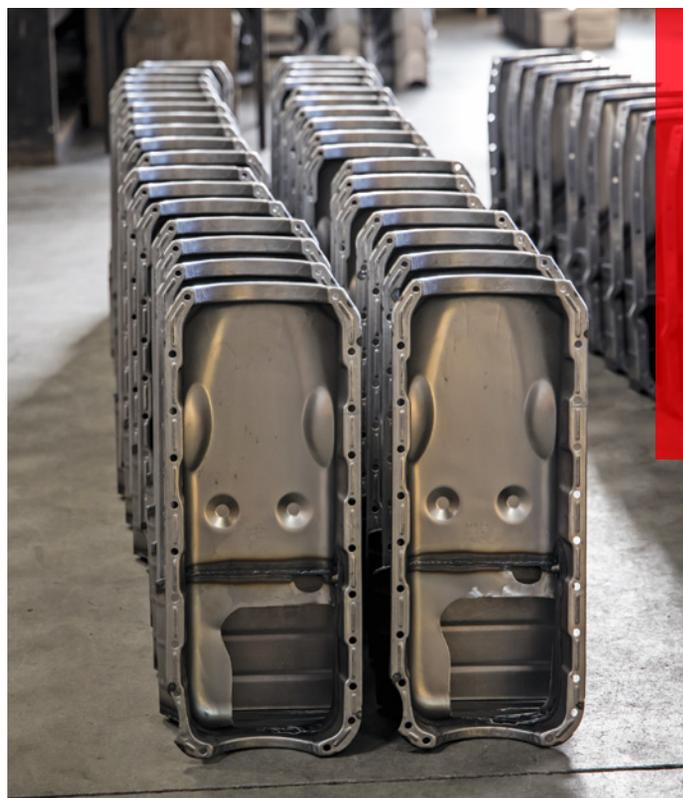
Milodon, and its famous oil pans, have been the industry standard across drag

racing, street performance, and other American motorsports disciplines since Milo Franklin and Don Alderson founded the firm in 1957. And for the record, it's pronounced “MY-lo-don,” an amalgam of the founders' given names.

Milodon first thundered to prominence when the Dead End Kids, a pioneering East Coast drag outfit, moved west and began campaigning in the Top Fuel wars of California with Milodon engineering help, which initially produced the company's first lightweight Hemi engine block for drag applications. Famed for its bottom-end



“The traditional V8 is the bulk of what we do,” said Milodon's Steve Morrison. He feels the company's “golden years” were the 1950s–1970s, but the current resurgence of American muscle cars “has rejuvenated us.”



While Milodon's product lineup encompasses fasteners, valves, gear sets, and engine-assembly tools, the core of its catalog is oiling equipment, including some 150 precision-designed oil pans for nearly every North American engine application.

durability, the Milodon block was employed from Top Fuel to tractor pulling.

The firm then built an aluminum small block Chevrolet block that became hugely popular in sprint car racing and eventually was raced successfully in the Indianapolis 500. Milodon has since kept its focus on hardcore parts for serious performance engines, its current product lineup encompassing fasteners, valves, gear sets, chains for timing, and engine-assembly tools. But the core of its catalog is oiling equipment, starting with some 150 precision-designed oil pans for nearly every North American engine application, plus windage trays and pumps. About a third of Milodon's workforce has been onboard since the founders were still in charge, including current owner Steve Morrison, who said Milodon's pans should be standard equipment for anyone planning to go seriously fast in an American-engine car.

“We have been manufacturing oil pans since 1963,” Morrison said. “We focus ourselves on American domestic V8 applications, not sport compact. It's just the



“OF ALL THE CRATE MOTORS THAT ARE SOLD, 100% OF THEM WILL NEED AN AFTERMARKET OIL PAN TO GO INTO WHATEVER CHASSIS THE GUY WANTS TO PUT IT INTO.”

traditional V8 that's the bulk of what we do.

“It's been kind of a renewing marketplace for us. You get so many crate motors right now from General Motors, Chrysler, and Ford. People out there keep building 1955 Chevys. It may not use the original body, but it's got a tube chassis with fiberglass parts and a brand-new crate motor, so the longevity is there, the drive, that we've always experienced. The golden years for us were in the 1950s and 1960s, I guess, and the 1970s, when all these muscle cars filled the streets.”

MARKET RESURGENCE

Milodon's current lineup of oil pans falls into three broad categories, for drag racing, circle track, and off-road. Despite Morrison's musings about the good old days of early drag racing, Milodon's current market is vibrant, due in large part to the plethora of crate engines now being sold across the parts counter by every major domestic automaker. “We're moving forward, which is where we're at right now with the Camaros and the Challengers and the Mustangs,” Morrison said. “It's sort of rejuvenated us. Of all the crate motors that are sold, 100% of them will need an aftermarket oil pan to go into whatever chassis the guy wants to put it into. We do this by the dozens every day. The government keeps trying to fight us, but hot rodders always seem to find a way. Business is good for us.”

The global pandemic turned out to be something of a boon for Milodon, at least in terms of sales while most of the planet was in lockdown. “All the performance issues just went crazy on the business end with the COVID-19 issue,” Morrison recalled. “Everybody got to stay home, UPS was still delivering, so hey, let's get some components and go work on the car. It was

sort of a golden opportunity for us. We were working 10 hours a day, seven days a week, for a long time here. Even today, we all work extra hours, but we're starting to catch up. The supply situation wasn't too bad. It was more extended, and we went out and bought a lot of materials, and pretty much had them stacked to the roof. It took a little longer for them to get here, so we bought more, and when they got here, we were good.”

Milodon, and Morrison, are bullish on 2023 and beyond. “Our sheetmetal, which is a base material for making oil pans, has come down probably 10–15% from where it was pre-COVID,” he explained. “It was up to a 225% increase before then, so I guess this is a light at the end of the tunnel. We get the materials down, but then everybody's raised their prices so much, so what do we do with that? Do we lower the cost? The consumer's seen sticker shock, but between material shortage and container charges, it drove our costs through the roof.”

It's still undetermined, but if inflation continues to drop, Milodon could consider downward price adjustments in the future. Part of that process involves interacting with other business leaders at the PRI Trade Show, which Morrison has been attending since the very first.

“PRI is very grassroots, and the location in Indianapolis is in the heart of racing,” Morrison said. “The vibe is always really good for the PRI Show. You have very serious engine builders coming in, looking for information. It's really beneficial. The Show's all about racing, everybody's excited and looking forward to next year, and finding ways to do it better. When Milodon was founded in 1957, it was just a bunch of guys who started out making components and racing on the weekends. And here we are today, a billion-dollar industry.” **PRI**



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PRI TECH

FUEL INJECTOR SELECTION

Fuel choice, power adder usage, and sizing are just some of the factors to be considered when determining the optimal fuel injectors for a race engine build.

By Anthony Donnarumma

The fuel injector in an electronic fuel injection (EFI) system plays a critical role in the performance and reliability of a modern internal combustion engine. It is the injector that allows EFI systems to attain fuel flow accuracy and efficiency that was previously not accessible with carbureted systems.

The simplest and longest-standing version—the “needle and seat” or EV1-style fuel injector—remains the injector of choice throughout much of the performance drag-racing aftermarket. This is due largely to both its reliability and design simplicity.

“THE VOLUME OF FUEL NEEDED IN THE CYLINDER, WHICH IS RELATIVE TO THE ENGINE’S DISPLACEMENT, IS WHAT DICTATES THE SIZE OF THE FUEL INJECTOR.”

There have been many evolutions of this original Bosch-designed EV1, such as slimmer EV14 or EV6 injectors with disc-style actuation. But because of its ease of construction and reliability, the EV1 remains the



preferred option for drag racing engine builders.

HOW INJECTORS FUNCTION IN AN ELECTRONIC FUELING SYSTEM

At its core, a fuel injector is a simple solenoid valve that is used to meter the amount of fuel that the engine demands at a given moment in time. This valve can be broken down into a few main components for an EV1-style injector:

- An electromagnetic coil
- An armature
- A needle
- A seat
- A housing to hold all these components together

The fuel injector actuates when an electrical signal is given from the vehicle’s ECU. This electrical signal, or current, is passed through the injector’s coil windings. This induces an electromagnetic field that in turn moves the armature. The end of this armature contains the needle that is raised off the seat, thereby allowing

For high-horsepower engines, typically 2,500 hp and up, two fuel injectors should be used per cylinder, said Anthony Donnarumma. The primary injector operates at all times when the engine is running; the secondary turns on when the vehicle’s ECU detects that the primary injector has hit a duty-cycle threshold.

In a multiple injector system, the secondary injector provides the engine with the fuel it needs at peak torque, while the primary injector delivers the precise fuel control needed to maintain good idle characteristics.

fuel to pass by into the intake port.

Knowing the basics of how injectors function, we can begin to understand how to select the right injector for your racing application. Amongst the many factors to consider:

Fuel Choice. The goal of a fuel injector is to maintain an optimal Air to Fuel Ratio (AFR). It is important to know what that specific ratio is for your select fuel. For example, gasoline has a stoichiometric AFR of 14.7: 1, while methanol is 6.5: 1. Thus, the size of the fuel injector that is required for methanol will be much larger than one that’s required for gasoline.

The type of fuel used determines the volume of fuel needed inside the cylinder. The volume of fuel needed in the cylinder, which is relative to the engine’s displacement, is what dictates the size of the fuel injector. Without knowing what fuel you’ll use and its AFR, you can’t properly size your injectors.

Power Adders. What about your selected induction method? For example, most engines across all displacement levels—naturally aspirated or forced induction—will use very little fuel at idle. In these instances, larger injectors are not



"IF YOUR INJECTOR CAN'T PROVIDE THE FUEL THE ENGINE NEEDS AT PEAK TORQUE, THIS CAN CAUSE IT TO RUN LEAN WHEN YOU NEED FUEL THE MOST."

required to keep an optimal AFR range.

However, when any of those same engines are at peak torque, they will consume much more fuel. When you add, say, 50 psi of boost at that peak torque level, you are now changing the theoretical volume of that cylinder. As a result, larger fuel injectors must be used to maintain the optimal AFR needed.

For performance applications, the primary consideration is the fuel flow needed at peak torque, where fuel demand and engine stress is highest. That demanding torque range is the basis you use to determine the requirements of your injector size.

Sizing Considerations. We've already noted that the goal of a properly functioning injector system is to maintain optimal AFR. If we know that adding more air requires more fuel, why not always buy the biggest and best flowing injectors? If it were only that simple....

If you decide to run an oversized injector relative to the engine's fuel requirements, the first thing you sacrifice will be idle quality. This is because injectors have an optimal operation range. An injector that flows enough fuel to support 5,000 horsepower won't also be able to happily idle at 800 rpm.

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This is because injectors function by allowing fuel to flow into the cylinder in specific and controlled intervals. Each of these intervals is determined by a precise electromagnetic pulse. How often these pulses occur is known as the duty cycle. If an injector is at 100% duty cycle, the needle that allows the pass-through of fuel flow never closes. At that point, your injector is no more controlled than a valve on a garden hose.

You never want to max out your injector's duty cycle either; instead, you want to keep them within their optimal dynamic ranges. This tends to be around 50% to 90% duty cycle depending on the application, so it's important to be precise with your selection.

Multiple (Staged) Injectors Systems.

Consider that the flow rate of the injector is determined by two factors: the diameter of the opening orifice and the distance the needle lifts off the seat. When your injector is too large for your fuel requirements, the injector's electromagnetic coil will not be energized long enough to control the correct amount of fuel needed to maintain a proper idle.

"IT'S GENERALLY SAFER TO OVERBUILD YOUR FUELING SYSTEM THAN TO DO THE OPPOSITE."

How do you solve this idle issue when you need a very large injector for your application? In the case of high-horsepower engines, typically 2,500 hp and up, a single fuel injector per cylinder will not suffice; rather, two fuel injectors will be used per cylinder as a primary and secondary injector.

The primary injector, typically the smaller of the two injectors, will operate the entire time the engine is running. The secondary injector turns on when the vehicle's ECU detects that the primary injector has hit a duty cycle threshold. This threshold is determined by the tuner based on the engine's application and size.

A smaller primary injector is used because of its better idle characteristics compared to a larger secondary fuel

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When it comes to performance injectors, it's always better to have more fuel flow than less, so the injection system can maintain the optimal air-fuel ratio.

injector. This way, you can get the fuel you need at peak torque without sacrificing the precise fuel control needed to maintain good idle characteristics.

INCORRECTLY SIZING INJECTORS HAS CONSEQUENCES

When it comes to performance injectors, it's always better to have more fuel flow than less. Remember, the goal of a proper injection system is to maintain optimal AFR. If your injector can't provide the fuel the engine needs at peak torque, this can cause it to run lean when you need fuel the most.

An unbalanced AFR at peak stress levels can lead to a detonation event. That is something you want to avoid at all costs. For that reason, it's generally safer to overbuild your fueling system than to do the opposite.

A good tuner will be able to work out the kinks for your setup and make good power while maintaining proper idle with a bigger injector than needed. However, if the injector is too small and peak torque fuel flow isn't cutting it, they may choose not to tune the engine altogether, knowing the possibility of a critical failure in the system.

Don't make your tuner's life harder than it needs to be. If you don't know what's best for your setup, ask questions.

SYSTEM OPTIMIZATION

Now that you have considered the key factors that go into choosing the right fuel injector for your application, it is just as important to pick the rest of your fuel system components with the same level of research.

Many injector manufacturers will give their customers recommendations on what fuel pump flow and system filtration will be required to match an injector setup. If you are unsure of what size and system is right for your engine build, consult your injector supplier. Every drop of fuel counts! **PRI**

Anthony Donnarumma has eight years of professional experience in the automotive racing industry. He currently works as a Design Engineer and Engine Builder for Moran Motorsports. Prior to this position, he worked for Fiat Chrysler Automobiles in the SRT Motorsports group as an engineer to help develop the 2021 Dodge Challenger Drag Pak. He has a BS in Engineering Design from Western Michigan University.

ADVOCACY CORNER

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

By Laura Pitts

PRI's Washington, DC-based legal and advocacy teams work continuously to protect and support motorsports venues, sanctioning bodies, and businesses around the nation. We are tracking several initiatives this month, including how West Virginia is laying the groundwork for tracks around the nation to reduce risk liability, as well as the introduction of a new Washington, DC-based PAC manager for PRI and SEMA.

WEST VIRGINIA RAISES AWARENESS FOR TRACK RESPONSIBILITY BILL WITH 'MOTORSPORTS DAY AT THE STATE CAPITOL'

Racing operators, promoters, officials, parts manufacturers, and related professionals recently gathered at the West Virginia State Capitol in Charleston, West Virginia, to help educate legislators about the positive impact the industry makes on the local and state economy. Representatives included professionals from the entire spectrum of motorsports—dirt tracks, road

courses, paved ovals, drag racing, and more—along with PRI, SEMA, Summit Point Motorsports Park, and GNCC Motocross.

Organized by the West Virginia Motorsports Committee, this second annual event also highlighted the PRI- and SEMA-supported "Motorsports Responsibility Act" (H.B. 2569/S.B. 236), designed to help racing facility operators and owners by defining areas of responsibility and assumed risks by participants. [Editor's note: H.B. 2569 is currently pending in the House Judiciary Committee while S.B. 236 is in the Senate Judiciary Committee. To contact lawmakers in



State Senator Mark Maynard, a huge supporter of motorsports, is helping to pass the Motorsports Responsibility Act to protect race venues.



Pictured at top row: Tim Cotter (MX Sports), Jeff Johnson (Summit Point Motorsports Park), Tom Deery (PRI), and Edwin Pardue (Summit Point Motorsports Park). At bottom row: WV Senator Ben Queen, WV Senator Mark Maynard, Kiley Chapley (SEMA/PRI), Laura Bowman (WV Motorsports Committee), Jared Frederick (Summit Point Motorsports Park), and Christian Robinson (SEMA/PRI).

support of the Motorsport Responsibility Act, visit <https://p2a.co/S9ILIWt.>]

Passage of this bill would likely reduce liability insurance premiums and allow the venues to invest the savings—such as to promote the venue—increasing tourism volume and, possibly, creating more jobs.

PRI race track ambassador Tom Deery was on hand to share information on PRI's Race Track Promoter Helpline [202-794-8279 and racinghelp@performanceracing.com], which is monitored five days a week and helps provide motorsports facilities and sanctioning bodies with access to relevant legal resources, peer-to-peer discussions, grassroots campaigns, lawyer referrals, and more support.

"PRI is represented at events around the nation, from NASCAR's biggest race in Daytona to short tracks in the Midwest to important legislative gatherings. Yes, PRI is the three biggest days in the motorsports business [set for December 7–9, in

Indianapolis, Indiana], but we're working hard year-round to support all levels of the industry," Deery said. "What's good about the WV Motorsports Day and the Motorsports Responsibility Act is that they provide a template for other state racing groups that might need to introduce similar legislation in their region. If passed, the bill would put motorsports venues in the same vein as ATV, equestrian, snow skiing, whitewater rafting, and related protected recreational venues in the state of West Virginia."

West Virginians can also celebrate the passing of February 24 as the official WV Motorsports Day at the Legislature. The resolution was sponsored by Senator Mark Maynard and, as a result of its passage, will ensure the gathering will continue to elevate motorsports tracks and businesses in the state for years to come.

PRI, SEMA HIRE ALICIA STEGER AS PAC MANAGER

PRI and SEMA have hired Alicia Steger as their Political Action Committee (PAC) manager. Based in the Government and Public Affairs office in Washington, DC, Steger will lead fundraising efforts for both PRI and SEMA during the 2024 election cycle.

Members of PRI and SEMA PACs can contribute personal funds, which are used to help elect lawmakers that support pro-motorsports positions and initiatives. One hundred percent of PRI and SEMA PAC donations are allocated to funding political candidates' campaigns that support PRI, SEMA, and their members.



Alicia Steger

"The 2024 elections will be here before we know. What's on the ballot? EPA overreach, internal combustion engine bans, burdensome noise and zoning ordinances, and so much more. It's essential that PRI and the racing community have a voice in each of these fights—and PRI PAC is our first line of defense," said Christian Robinson, Senior Director, State Government Affairs & SEMA PAC.

For more information, contact Steger at alicias@sema.org. **PRI**



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INDUSTRY NEWS

BUSINESS OWNER/FOUNDER, FORMER BENDPAK VP GARY HENTHORN, 52

Gary Henthorn, the founder of three automotive brands and son of BendPak owners Don and Ginger Henthorn, has passed away. He was 52. BendPak is based in Santa Paula, California,



Gary Henthorn

and is the manufacturer of wheel service equipment, pipe benders, air compressors, and the QuickJack portable car lift.

Henthorn began with BendPak as a teenager on the shop floor and was eventually promoted to vice president. He established a construction company in Malibu, California, in 2008, and later founded Garage Equipment Supply, Dannmar Equipment, and MaxJax automotive brands. In 2014, he patented a two-post vehicle lift with opposing lift carriages.

"Gary was a kind and loving person who brought joy to all who knew him. He will be deeply missed by all who had the privilege of being part of his life," Don and Ginger Henthorn said.

DEATSCHWERKS ANNOUNCES NEW TECHNICAL DIRECTOR

DeatschWerks—the Oklahoma City, Oklahoma-based high-performance fuel systems manufacturer—has appointed Matt Patrick as its technical director. He will lead the company's product development,



Matt Patrick

product management, engineering, and technical support functions in this newly created role.

With 25 years of industry experience, Patrick most recently served as the vice president of Product Development at Edelbrock, based in Olive Branch,

Mississippi. His prior experience includes positions such as Zex product manager, Lunati commercial manager, FAST product manager, and COMP Cams group director of Product Development. He has also been awarded several patents related to nitrous oxide injection and engine valvetrain technology, according to the company.

FORD SET FOR F1 RETURN IN 2026

After more than 20 years, Dearborn, Michigan-based Ford has announced its return to the FIA Formula One World Championship. The automaker will compete in 2026 in alignment with the new engine regulations.

"Ford is returning to the pinnacle of the sport, bringing Ford's long tradition of innovation, sustainability, and electrification to one of the world's most visible stages," said Executive Chair Bill Ford.

Ford will partner with Red Bull Powertrains to develop the next-gen hybrid power unit featuring a 350kW electric motor and a new combustion engine that can run on fully sustainable fuels.

NASCAR SELLS MAJORITY OF AUTO CLUB SPEEDWAY LAND

NASCAR has sold the majority of land on the site of Auto Club Speedway, the 2-mile, low-banked D-shaped oval superspeedway near Fontana, California, according to multiple reports.

Approximately 433 acres of the 522-acre site is said to have been sold to an unknown buyer at an undisclosed price. Reported plans include demolition of the famed track, which would then be replaced with a short track by 2026.

DYNABRADE ACQUIRES ABRASIVE CONVERTER GLOBAL ABRASIVE PRODUCTS

Dynabrade—the Clarence, New York-based manufacturer of portable pneumatic abrasive power tools—has announced the asset purchase of one of its strategic suppliers, Global Abrasive Products (GAP).

GAP is an abrasives converter company with 50 employees across Lockport, New York, and Alpharetta, Georgia.

BORGWARNER ANNOUNCES NEW SPIN-OFF, BOARD APPOINTMENT

BorgWarner, the American automotive supplier located in Auburn Hills, Michigan, has announced a new spin-off fuel system and aftermarket segment—a separate, publicly traded company that is named "PHINIA Inc."

PHINIA is designed to provide fuel systems, starters, alternators, and aftermarket distribution components among commercial vehicle, light vehicle, and aftermarket end markets. The proposed spin-off is expected to be completed later this year, subject to customary conditions.

In addition, Brady Ericson will serve as president and chief executive officer (CEO), while Chris Gropp will serve as executive vice president and chief financial officer (CFO).

Ericson joined the company in 2000 and has served as VP of BorgWarner and president and general manager of BorgWarner Fuel Systems and Aftermarket since March 2022. Gropp began her career at BorgWarner in 2001, serving most recently as VP of Finance for Fuel Systems and Aftermarket since October 2020.

In related news, Hau Thai-Tang has been named to BorgWarner's board of directors.

Thai-Tang retired from Ford Motor Company in 2022 as chief industrial platform officer, where, among his many duties he led product development and purchasing during Mustang Mach-E, F-150 Lightning, Bronco, Maverick, and Puma launches.

FOX FACTORY TO ACQUIRE CUSTOM WHEEL HOUSE

Fox Factory—the Duluth, Georgia-based designer and manufacturer of performance products for applications including off-road vehicles, side-by-sides, and more—has entered a definitive agreement to acquire Custom Wheel House from Thompson Street Capital Partners and other sellers.

Subject to customary closing agreements, the transaction is valued at \$131.6 million.

Custom Wheel House—based out of Rancho Dominguez, California—designs, markets, and distributes high-performance wheels, performance off-road tires, and accessories. Its brands include Method Race Wheels, Tensor Tire, and GMZ Race Products.

FRAM, RAYBESTOS PARENT COMPANY ACQUIRES TOWING BRAND

First Brands—the Rochester, Michigan-based parent company of FRAM, Raybestos, Centric/StopTech, and other automotive manufacturing brands—has acquired the towing and hauling accessories provider Horizon Global.

Based in Plymouth, Michigan, the company offers several brands, including Draw-Tite, Reese, Bulldog, Fulton, Tekonsha, Witter, and more.

TEAM ALLIED DISTRIBUTION ACQUIRES CALIFORNIA WAREHOUSE

Team Allied Distribution—the Benicia, California-based independent warehouse distributor of automotive exhaust components—has announced the opening of its Stockton, California, location after acquiring Wicked Flow's facility, warehouse equipment, distribution operations, assets, and on-site inventory.

Team Allied will extend permanent positions for most of the staff already in place at the fully integrated warehouse, company reps stated.

NASCAR ANNOUNCES NEW CAMPUS LAB PROGRAM

NASCAR has announced a new Campus Lab Program for students interested in motorsports careers at Bethune-Cookman University in Daytona Beach, Florida.

The program will provide students with hands-on experience through a specialized curriculum and resources. Upon completion, NASCAR will provide participating students



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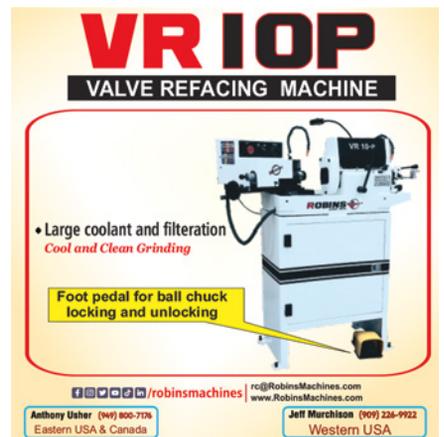
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OFF-ROAD WAREHOUSE OPENS NEVADA LOCATION

Off-Road Warehouse (ORW)—the off-road retailer and installer with eight locations across the US and headquarters in San Diego, California—has announced its ninth and newest location in Sparks, Nevada, which is near Reno.

The 14,000-square-foot facility opened with a special event in February.

DON SCHUMACHER MOTORSPORTS ANNOUNCES \$10.5M EXPANSION

Don Schumacher Motorsports—the manufacturing arm of Don Schumacher Racing—has announced plans for a \$10.5 million expansion in Brownsburg, Indiana, according to published reports.

A total of \$7 million will be used to add manufacturing equipment to its existing 20,000-square-foot space, while \$3.5 million has been allotted to create a complementary 32,500-square-foot building adjacent to the current operations.

Both expansions are expected to create more than 40 new jobs by 2025, according to the company.

NCMA NAMES CHAIRMAN, BOARD VICE CHAIR

The North Carolina Motorsports Association (NCMA) has announced that Greg Walter was recently named chairman of the NCMA board of directors. He is the executive vice president and general manager of Charlotte Motor Speedway in Concord, North Carolina.

Walter will step into the role previously held by Greg Fornelli, president of Stock Car Steel & Aluminum/SRI.

In addition, Hendrick Motorsports Chief Financial Officer and Vice President Scott Lampe will serve as the board's vice chairman.

HOLLEY'S TOMLINSON RETIRES; INTERIM PRESIDENT & CEO NAMED

Holley—the platform for performance automotive enthusiasts based in Bowling Green, Kentucky—has announced that President and CEO Tom Tomlinson has retired and resigned from the company's board of directors. He had served as president and CEO of Holley since 2009.

Michelle Gloeckler, current director, will serve as interim president and CEO.

MECHANIX WEAR NAMES JESSE SPUNGIN CEO

Mechanix Wear—the Valencia, California-based designer and manufacturer of high-performance work gloves—has announced that Jesse Spungin has been promoted from president and chief operating officer (COO) to chief executive officer (CEO). Former CEO Michael Hale will transition to the position of vice chairman of the board.

Prior to joining the company in 2019, Spungin was president at K&N Engineering.

WHARTON AUTOMOTIVE GROUP, MCLEOD ANNOUNCE APPOINTMENTS

Wharton Automotive Group—including brands McLeod Racing, FTI Performance, and Silver Sport Transmissions—has appointed Will Baty to the position of product development manager. He was previously the off-road and research and development specialist for McLeod Racing in Anaheim, California.

In addition, McLeod Racing has announced the addition of racer and engine builder Gary Kubo as its new racing department coordinator.

RWB ADDS BOB COOK SALES

Race Winning Brands (RWB)—the Mentor, Ohio-based portfolio company of MiddleGround Capital in Lexington, Kentucky, and high-performance component manufacturer—has announced that Bob Cook Sales (BCS) will help represent RWB brands in the Southeastern US.



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**WISSOTA NAMES NEW
DIRECTOR OF OPERATIONS,
EXECUTIVE ASSISTANT**

St. Cloud, Minnesota-based WISSOTA Promoters Association recently announced that longtime employee Callie Sullivan has been named director of operations.

Sullivan has been with WISSOTA since 2001. She was named the organization's first full-time employee (office administrator, and points and licensing director) in 2007.

"Callie has a wealth of knowledge in every aspect of WISSOTA and was long overdue for this promotion," said WISSOTA Executive Director Rod Lindquist.

In addition, Kayla Siercks has been named executive assistant. She will focus on partner/sponsor follow-through, support, and relations.

**ERICK CHESTERMAN JOINS
USRA, USMTS**

Officials from the United States Modified Touring Series (USMTS) and United States Racing Association (USRA) have announced Erick Chesterman as the director of Track Operations. He will oversee communication between the dozens of tracks operating under the Summit USRA Weekly Racing Series banner and serve as the lead announcer at USMTS events.



Erick Chesterman

Chesterman, who comes from 81 Speedway (Park City, Kansas) and Humboldt Speedway (Humboldt, Kansas), replaces Bryce Hall, now the general manager of the new Arrowhead Speedway in Colcord, Oklahoma.

**SONOMA RACEWAY NAMES
NEW VP OF MARKETING &
EVENTS**

Officials with Sonoma Raceway—the road course and drag strip located in Sonoma, California, and owned by Speedway Motorsports—have appointed NASCAR industry veteran Karen Davis as the vice president of Marketing and Events.

Davis joins Sonoma Raceway most recently from DoorDash, where she was senior manager, Partnership Marketing. For 20 years prior, she worked in strategic partnership and marketing management in and around NASCAR.

**DEI ADDS NEW VP OF SALES &
MARKETING**

Design Engineering, Inc. (DEI)—the heat and sound installation product specialist based in Avon Lake, Ohio—has announced the addition of Brad Bricker to its sales team as vice president of Sales & Marketing.



Brad Bricker

Bricker will manage the inside sales team focused on DEI's automotive aftermarket products, and work with automotive aftermarket representatives, outside representatives in the RV and Powersports groups, and DEI's marketing and product development teams.

**BD MOTORSPORTS TO
PROMOTE DELAWARE INT'L
SPEEDWAY (DE)**

BD Motorsports Media has reached an agreement with the Cathell family to promote special events at Delaware International Speedway in Delmar, Delaware. Officials there said they will work to coordinate schedules with neighboring Georgetown Speedway in Georgetown, Delaware.

OPTITORQUE TECHNOLOGIES ANNOUNCES NEW VP

Penn Yan, New York-based fastener manufacturer OptiTorque Technologies has announced Brock White as vice president of Performance Sales & Marketing. Based in North Texas, he will support sales and marketing efforts to help increase OptiTorque's reach to accounts and events throughout the US, according to company sources. He brings over 20 years of high-performance and motorsports experience to the newly created role.

NEW DIRECTOR OF RACE OPERATIONS FOR CIRCLE CITY RACEWAY (IN)

Officials with Circle City Raceway—the 1/4-mile dirt track at the Marion County Fairgrounds in Indianapolis, Indiana—have announced Will Greenwell as the new director of Race Operations.

Greenwell will develop a team of professionals for officiating and scoring duties. His prior experience includes roles with Fayetteville Motor Speedway (Fayetteville, North Carolina) and Florence Speedway (Union, Kentucky).

SPEEDWAY MOTORSPORTS ANNOUNCES PROMOTIONS

Officials with Concord, North Carolina-based Speedway Motorsports have announced the promotion of five industry veterans.

Daniel Bandoly has been elevated to the vice president of sales operations for Speedway Motorsports. He will oversee technology platforms to drive business and productivity, and assist the company's sales leaders in growing revenues across Speedway Motorsports' 11 venues.

In addition, Nick Skrabalak has been promoted to vice president of consumer sales. He will be responsible for providing executive leadership and direction of the company's consumer sales efforts for admissions, camping, hospitality, parking, and value-added inventory across all venues. Skrabalak is a 13-year ticket sales veteran at Charlotte Motor Speedway.

Jason Christofferson has been promoted to vice president of consumer operations, where he will provide executive leadership and direction of the company's consumer operations efforts across all properties. Prior, he was a vice president of Ticket System Operations at Charlotte.

Landon Owen has been promoted to vice president of consumer sales for Bristol Motor Speedway and New Hampshire Motor Speedway. Before, Owen served as senior director of Ticket Sales and Service for Bristol.

Finally, Kacy Harmon has been promoted to vice president of consumer sales for Nashville Superspeedway and Dover Motor Speedway. She previously joined the company in January 2022 as senior director of ticket sales for both speedways.

FIRST-EVER ALASKA SPEED WEEK SET FOR JUNE

Michelle Lackey Maynor, co-owner and president of Alaska Raceway Park in Palmer, Alaska, has announced that the first-ever Alaska Speed Week is set to take place on June 11–16.

Dubbed the "toughest and most scenic Drag-And-Drive event," Alaska Speed Week will be supported by Sick the Mag, which hosts the iconic Sick Week at venues across Florida and Georgia.

NHRA'S MAYNARDS LAUNCH JCM DRIVER DEVELOPMENT PROGRAM

NHRA team owners Joe and Cathi Maynard have launched the JCM Racing Driver Development program and announced its 2023 lineup of drivers.

Junior drag racer Waylon Bennett, 10; Super Comp driver Kayleigh Hill, 21; and Super Stock racer Wyatt Wagner, 21, make up JCM Racing's inaugural program, created to support up-and-coming drivers as they work toward a professional NHRA career.

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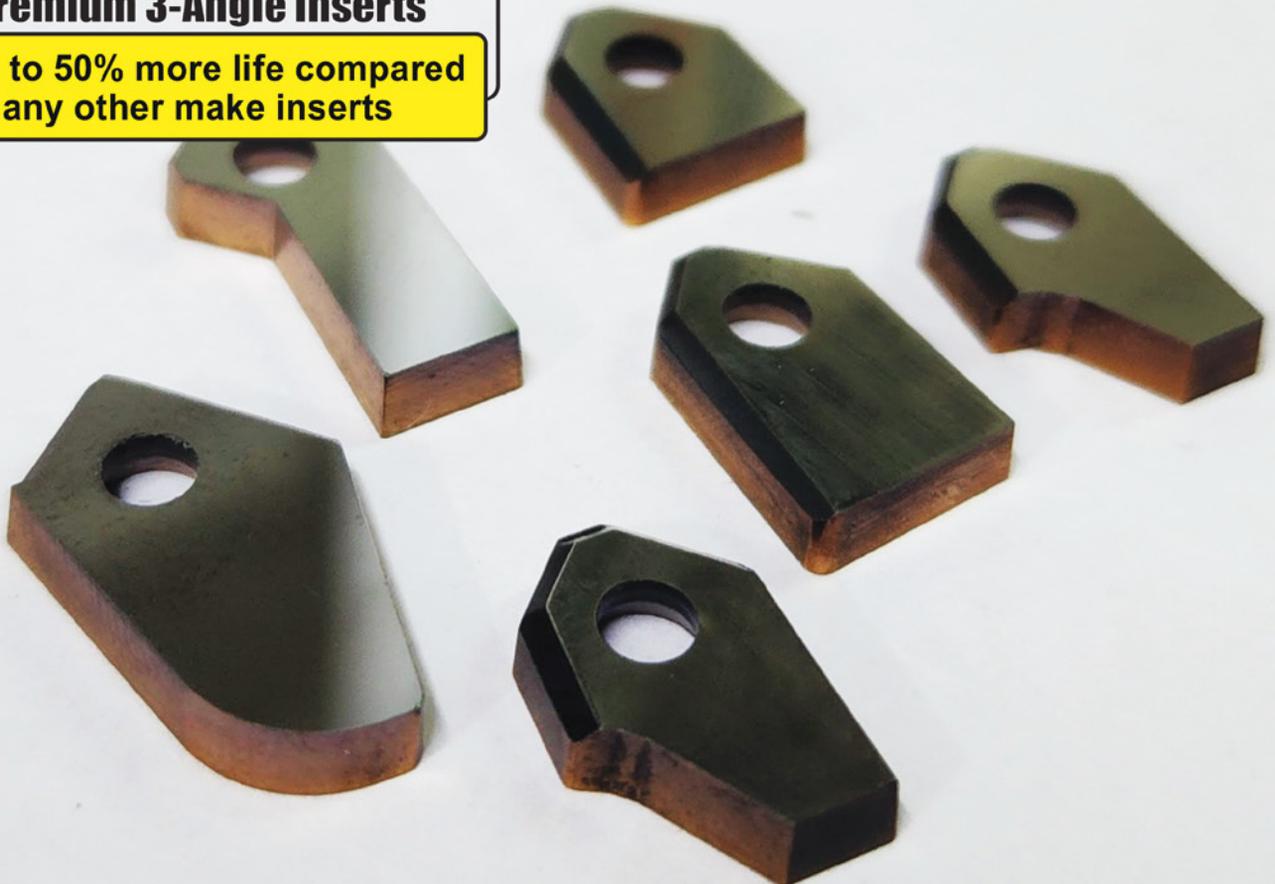
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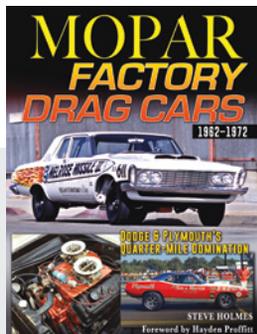
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"Mopar Factory Drag Cars: Dodge & Plymouth's Quarter-Mile Domination 1962-1972" provides a blow-by-blow account of Chrysler's factory drag car programs and the various cars it produced to compete with its rivals during an epic era in stock drag racing. Racing historian Steve Holmes captures the careers of several racers at the time in this 176-page book featuring 406 photos.

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The High-Mount Accessory Drive systems for Ford Godzilla 7.3L provide additional accessory clearance for swap applications that work with the factory rear sump oil pan. The accessory drive components in this system can be configured in several different ways, and the kit includes timing cover/water manifold, water pump, and alternator bracket, plus much more.

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SOCIAL STATUS

A closer look at how racing and performance industry members can increase engagement using short-form videos on YouTube.

Video is everything right now when it comes to social media. TikTok has surged over the past several years, causing other platforms to adopt the short-form, vertical video template to compete.

As more of these platforms (TikTok, Instagram, YouTube, Facebook) focus on short-form video, each platform's algorithm is heavily weighted toward this format, which means content will reach a larger audience when promoted in this fashion. Fifteen- to 60-second videos are getting much more engagement and exposure than still shots, and they are living longer on the platform. A video can show up in someone's feed weeks after it was posted.

Although several platforms have these video options, the focus here is on YouTube Shorts. YouTube itself is nothing new, having been around for nearly 20 years. It's the second largest social media platform behind Facebook in terms of users, as well as the second largest search engine behind Google. However, Shorts was introduced more recently, and has

grown quickly.

YouTube Shorts are very similar to TikTok and Instagram Reels in that users can edit together multiple short clips, add audio, adjust speed controls, and more. Vertical video is the proper presentation for Shorts (with a 60-second limit), whereas horizontal video is better suited for YouTube's original longer format. Shorts appear online when users visit youtube.com as well as through the YouTube app, where users can also record video directly through the app camera and use its set of features.

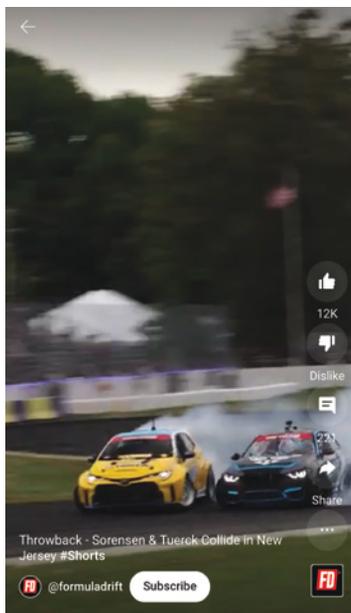
For those who already have a large following on YouTube, utilizing Shorts is a way to capture a different—typically younger—demographic, as well as take advantage of its sizable engagement rate. Users can potentially grow their YouTube following through the use of Shorts since it has the best organic reach on the platform. And using SEO-focused tags and keywords will expand reach to further increase engagement numbers. Plus, Shorts can be used to reach a new audience and channel

that crowd to the long-form content.

Here are some stats to think about: More than 2.3 billion subscribers regularly visit YouTube every month, and about 40% of YouTube users' watch time comes from smartphones; YouTube Shorts got 3.5 billion daily views during 2020 (and it was just launched late that year); according to studies, one YouTube subscriber is worth 25 TikTok followers, which shows the value of YouTube. So, it's safe to say that YouTube Shorts has skyrocketed since its inception, and remains enormously popular.

Additionally, YouTube rolled out a \$100 million Shorts fund for creators in 2022 and 2023. So if your business can create entertaining, viral Shorts, there's potential to monetize.

Just like every other short-form video social media platform, the best way to utilize Shorts is to create quick, engaging videos; be consistent with posting; make valuable content related to your business and industry; and keep people entertained and coming back for more! **PRI**



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