VOLUME 38 | NUMBER 9 | SEPTEMBER 2023

PRI

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FEATURES

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FROM THE EXECUTIVE EDITOR

MEREDITH KAPLAN BURNS
meredithb@performanceracing.com

LET'S RECHARGE

Like it or not, EVs are here to stay. Before you turn the page, hear me out. Challenges are nothing new to the motorsports industry—new rules, the closure of a local track, and supply chain problems are just a few of the obstacles we face on a regular basis. We are an innovative bunch, and we do whatever it takes to make sure we keep racing. That same innovation applies to the EV segment. Consider some of the positives: Because EVs are so quiet, racers can still drive at tracks where neighborhoods continue to encroach and even race later in the evening since sound curfews won't be relevant.

PRI contributor Drew Hardin interviewed three established performance conversion operations that took EV head-on and now embrace it. See Building Momentum on page 58. Of course, this doesn't mean we at PRI are turning aside from traditional ICE-powered racing segments or overlooking other types of propulsion for racing. Instead, we are presenting new possibilities that continue to grow and strengthen motorsports as a whole.

Take Bisi Ezerioha of Bisimoto, as an example. He admitted his initial "discontent with the EV marketplace," but when he saw the direction his partners were going, "If I wanted to remain relevant in the business, I needed to explore this technology." Now, EVs account for 90% of his business.

Michael Bream of EV West specializes solely in EVs, but with the nostalgia of his father's hot rod era. Bream's cars have raced on Pikes Peak and the Bonneville Salt Flats, setting records at both. As a result, "We're struggling to keep up with demand."

For those who want to learn more about EVs and motorsports, visit the EV & Alternative Fuel section on the Lucas Oil Stadium floor at December's PRI Show. Here, you can see how this technology is being used to advance motorsports, all with a more environmentally friendly focus.

Three PRI Show seminars have already been planned on this topic: Alternative Fuels: Maintaining the Internal Combustion Engine; EV Powertrains: Converted for Racing; and EV Racing: Aftermarket Performance Products. These will take place at the Lucas Oil Stadium seminar rooms, which are conveniently located near the EV & Alternative Fuel display.

Also at Lucas Oil Stadium is the popular Trailers Exhibit. Turn to page 104 for a list of 23 suppliers who have already confirmed that they will bring some of the newest models of not only race trailers, but also new motorhomes and toterhomes, all designed to improve the at-track experience.

These suppliers will be ready to design the best-suited trailers for specific racing disciplines, including sprint cars, dragsters, dirt late models, road race vehicles, and so much more. Beginning on page 94, several of these suppliers share how they work directly with race teams to design trailers that organize race cars and parts. For example, winged sprint car racers can benefit from a trailer with a taller than normal interior height so the car can be loaded without removing the wing. Dirt late model racers will require a wider opening to allow the car to enter and exit the trailer easier. Front dragster wheels can be elevated to fit two cars into the trailer, allowing teams to bring more than one complete car to events.

If you haven't already, sign up today to attend the PRI Show, December 7–9, at PRI2023.com. PRI

PRI MAGAZINE

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ACCOUNTING

PAYABLES
Lily Huang

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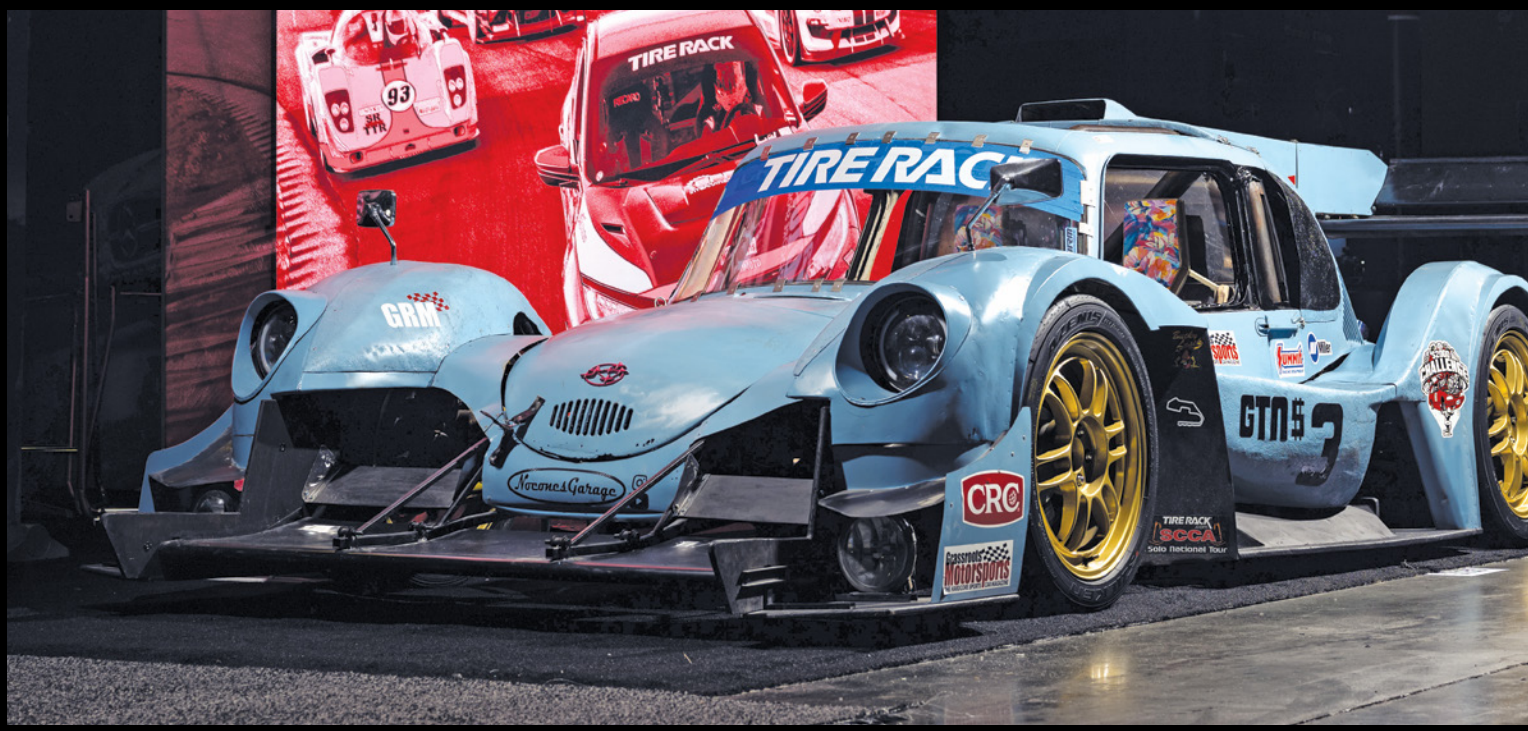
FEATURED VEHICLES

These classic car bodies have been transformed for a new life on the race track.



1995 BMW 325I

CARL BALZER | TOLEDO, OHIO

RACE SERIES/CLASS: Drag racing, drifting, burnout competitions, drag-and-drive events, daily driver

ENGINE: 427 LS3-based engine built by Texas Speed and Performance, runs on E85 or M1 methanol

CAR: Built by Carl Balzer of Hidden Motorsports

FEATURES: PRC heads, Holley Hi-Ram, twin Forced Performance 7875 turbos, XClutch triple disc clutch, Darton Sleeves, Grannas Racing billet T56 Magnum, GForce Engineering axles with billet stubs, Holley Terminator, many ancillary parts from Texas Speed and Performance, Holley, and Motion Raceworks

FACTS: The car is capable of low 8s in the quarter-mile. It made 1,415 whp with a 6-liter motor, and Balzer is hoping for more than 1,600 whp with the new 7-liter. Balzer is also involved with a charity called Skids4Kids USA that helps raise money for children's hospitals.

1968 SUBARU 360 SEDAN

DANIEL CUMMINGS | MAHOMET, ILLINOIS

RACE SERIES/CLASS: GridLife Super Unlimited Time Attack

ENGINE: Subaru EJ251 NA, Flat-4 OEM build out of a 2002 Outback, utilizes Subaru ECU with stock tune and power levels

CAR: Built by Daniel Cummings at home

FEATURES: Full aero elements with dual element front and rear wing and underbody tunnels, uses a 4130 chromoly tube frame with custom F&R SLA suspension using pullrod-actuated bellcranks with motorcycle sourced coilovers, Wilwood brake pedal cluster with remote reservoir master cylinders

FACTS: This car was built for and won the Grassroots Motorsports $2,000 Challenge. Most of the basic running gear of the car is OEM Subaru but modified for use on this vehicle. The goal was to build a car that gave the driving and aesthetic impression of an LMP-style prototype on an affordable budget. Since the $2,000 Challenge, the car has been updated to run at GridLife.

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ASK THE EXPERTS

HOW TO SELECT A HEAD-AND-NECK RESTRAINT

These safety devices have been proven to reduce injuries, and an increasing number of motorsports organizations are requiring them, but one size does not fit all.

By Bradley Iger

Originally developed in the early 1980s by Dr. Robert Hubbard, an American scientist and professor of biomechanical engineering at Michigan State University, head-and-neck restraints were borne out of a need for additional protection during sudden changes in speed due to impacts. Without an additional device to protect the head and neck in these types of incidents, the situation was such that racing harnesses would keep the body in place, but everything above the shoulders was still potentially subject to violent movement.

Over the past 20 years or so, head-and-neck restraints have become an increasingly common sight at road courses, drag strips, and circle tracks across the country. There's a good reason for that. "Some states, like New Jersey, require the use of head-and-neck restraints in all forms of motorsport," explained Trevor Ashline of Simpson Race Products, New Braunfels, Texas. "So whether you're driving a Junior Dragster or a Cup car, you're going to be wearing one. It just comes down to reducing the potential for injury. Modern street

"SOME STATES, LIKE NEW JERSEY, REQUIRE THE USE OF HEAD-AND-NECK RESTRAINTS IN ALL FORMS OF MOTORSPORT."

cars have airbags that serve a similar purpose, and they're used all the way down to 30-mph impacts."

As sanctioning bodies began to see the value of these devices and mandate their use, other organizations running similar events soon followed suit. A growing number of racers are acknowledging the safety benefits of these devices as well. "We're reaching a point where these devices are now commonplace at the grassroots level," Kevin Shaw of RaceDay Safety, Dallas, Georgia, pointed out. "Even in disciplines where they aren't required, you'll typically see about half of the drivers using them anyway."

Advances in design now offer drivers some options when it comes to shape and size, but it can also make selecting the right head-and-neck restraint for a given driver, car, and racing discipline a trickier proposition. To help narrow things down, Ashline suggested starting off by consulting with other racers who're competing in similar types of events to get feedback from them. "Whether it's a HANS, or a NecksGen, or a Simpson Hybrid restraint, they're all designed to do the same thing for you and meet the SFI 38.1 standard. The end game is to lower neck tension. So at that point it really becomes more about comfort and how well it integrates into your particular setup. Can you get into and out of the car with the device connected to the helmet? How well does it fit into your seat system with your shoulder belts? That kind of thing."

"Whether it's a HANS, or a NecksGen, or a Simpson Hybrid restraint, they're all designed to do the same thing for you and meet the SFI 38.1 standard," said Simpson's Trevor Ashline. "The end game is to lower neck tension."

He added that the size of the driver can also be an important factor in head-and-neck restraint selection as well as the type of racing it will be used in. "Sometimes a yoke-style device such as a HANS will have limitations because they're made out of carbon fiber and have a specific shape to them. So if you're a body builder, for instance, and you have a big chest and big shoulders, you may find that a yoke device doesn't fit well, and a hybrid is a better option. Hybrid-style restraints are also prominent in the dirt world because the harness actually helps keep the driver in position and return them back to position after an impact, which can

Advances in head-and-neck restraint design now offer drivers options when it comes to shape and size, but it can also make selecting the right device trickier for a given driver, car, and racing discipline. Consult with other racers for their feedback, and measure for the device while wearing your other safety gear.

provide additional protection if there are multiple impacts."

Shaw noted that some designs offer more modularity than others, too. "Just about every head-and-neck restraint manufacturer offers sizes that will work for body types ranging from small children to large adults," he said. "Some of them won't fit really big guys very comfortably, but Zamp's head-and-neck restraint design is adjustable, so the effective size of the device can be changed to fit a wider range of drivers."

When it comes to getting a proper fitment, both note that following the manufacturer's measuring guide is essential, and it's wise to take those measurements while wearing your other safety gear. "If you're in a Top Fuel car or something like that, you're going to be wearing a really thick fire suit, and the neck collar on that suit is going to be thick as well," said Ashline. "So the neck size measurement you want isn't just your neck—it's your neck plus the material surrounding it."

When selecting a head-and-neck restraint for a young driver, both agree that the device should be properly sized for today rather than tomorrow. "You shouldn't buy one that's oversized in hopes of preventing them from outgrowing it too quickly," Shaw said. "If you do that, they'll often end up with a device that's too wide at the shoulders, and then you'll be unable to properly position the shoulder harnesses of the seat belt on the device. They'll be spread out too far, which can compromise driver safety." PRI

SOURCES

RaceDay Safety
racedaysafety.com

Simpson Race Products
simpsonraceproducts.com

STOP DOING THAT...DO THIS INSTEAD

UTILIZING FREE BUSINESS RESOURCES

Why invest in consultants who require thousands of dollars when a knowledgeable expert is available through SCORE and SBDC? And at little or no cost.

By Tom Shay

As the fourth generation working in our small business, I remember several expressions my father told me that were signs of impending problems. The first was, "The check is in the mail." Another was, "I'm from the government, and I am here to help you." There is a third expression to be wary of, and it comes in a variety of forms when listening to a speaker at a trade show. The essence of the speaker's message is that you need to hire that person on an individual basis or join their coaching program to take your business to the next level or solve any problem your business has.

> *"A SUCCESSFUL PARTNERSHIP REQUIRES WORK FROM BOTH PARTIES."*

Whether you are seeing opportunities for growth in your business, or your business is facing challenges, the Service Corps of Retired Executives (SCORE) and Small Business Development Centers (SBDC) are a couple of alternatives to find assistance and information. Before deciding to spend money with one of those consultants, investigate both of these organizations. You may find that the answers you seek are in "your backyard."

SCORE

SCORE was created in 1964, and like the SBDC, receives funding from the Small Business Administration (SBA). Its task is to assist every person who is or wants to

be a small business owner. Each of the 10,000 volunteers within SCORE has years of experience in their field. The process begins by visiting its website and entering a few questions, including:

- Does the mentor need to be local, or can that person be anywhere in the country?
- What language do you speak?
- What is your industry?
- What stage of life is your business in?
- Do you want in-person or online assistance?
- What aspect of business ownership do you want to discuss or learn more about?

Before spending money with a business consultant, consider the low cost or even free services of local government business resources in SCORE and SBDC. The answers you seek may already be in "your backyard."

SCORE offers workshops. Are you a machine shop and have a customer that won't pay the bill? SCORE has a workshop that explains how to navigate small claims court. Perhaps you feel your business focus is too broad. SCORE has a workshop on finding your target customer.

Maybe you have a business that sells equipment trackside, and you want to add something to your business. SCORE even has a class on how to start a food wagon business. It could work if the track didn't have a rule that restricts who can sell food.

SCORE webinars are both live and archived in a recorded library of topics. SCORE also has in-person workshops; at the time of this writing, there were some 2,000 in-person workshops available at little or no cost. Enter your zip code and click a few boxes to narrow your search to find what is in your area.

SBDC

The second organization, America's SBDC, has a state-level organization in every state with Texas and California having multiple chapters. Working with the SBDC begins by visiting the website and entering your zip code. There are nearly 1,000 centers across the country, with many affiliated with a college or university. SBDC

> *"VERIFY THAT THE COUNSELOR OR ADVISOR HAS EXPERIENCE AND/OR KNOWLEDGE IN THE AREA OF YOUR BUSINESS YOU WANT TO FOCUS ON."*

offices offer counseling in a one-on-one setting. It also offers many online webinars and live events. The counseling is at no cost, and the majority of its live and online events are also free.

One example of a successful SBDC experience began with a business that consisted of a combination of manufacturing, wholesaling, and retailing. The business was utilizing QuickBooks. Unfortunately, its version of QuickBooks was not correct for its situation.

The company's SBDC advisor made that observation and then recommended the correct version. While that was impressive, the advisor, qualified with QuickBooks, helped the business purchase the correct version of QuickBooks at a discounted price and transition its information to the new version. Another SBDC advisor, a CPA, reviewed and confirmed the work. The business owner continued to work with a SBDC advisor, both in the business and by online meetings, as the company grew as a part of the owner's long-term plan toward retirement in the next five years.

FIRST STEPS

While both of the above scenarios sound wonderful and easy, there is more to working with either organization. A successful partnership requires work from both parties.

Your work begins earlier than the initial meeting with an advisor. It starts with clearly defining your needs and expectations of the relationship. Also, be respectful of the time and effort of the SCORE or SBDC representative, whose schedule includes you as well as other clients.

Before addressing an opportunity or challenge, reach out to the organization of your choice to establish a relationship. By doing so, when that opportunity or challenge arises, you will already have that "partner" in your corner with an understanding of you and your business.

Sometimes, a business owner and the advisor or counselor aren't a good match. One example involved a counselor who had worked for a major chain retailer and was assigned to a retail business. Unfortunately, the counselor's career was in logistics; moving freight for that retailer did not provide the background of experience needed for the client.

Another example involved an advisor with three years of work history at a large corporation but no experience in the aspect of business that was to be discussed.

These two experiences emphasize that you will need to verify that the counselor or advisor has experience and/or knowledge in the area of your business you want to focus on. If it's not the right connection, you simply explain and ask for a different individual.

If you were going to hire one of those "consultants" or join one of their "insider clubs," you should do your research. One of the benefits here is that the SBDC or SCORE is not getting in your wallet. Both of these organizations are a great source of information for your business.PRI

Tom Shay, of Profits Plus Solutions, will share his expertise at the 2023 PRI Show. He will give two seminars on Friday, December 8, covering "Why a business plan can make you more money" at 9:00 a.m., and "Disrupting or prompting: Does this affect how you approach business?" at 3:00 p.m.

SOURCES

Profits Plus Solutions
profitsplus.org

Service Corps of Retired Executives (SCORE)
score.org

Small Business Development Centers (SBDC)
americassbdc.org

EDITORS' CHOICE

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

CONNECT BATTERY MONITORING SYSTEM

ODYSSEY

odysseybattery.com

A tow rig breaking down on the road before getting to a race is more frustrating than losing in the final round. But the new Odyssey Connect battery monitoring system can help avoid such a misfortune.

"The Odyssey Connect is for trucks and haulers, including those used to transport race cars," said Alan Kohler. "It can be used to monitor the truck's battery health while traveling back and forth to the track. No missed races due to downtime of the hauler."

Users always have the battery information at hand because data collected through the system is communicated via Bluetooth to any Apple or Android smart device. The system actively tracks the battery state of charge (SOC) and state of health (SOH) by checking voltage and temperature status throughout cranking and other events.

"Our feedback from fleets indicates the Connect system helps with a solution that was not previously addressed in the battery world," added Kohler.

Drivers can view warning and safety notifications directly on their smart devices in addition to reviewing battery trends on a 24/7 basis. The system can highlight the previous six days of battery voltage and temperature data in a combined graph. Plus, from the first day of operation the system captures and analyzes battery operating history. *—Mike Magda*

EV STUB AXLE ASSEMBLY

MARK WILLIAMS ENTERPRISES

markwilliams.com

Given the massive torque potential of electric motors, it's no surprise that heavy-duty driveline components will be necessary for competition EVs. Mark Williams Enterprises, already a well-known supplier of performance driveline equipment for racers, is now offering a new stub axle assembly specifically for the popular IDM-190 power module from Cascadia Motion.

"With an increase of EVs in competition applications, it warrants our attention," explained Mark Williams.

The assembly facilitates use of the popular Series 15 constant velocity joint, which is commonly referred to as a Porsche 930 CV joint. Williams said the Cascadia high-torque power unit is the choice of many independent EV builders.

"As the torque output of EV power modules continues to increase, we see the need for developing heavy-duty driveline components for this burgeoning market," added Williams.

The unit is manufactured from a 300M alloy steel forging and heat-treated to more than 300,000 psi tensile strength. It's also double shot peened, and all exposed surfaces are treated to a Cerakote ceramic gray coating for rust protection. Included in the shaft assembly is a plated CV cup to retain grease, and an expand ring to locate the shaft to the axle gear. *—Mike Magda*

JEEP JL SINGLE-DISC CLUTCH

MCLEOD RACING

mcleodracing.com

Jeep JL and JT racers and performance users will appreciate the new single-disc clutch in the Adventure Series from McLeod Racing.

"This new clutch line is designed with performance and durability in mind," said Will Baty. "The Max Mass steel flywheel with its extra mass provides additional energy to the engine that will help reduce stalling on obstacles or when using larger diameter tires."

Each kit includes a high-clamp-load pressure plate, sprung hub disc, steel flywheel, billet hydraulic bearing, bleeder, and hardware.

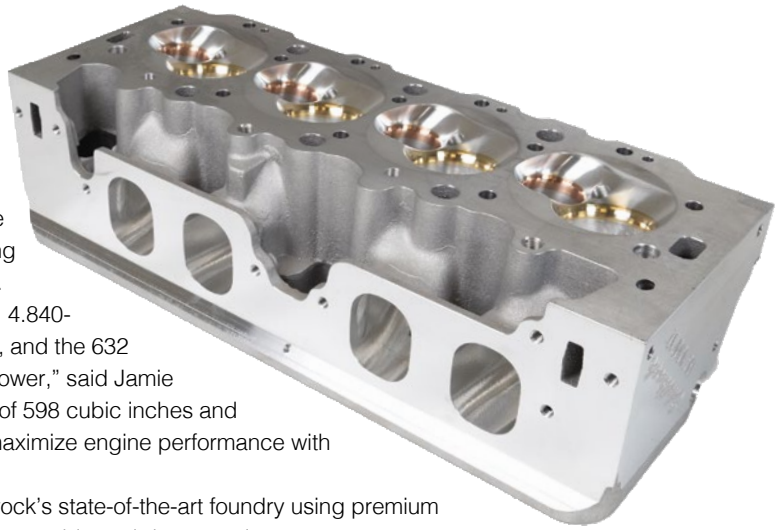
"We added additional strength to the drive straps of the HD pressure plate to help eliminate strap failure during a hard deceleration or on any downhill where the vehicle's weight is loading the drive straps," explained Baty. "The friction disc is designed with a steel back lining to prevent any type of failure or explosion of the facing and withstand the additional heat that comes with spirited driving."

The Jeep JL clutch and flywheel kits will be available in three stages. The Trail Pro is rated for 450 lbs.-ft. of torque, and the Super Trail Pro is rated for 510 lbs.-ft. of torque. The Trail Extreme is rated at 570 lbs.-ft. of torque. It can hold onto big engine modifications as well as increased vehicle weight with large tires. This kit is provided with a ceramic-lined disc. *—Mike Magda*

VICTOR CNC 12-DEGREE BBC CYLINDER HEADS

EDELBROCK

edelbrock.com



The new Edelbrock Victor CNC 12-degree cylinder heads are specifically designed for big block Chevrolet engines running naturally aspirated, nitrous injection, or boost in competition.

"Racing classes that take advantage of the larger displacement, 4.840-inch bore spacing engines, such as Top Dragster, Top Sportsman, and the 632 Grudge class, rely on these types of cylinder heads to maximize power," said Jamie Wagner. "This head lends itself very well to engine displacements of 598 cubic inches and larger but can be used in other engine configurations wanting to maximize engine performance with this bore spacing."

Nicknamed the Big Vic 12, the head is cast in the USA at Edelbrock's state-of-the-art foundry using premium aluminum alloy that undergoes hot isostatic pressing (HIP) for a more stable and dense grain structure.

The heads feature 12-degree valve angles and large CNC-machined raised oval intake ports that measure 498cc and have been designed to maintain high airspeed through the valve, which generates a higher torque curve throughout the engine's operating range. The exhaust ports are also raised from the stock location.

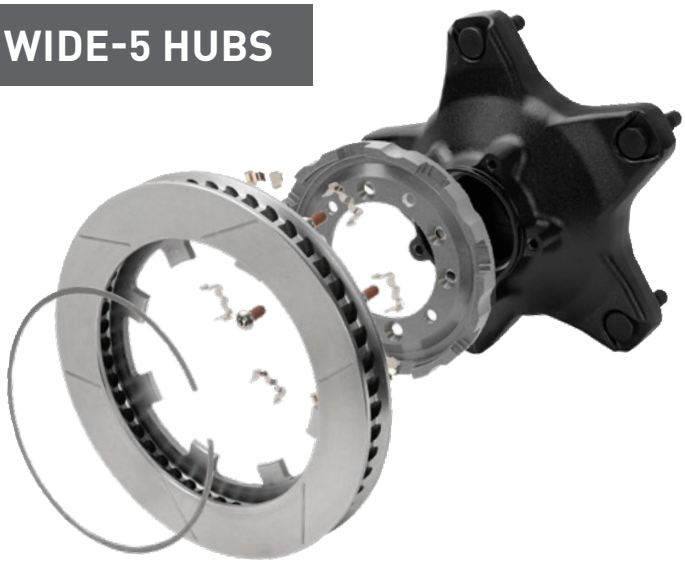
"All the feedback we have received from our customers state they are very happy with the overall performance of the Big Vic cylinder heads," added Wagner.

Other features include copper intake and exhaust valve seats that are cut for 2.500-inch intake valves and 1.800-inch exhaust valves, and a conical combustion chamber design that measures 82cc. *—Mike Magda*

LUG-DRIVE ROTOR ADAPTER FOR WIDE-5 HUBS

WILWOOD

wilwood.com



A new floating rotor lug-drive system from Wilwood simplifies assembly with a single snap-ring in place of typical rotor bolts and safety wire. Also, the floating rotor eliminates heat distortion from thermal expansion for a more predictable pedal feel.

"It's a complete bolt-on system for any wide 5 or 5x5 hub that maintains original rotor position without moving the caliper or space a hub," explained Dave Brzozowski. "Our unique stainless-steel wear/float control clips ensure a long life on our 6061 aluminum Type-III hard anodized plates."

Racers can expect improved pedal feel, float consistency, and longer life due to the new design that eliminates a traditional aluminum plate/hat coming into direct contact with the rotor. Drag and road race cars have used the Wilwood Lug-Drive system for years, and the wide 5 version was extensively tested in asphalt Late Model racing for over a year.

"We've had this system-on-hat setup designed for TransAm2 for the past three years, winning numerous events and championships in 2022," said Brzozowski. "We have had the new wide 5/5x5 parts in the field for over a year on numerous cars before releasing them for production, and have had nothing but positive feedback, as mentioned." *—Mike Magda*

MODULAR INTAKE MANIFOLDS FOR FORD COYOTE ENGINES

HOLLEY

holley.com

Holley's new line of modular intake manifold components for Ford Coyote engine platforms allows the user to choose between color, throttle body openings, and plenum volumes. The as-cast aluminum construction is offered in a Hi-Ram style or Ultra Lo-Ram (shown in photo).

The modular design offers different tops to support additional accessories.

"The new Holley Coyote Lo-Ram and Hi-Ram are cost-effective manifolds that perform. The Hi-Ram is designed to allow for water-to-air-intercooler bricks, nitrous plates, and more," said Mark Gearhart. "The intakes already feature a refined port design with streamlined injector bosses for reduced turbulence. Different sizes and styles of throttle bodies can be used, and include a large oval or round monoblade, and the GM LS 4-bolt. Plenum volumes will vary between 9.8 liters, 8.4 liters, and 8.2 liters, depending on the top and throttle opening.

"Also, being a multi-piece cast manifold, it allows for easy porting, custom modifications, and more," added Gearhart.

The intakes are offered in black and natural finish. Both styles have 9.20-inch runner lengths designed to improve mid- to high-rpm powerband. They fit bolt pattern OE heads found on the 2011–2023 5.0-liter Coyote V8 engines, including Voodoo and Predator. Kits include fuel rails for use with OEM-style fuel injectors, clips, mounting hardware, and O-ring gaskets. *—Mike Magda*

PURPOSE-BUILT MARINE OIL PAN

MILODON

milodon.com

A marine engine has different needs than a car engine, and the oil pan is a perfect example. Milodon doesn't "adapt" its car pans to the boat market, but rather offers a line of true, purpose-built marine oil pans.

"Marine oil pans require extra heavy-duty steel construction, unique oil-control baffling, and large oil capacity that must also be controlled," explained Steve Morrison. "Heavy-gauge steel construction is used so the pan can withstand the beating that a car will never see. Marine application pans also double up for the monster truck market as they see the same unique and severe loads."

The pans are made in the USA, constructed from 16-gauge steel and TIG welded. Finally, Milodon's signature gold finish has a zinc undercoating.

"Boat engines have to work harder turning the jet or prop drive, and that creates a lot of heat," added Morrison. "The engine is in the hull, which does not allow for much airflow or cooling, so it tends to build excessive heat. Milodon marine pans have many provisions to help reduce heat and control the oil from sloshing."

Marine pans are available for big block Ford, big block Chevy, small block Chevy, and Olds 455. *—Mike Magda*

FAST MOVERS

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

By Dana Ford

Motorsports retailers and service providers are constantly tracking the latest 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 snapshot from shops across the US.

MARTINO MOTORSPORTS

Youngstown, Ohio

Martino Motorsports is a racing team that sells and uses a variety of components and products as part of its operation. Approximately 85% of its customers are in racing, with 15% having a street focus.

The popular, fast-moving products it uses and sells come from companies that include Lucas Oil Products, K&N Filters, NGK Spark Plugs, XS Power Batteries, Mickey Thompson Tires, Strange Engineering, Sonnax Performance, and ProCharger. The company has used and sold a majority of these brands for 30-plus years. Its customers are drawn to these products not only by reputation, but they can see the proven quality of the products in Martino's dragster on every race day.

As a racing team, Martino Motorsports is unlike traditional retail operations. It has always sold products trackside but is in the process of shifting focus from direct retail sales to installation and tuning for both street and strip. The company is also electing to promote the associates of its race program, allowing customers the option to purchase direct from the manufacturer if not from Martino.

According to Ryan Martino, the company's marketing strategy is, "driven by the classic motto, win on Sunday, sell on Monday. Our on-track efforts with our race program undoubtedly 'drive' sales for us and the aforementioned associates throughout the year."

When not racing, its sales message is driven by a strong social media presence. Martino explained, "Social media marketing has allowed us the opportunity to show how products are used, how they are installed, and what they look like during pre- and post-maintenance. Social media has further allowed us to answer any questions relating to the products/services that keep Martino Motorsports in the fast lane to success. Our social media sources have a daily global reach."

JEFF'S TUNING AND PERFORMANCE

Ocala, Florida

Jeff's Tuning and Performance is a shop that sells parts revolving around the high-tech dyno tuning services it performs. Approximately 20% of its customers are racers, while everybody else, as owner Jeff Joachim said, "just wants a fast daily driver." The company has customers come from all over the Southeast US to get their cars tuned, and many of these serious racers compete at nearby Gainesville Raceway.

Many of the customers of Jeff's Tuning and Performance buy supercharger kits and tuning kits, all of which can be installed in-house.

Fast-moving items in this realm are superchargers from Whipple, ProCharger, and East Coast Supercharging. For tuning, fast movers are SCT devices and custom tuning packages as well as HP Tuners MPVI interfaces. For engine builds, Jeff's sells plenty of Clevite bearings and many Summit-branded components.

Customers are drawn to Jeff's because the company bundles complete supercharger packages that leave room for future horsepower growth, and all the components provide a very tangible gain in dollar per horsepower.

The company has developed a solid reputation and is deservedly proud of it. Part of that reputation comes from working with these components since starting the business almost four years ago. That is why it hasn't been necessary to market the business much. As Joachim explained, "We really don't do much marketing. Once I explain it, they really do sell themselves at that point. We'll show them their car on the dyno before and after, and they can see what they've paid for. Proof is in the product. The last thing I want to do is sell a product that doesn't work."

G.A.T. RACING

Tucson, Arizona

The shop at G.A.T. Racing provides a blended mixture of retail parts sales and fabrication for its customers. Owner Paul Banghart estimated about 85% of its customer base consists of hardcore racers along with a few street rods. The serious racers who make up its customer base primarily compete in the IMCA series or at the local NASCAR track, Tucson Speedway.

Three of the best-selling fast movers from G.A.T. Racing are helmet tear-offs for dirt track racing from Racing Optics, Hoosier tires for its circle track customers, and rod ends and heim joints by FK Bearings. These are all common consumable items that wear, break, or bend during the course of dirt track races. Customers like these products because they've proven to work well in competition and are known to be of high quality. Due to this proven track record, G.A.T. has been carrying these products for many years, with no current problems keeping them in stock.

G.A.T. does no special marketing to sell these products, relying first and foremost on word-of-mouth testimonials from customers, along with a slight presence on Facebook. Stability also figures into the sales equation, as G.A.T Racing celebrated its 30th anniversary in business last year. PRI

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NEWLY APPOINTED

ROB KINNAN

MAHLE Motorsport's new marketing manager is a true hot rodder at heart and in practice, having started building engines at age 13 and later landing the editor's spot at iconic Hot Rod Magazine.

By Jim Koscs

MAHLE Motorsport, the performance division of MAHLE North America, found in Rob Kinnan a solid blend of performance and racing enthusiasm, industry knowledge, and hands-on builder-racer experience for steering its marketing efforts. Many in the PRI/SEMA community know Kinnan well from his 30-plus years of participation.

Kinnan mused that he graduated from Colorado State University with a "minor in street racing" and a degree in technical journalism. His goal was to be behind the camera and editing for the TV news feature show 60 Minutes. When those jobs seemed unavailable, he sent resumes to his favorite car magazines, Hot Rod and Popular Hot Rodding. While on a trip to Southern California in 1989, he cold-called John Dianna, former Hot Rod editor and at the time vice president, group publisher, and got a meeting. "Then, bugging him for about three months got my foot in the door for a 33-year career of surfing among the Petersen magazines," Kinnan recalled for PRI. "Finally, I made it into Jeff Smith's former chair as editor of Hot Rod."

"WALLY PARKS TOLD ME IN THE TOWER AT POMONA TO ALWAYS TELL THE TRUTH, SINCE THE READERS TAKE WHAT WE SAY AS GOSPEL, AND TRY TO NEVER DISAPPOINT THEM."

Kinnan helmed Hot Rod for seven years and also served as editor for Mustang Monthly and several other titles before his recent stint as marketing director for ATI ProCharger. After relocating from California to North Carolina, he joined MAHLE Motorsport.

"I wanted to work at an established company with a spectacular reputation," he said. "MAHLE's reputation is second to none, and promoting such a fabulous company is a great job. Being an engine builder—well, more of an engine assembler—from an early age, it's right up my alley."

Kinnan shared why he feels he's a good fit with MAHLE Motorsport.

PRI: Let's start with your tight connection to hot rodding and motorsports. What was the experience that pulled you into an automotive career?
Kinnan: There wasn't really a single experience that got me into it. By the time I was 13 years old, I was totally eaten up about cars and hot rods. My dad was a heavy equipment mechanic and had me rebuild a 361-cubic-inch Ford V8 truck engine at 13. Then I helped him build the 327 in my first car, a 1968 Camaro convertible, and from then on it was, "Forget the bicycle, bring on the hot rods."
PRI: How would you say your career in publishing, and perhaps specifically as editor of Hot Rod, prepared you for marketing in the performance/motorsports category?
Kinnan: I had experience with both good and bad marketing from other companies pitching me their products, so I kind of knew what to do and what not to do. That was preparation in itself. My experience at ProCharger taught me some tricks as well, even though my entire tenure there was during the COVID-19 pandemic when the world and all racing was shut down.
PRI: In your publishing career, you witnessed and experienced firsthand 30-plus years of evolution in performance cars and their influence on motorsports. How does your experience from that side of the fence inform your perspective on that market?
Kinnan: I think it would be how close some production cars are, performance-wise, to race cars. That was certainly not the case 30 years ago. I would say the perspective that gives me is that the OEMs know what they're doing. And getting to know many of their engineers over the years has solidified that in my mind.
PRI: What do you see as the main challenges in motorsports today?

ROB KINNAN

TITLE:
Marketing Manager

ORGANIZATION:
MAHLE Motorsport

HOMETOWN:
Asheville, North Carolina

FAST FACT:
"My fantasy has always been, since I was maybe five years old, to win the Indy 500, or at least to qualify for the race. That would be the coolest thing in the world to me. Making a lap around the Brickyard in one of the actual Camaros that paced the race around 2010 got me close. I had a tear in my eye as I lapped that track just two weeks after the race."

"FOR RACERS, SOME OF THEIR BIGGEST HURDLES ARE ACQUIRING AND MAINTAINING SPONSORSHIPS."

Kinnan: That depends on whether you're asking a racer or an engine builder. For racers, some of their biggest hurdles are acquiring and maintaining sponsorships. For builders, I think it's easier, since the technology and brainpower that's out there has brought us all the killer parts and tuning required to build huge power, which was much more difficult to do 30 years ago. I think the biggest challenge for them is developing their own ways for making that extra 1 horsepower than the next guy, which is increasingly difficult these days.

PRI: Who has been most influential to you in your professional career?

Kinnan: Right after I got the Hot Rod editor's job, [NHRA and Hot Rod founder] Wally Parks told me in the tower at Pomona to always tell the truth, since the readers take what we say as gospel, and try to never disappoint them. And of course, Jeff Smith for launching my career and teaching me the basics of how to be a magazine guy.

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

Kinnan: My camera. That's because my camera has always been an integral part of getting the job done, whether that's telling a story, illustrating it, or providing evidence of what's going on in the world. PRI

INDUSTRY INSIGHTS

JUSTIN MARKS

This trailblazer is turning NASCAR on its head with a successful, fresh approach to racing, sports, and entertainment.

By Jeff Zurschmeide

Justin Marks and Trackhouse Racing are changing the way NASCAR works at a fundamental level. Not so much on track or in the tech shed, but certainly in the way that NASCAR functions as a channel for media and promotion. It's right there in the company's official name, "Trackhouse Entertainment Group." The racing team is just one property of the company, and its mission is to "marry the cultures of music and motorsports." The team's tagline is, "Trackhouse is a sports and entertainment brand rooted in racing, bringing a fresh approach to NASCAR, sports, and entertainment."

The organization is committed to its branding. The Trackhouse Racing team is partnered with "Pitbull," AKA Armando Christian Pérez, a Grammy-winning international recording artist who has sold more than 25 million studio albums and 100 million singles. Instead of the usual sponsor liveries, Trackhouse cars have turned up at Cup races advertising Pitbull's new album, also named Trackhouse. The team is also involved in a series of SLAM (sports leadership and management) charter schools that Pitbull founded to bring tuition-free academic excellence to underserved communities.

"WE MAKE SURE THAT EVERYBODY IN THE COMPANY IS CONTRIBUTING VALUABLE WORK EVERY SINGLE DAY THAT IS TRACKABLE AND ACCOUNTABLE, AND WE KNOW EXACTLY HOW IT MAKES THE SHIP GO FORWARD."

Another of the team's efforts is called Project91. The project was designed to expand NASCAR's international reach by putting world-class drivers from other racing series into Cup races. The team entered former F1 driver Kimi Räikkönen in two races, and in July, Shane van Gisbergen drove the entry to conquer the streets of Chicago in the inaugural NASCAR Cup event.

The man behind the concept and the team is Justin Marks. Marks is himself a NASCAR veteran with a 2016 Xfinity Series win to his name, as well as a successful two-decade career in sports car racing with Trans Am and IMSA. In addition to his role as a NASCAR team owner, Marks has continued to drive, most recently winning a Trans-Am race at Road America in July.

As an owner, his teams have won three championships and claimed more than 30 career wins in the World of Outlaws series. A recent addition to the racing business mix is Trackhouse Motorplex, the go-kart racing facility previously known as GoPro Motorplex, in Mooresville, North Carolina.

We caught up with Marks recently to ask him about his unconventional approach and what it means for the future of NASCAR and racing in general.

"I'M 42 YEARS OLD, AND I LOOK AT THE SPORT AND LOOK AT THE WORLD, AND I WANT TO CHALLENGE THE WAY EVERYTHING IS DONE."

PRI: What makes Trackhouse Racing different from other teams?
Marks: Trackhouse is in the fortunate position of not having any legacy departments in the company or in anything we do. We were able to efficiently engineer this team from the ground up for the Next Gen era of the sport. That continued through the acquisition of Chip Ganassi Racing. We basically just took a real deep audit and said, "The world didn't exist before the Next Gen car hit the race track." We make sure that everybody in the company is contributing valuable work every single day that is trackable and accountable, and we know exactly how it makes the ship go forward, and this is where we ended up.

A big part of it is that we have a relationship with Chevrolet as one of their three key partner teams. Chevrolet invested a ton of money in their technology center. They've got huge engineering and data depth over there, and the results come to us through a communications pipeline, so we don't have to procure that intellectual property in-house. There are other teams that also have that opportunity, but they do want to keep those programs in-house. We have to be as lean and as efficient as possible because we are wholly dependent on partnerships and sponsorships to make this go. It all creates a "one team" mentality where we're just very efficient and good and effective at the work that we do. So just about every week we show up, we've just got very fast race cars.

PRI: Your team goes out of its way to promote community involvement among your team members. How do you think that benefits your organization?
Marks: Being stewards of the community and engaging ourselves as much as possible in "greater good" activities has always been very important. Internally to the company, it provides perspective. And we don't get sucked into this bubble of NASCAR where you get so hyper-focused on your competition that you lose sight of the fact that what we're doing is something that we're very, very lucky to do. I think we should appreciate and see where the work that we do at NASCAR fits into the bigger picture of the American experience. So our crew is empowered to go out into the community.

They've got a lot of programs that they do that are really special and fun. We've done a lot of work with Pitbull's SLAM schools in Florida. We've done speaker series, and our partner CommScope has done STEM events. We just go out and try to contribute to making the world around us a little bit better of a place. We're not the only team doing that by any stretch of the imagination, but it's an important thing to do psychologically for us as people. And it's what every business in America needs to do. Whether you're donating a hundred million dollars to some initiative or you're giving away free sandwiches at the local shelter, it doesn't matter. Everybody's got to do something.

Justin Marks and Trackhouse Racing are "bringing a fresh approach to NASCAR, sports, and entertainment," as the team's tagline states. Trackhouse Racing's forward-facing members include (from left) Marks, driver Ross Chastain, recording artist Armando Christian Peréz (aka Pitbull), and driver Daniel Suarez.

PRI: Your partner Pitbull is a celebrity in his own right, not related to racing, and you pulled him into the sport. Do you think other race teams can and should attract outside celebrities and VIPs into their teams?

Marks: I think that they should, but I also think that there's a right way to do it and a wrong way. It was important for me when Trackhouse started that we had somebody amplifying who we were out to the world in a bigger way than we could, but that it was authentic. Some of the early conversations were very transactional, and it was brand ambassadorship, and I didn't want that. I didn't want to just have someone fake their interest in the team to get paid. I think that's the wrong way to do it. It doesn't stick with people.

Armando (Pitbull) was introduced to us through somebody that we both knew. We told him, "This is who we are, this is what we're trying to do." Then we flew down and sat with him in Florida, and we found that our values and our missions in life were so well aligned that we just wanted to go through this adventure together. He's been very engaged and out in front of it promoting the brand. He's been doing a lot for us and for our partners. So it works very authentically. That's something that I hope will continue and will unlock some doors for other teams to start thinking about that. But it has to be authentic. It's got to be somebody who understands the sport, who really actually understands the sport and sees the value in the partnership for both sides. It has to be someone who will get out in front of it and engage with the team in a very real way.

"PROJECT91 IS SPECIFICALLY GEARED TO VERY HIGH QUALITY, TALENTED RACE CAR DRIVERS THAT COME FROM VERY DIFFERENT DISCIPLINES."

PRI: With your association with Pitbull and your drivers and everything else, you're speaking to a younger demographic than traditional NASCAR and especially IMSA. What are you doing to bring in that younger and more diverse fan base?

Marks: Well, it certainly helps that we've got a guy like Pitbull who has a wide demographic of fans. He gets to take our message out to the world. Being focused on the youth is important because it helps build a strong future. I think it's important for the sport, and I think it's important for any consumer-facing business that wants to build longevity.

We are a young team, and we allow everybody to be young and enthusiastic and to learn and be authentic. I'm 42 years old, and I look at the sport and look at the world, and I want to challenge the way everything is done. Being able to do that in a sport that has traditionally had team owners who are much later in their life gives me an opportunity to attract younger fans.

We certainly don't want to alienate anybody, but that attitude resonates with our partners. We have almost all of our race sponsorship inventory for the next two years already sold. A big part of that is because they want to be a part of the next new thing.

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PRI: Tell me about Project91. What is it and why people should care about it?
Marks: I have noticed over the years that there's a lot of international interest in the NASCAR Cup series because it's unique and high-quality racing. I think a lot of drivers from around the world view NASCAR as a bucket list item. But there's been nothing set up in the sport to really welcome them in, or a framework of a program that's catered specifically to drivers from different disciplines. It was typically just one-offs to roll an extra car out. Project91 is specifically geared to very high quality, talented race car drivers that come from very different disciplines.

"THE TOOLS THAT THE YOUNG PEOPLE HAVE TO DEVELOP THEIR RACECRAFT AND BE PREPARED ARE MORE EFFECTIVE AND DEEPER THAN THEY'VE EVER BEEN."

We provide training programs, familiarization tests, time with Chevrolet and in the simulator, all baked into this one program. We can then build commercial viability around this for our partners. From a promotional and marketing standpoint, I wanted to brand it independently from Trackhouse. We plan to build some brand DNA to attract partners. I like that instead of just being a third car, it's something completely independent that stands on its own.

PRI: What's the source of the Project91 name?
Marks: 91 is the car number, and it encompasses our two other numbers. Calling it Project91 was inspired by some of the secret government projects of the 1960s and 1970s. We wanted a cool, experimental, groundbreaking, disruptive type of name. Like it's a special experimental project about trying to attract the great drivers of the world and put them into NASCAR to see what happens.

PRI: It looks like you're really trying to take NASCAR international. Is that something that's important to you and to NASCAR?
Marks: Everything that we do at Trackhouse is to be good stewards of the sport and trying to help get the sport in front of new people. There's certainly an element of altruism behind that. For us, it's just seizing opportunity that nobody else is seizing. Ultimately, it has to work from a business standpoint, but we're just doing something that needs to be done in the sport.

PRI: Your driver Ross Chastain made that famous move in Martinsville, and it was attributed to video game practice. Do you think that more drivers are going to say they made a move because they practiced it on the simulator?
Marks: Everybody tried that move on a video game, but it takes a pretty rare personality profile to commit and do it in real life! I think that's more Ross's personality to commit that deeply to something. But the bigger answer around simulation is that it is absolutely going to play a bigger role in driver development because the physics engines [programs in the simulators] are getting so good that you can race and learn any time of any day at any age.

Justin Marks is a NASCAR veteran and has had a two-decade career in Trans-Am and IMSA racing, most recently winning a Trans-Am race at Road America in July. As an owner, his teams have won three championships and earned more than 30 wins in the World of Outlaws series.

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"We are a young team," Trackhouse Racing team owner Justin Marks said, "and we allow everybody to be young and enthusiastic." Marks (facing the camera) congratulates driver Daniel Suarez after winning the NASCAR Cup Series Toyota/Save Mart 350 at Sonoma Raceway in June driving the #99 Onx Homes/Renu Chevrolet Camaro.

I think you're also going to start seeing younger and younger Cup-ready stars. It's truly amazing because when I was coming up at 17 or 18 years old, I felt very far away from the NASCAR Cup series level. But nowadays we have 16- and 17-year-olds who look like they're on a path to be Cup-

ready in two years. The tools that the young people have to develop their racecraft and be prepared are more effective and deeper than they've ever been.

PRI: Do you think there's a happy medium between drivers being safe for corporate sponsorship while also allowing their individuality to be at the forefront?

Marks: That's 100% where the balance needs to be found. The fact is, there's just not very much money distributed to the teams in NASCAR, so we're dependent on corporate sponsorships. I think it's gotten to a point where people are afraid of being controversial. They're afraid of saying the wrong thing. Drivers don't want to put themselves out to the world as personalities because of that fear. But there's a balance there because sponsors also love somebody who passionately talks about how hard they're trying to win these races, because ultimately it reflects the stories that brands are trying to tell.

"THERE ARE MORE TEAMS THAT CAN WIN ON ANY GIVEN SUNDAY TODAY IN NASCAR THAN AT ANY TIME IN THE HISTORY OF THE SPORT. AND THAT'S GOOD."

PRI: Do you think NASCAR is better now than it was 10 years ago?

Marks: I think that NASCAR is better in the sense that the level of competition has never been better than it is today. There are more teams that can win on any given Sunday today in NASCAR than at any time in the history of the sport. And that's good.

PRI: If you could make one or more changes to improve NASCAR or IMSA, what would they be?

Marks: I would be making massive investments in the star power of the drivers. I think we've got the competition nailed. We've got the locations nailed. We've got great television partners. But you know, I grew up idolizing these larger-than-life personalities like Dale Earnhardt, Tony Stewart, Jeff Gordon, and so on. I just see a lot less promotion of our drivers by the league these days than when I was growing up. These guys need to be larger-than-life aspirational heroes. I think that's where there's a huge opportunity for the league to invest capital, for the television partners to invest capital, and frankly for a lot of the sponsors of these cars to do what they did for a long time. They would run national advertising campaigns around their driver. I think that's the next big step for growth in NASCAR. PRI

SPECIAL REPORT:

THE CHANGING LANDSCAPE OF CUSTOMER SERVICE

Social media has become a dominant form of communicating throughout many industries, and now it's increasingly a means of handling customer service. But is that effective for motorsports businesses?

By David Bellm

Business is a lot like racing—constantly evolving, relentlessly competitive, and always taking advantage of the latest technology to get an edge. It's no surprise then that more companies in motorsports and the performance automotive aftermarket are tapping into social media as another method of addressing customer service.

While traditional avenues such as emails and phone calls are still used to address customer inquiries, the advent of social media has provided companies with a powerful tool for communication and customer service. It's allowing motorsports companies to build better rapport with customers, strengthen brands, and trigger positive conversations among other potential customers who are witnessing the effective resolution of issues.

But on the flipside, there's also the potential for negative effects. Customer expectations are rising higher than ever, which can prove challenging for companies that haven't adequately prepared, or don't have the necessary resources to accommodate customers through additional channels. And, at the same time, the multi-faceted nature of social media communication can strain centralized, chain-of-command driven teams that struggle to devote resources to other departments when necessary.

Handling customer interactions via social media is a lot like keeping up with a business's inventory demands. "If you try to handle customer questions sporadically, you'll get lost," said Will Farkas of Design Engineering. "You've got to really dedicate time each day to making sure that you are able to cover it."

Given these opposing dynamics, the methods and the degree of commitment to social-media customer service varies widely in motorsports. Some companies have jumped in wholeheartedly, some are dipping a toe in it, and some are avoiding it altogether. And even for those that are embracing it, there's a wide range of methods and expectations being applied to the task.

Nonetheless, social-media customer service experts are looking ahead to a bright future for these platforms in the industry, particularly with the advent of powerful new labor-saving social-media tools driven by AI technologies. These tools could lower the barriers that are keeping some companies from diving into social media as a means of improving customer service.

CUSTOMER SERVICE EVOLUTION

Social-media customer service has evolved considerably in its relatively brief history. Many of the first forays into using social media to communicate with companies came from angry customers taking a last-resort shot at unresponsive businesses in a public forum. But over time, social-media customer service has evolved into a nuanced give-and-take between customers and companies. The topics of these exchanges can be almost anything, including general questions about policies, deep details about products, or even gushing praise from loyal zealots.

Use of various social media platforms in these ways had been steadily growing for years as people in general were spending increasing amounts of time in front of phones and computers, while doing more and more of their business transactions online. Then the pandemic kicked that trend into high gear. With limited means for contacting companies and people spending more time in front of computers during the two-year-long international ordeal, customers began flocking to Twitter, Facebook, Instagram, and other platforms to voice their needs to companies with which they did business.

Besides the undeniable global factors that have fueled customers' expectations of social media as a medium for communicating with companies, there's a more fundamental reason customers increasingly use social media in this way. Today's social media platforms convey a greater sense of there being a real person behind the scenes, compared to the coldly anonymous feeling of a blank email contact form, or an impersonal-looking 800 number listed on a website. The basic sense of humanity on social media tends to encourage customers to use this channel instead of the more traditional email and phone methods.

"I think there's an understanding that social media has to have a person behind it, unlike an email form, which you don't really know if it's actually going to a person," said Andreanna Ditton of RacingJunk.com, El Segundo, California.

Handling customer service through social media allows companies to reach customers where they're already at, in a means that they're comfortable with. This fosters a greater sense of trust and openness among customers. This trust is further enhanced by the experience of seeing other customers successfully having their problems with a company resolved on the platform. This creates a powerful social proof that can foster positive feelings toward a brand and build enduring loyalty.

Scenes like this at speed shops and performance retailers across the country disappeared as a result of the pandemic. With limited means for contacting companies and people spending more time in front of computers during the two-year-long ordeal, customers began flocking to social media platforms to voice their needs.

"There have been studies done that have showed that the overall feeling about that business goes up when people see a problem resolved for a customer," explained Corey Perlman of Impact Social Media, Roswell, Georgia. "The reason for that is people don't expect businesses not to make mistakes—they just want to see how the company is going to respond to those mistakes."

PLATFORMS FOR WORK AND PLAY

Although almost any social media platform is potentially suitable for customer-service interactions, in motorsports and the performance automotive aftermarket the dominant social platforms are Facebook and Instagram. These platforms have become the default standard for car culture, whether it be in the form of videos, cars for sale, or posts about automotive topics. This has fostered a vast audience of deeply enthusiastic users for these platforms, and so they're naturally the place companies in this segment need to be when handling customer service through these channels. For automotive-related companies of all types, platforms other than these two stalwarts tend to be too much effort for too little return, according to our sources.

"For our audience, Twitter was a bigger job than we were able to maintain, and we didn't gain much from it," said Ditton. "We still have a Twitter account that people can connect with us or tag us on. We use it to promote our ads, press releases, and stuff like that, but we don't do a lot of discussion on it. Same with Pinterest."

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Within the car-culture world, Facebook and Instagram users have somewhat different tones and attitudes between the two platforms, driven in large part by the nature of them and the slightly older demographics of Facebook users compared to those of Instagram. But for the most part, the companies we spoke to said the difference in tone and style between the two platforms has become negligible at this point.

"The Facebook and Instagram audiences are more similar than you'd think these days," said Ditton. "We used to see a much different demographic on Instagram than on Facebook. I just don't see that quite as much anymore."

REACHING OUT

Whichever platform is used, customers have three basic methods to communicate with companies: Direct messages (DMs), posts, and tagging. Direct messages are the most private of these methods, and that brings advantages and disadvantages. When messaging a company directly, there's limited damage to a company's brand if the interaction is negative in any way. But, on the other hand, DMs have

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limited potential for enhancing a brand and building general goodwill if the interaction goes particularly well.

Instead of messaging a company directly, customers may also choose to simply put their thoughts in a post, for potentially everyone to see. In the extremes, this can have a very damaging effect if the post is negative, but it can also be a very positive lift for a brand if it's in the form of praise for the company or its products.

The sources we spoke to said that it can be effective and efficient to communicate with customers via posts, but they agreed that the interaction should be moved to private DMs if things get at all negative. Everything is fair game for public consumption and comment when it's in a post. For that same reason, sometimes company representatives need to dial down any negative emotions that can cloud the interaction.

Today's social media platforms convey a greater sense of there being a real person behind the scenes, compared to an anonymous email contact form or 800 number listed on a website. The basic sense of humanity on social media encourages customers to use this channel instead of the more traditional email and phone methods.

"When a negative response or interaction comes from a customer, the first thing you do is not respond right away, because you're emotional about it," said Perlman. "Take a breath. Give it a little time until you can let go of the emotions and can respond in a diplomatic way. Then respond and try to fix the problem. Oftentimes, if you do that, you can turn a critic into a champion. You can turn an unhappy customer into a very happy and loyal customer just by listening and being attentive to them—even if the problem doesn't necessarily get fully solved—just by being empathetic to their situation.

"But if you can't, and this person is just

looking for a fight, then that's the point where you take it offline," continued Perlman. "It's best to say something like, 'I'd like to personally talk with you through this. Please provide me your email,' or 'I'm going to provide our business email here so we can get your phone number and I'll get in contact with you right away.'"

Besides messaging or creating a post that mentions a company directly, customers can also tag a company in a post. Doing so consists of simply putting the company name somewhere in the post, preceded by a hashtag. This can be done on any post, even if it's only tenuously related to a company or its products. Like other methods of contact, this can be a positive, uplifting moment for a brand, or it can be damaging and negative.

That's why it's crucial for companies to continuously monitor what's being said about them online. This technique is called social monitoring, or social listening. Although this is a simple concept, it needs to be done on a consistent basis so that damaging statements don't spiral out of control, fueled by a perceived lack of response from the company. Fortunately, it's relatively simple to manage the process and stay on top of what people are saying.

"THE FACEBOOK AND INSTAGRAM AUDIENCES ARE MORE SIMILAR THAN YOU'D THINK THESE DAYS."

"One easy thing that companies can do to monitor is to set up Google Alerts around their brand," said Perlman. "That way, if something pops up on the Internet with their name attached to it, they'll be alerted by Google via email. Or, if you go to Twitter, or Instagram, or Facebook, or even LinkedIn, you can simply type in your brand name in the search bar, and you very quickly can see if anything's been mentioned about you."

The companies that are the most effective at social-media customer service typically have a specific social monitoring methodology that ensures that job is handled thoroughly and consistently. Bringing greater efficiency and effectiveness to these methods are a number of digital tools that automate the work and provide greater control of the process. But businesses have to be careful to maintain the valuable human component that attracts customers to social media in the first place.

"It all comes down to being authentic," said Perlman. "One of the big questions now is whether businesses should use automatic responses or artificial intelligence services. My thinking on that is yes, as long as you aren't trying to pull the wool over the eyes of the customer—you're not trying to make them think it's a real person. Commonly

asked questions, and requests that come in after hours, can be addressed by automated programs. But when you get to a point where it's more specific, you need to get the customer over to a real person."

These digital methods are typically just one component in a comprehensive suite of effective techniques organizations are using to handle customer service via social media. It's essential to establish a solid, consistent process for handling social-media customer service. Without such systems, the chances of customer interactions turning negative greatly increase. But such a system doesn't necessarily need to be complex or especially sophisticated. It can be as basic as having a set time of day to handle certain important tasks.

"If you try to handle customer questions sporadically, you'll get lost," said Will Farkas of Design Engineering Inc. (DEI), Avon Lake, Ohio. "You've got to really make sure to dedicate time each day to making sure that you are able to cover it. I check things once in the morning, once at lunch, and then once at the end of the day."

DIFFERENT MODES FOR DIFFERENT FOLKS

For the most part, opening up social media channels for customer service questions is largely a matter of companies simply going where their customers are. But

COUNTERPOINT: IGNORING SOCIAL-MEDIA CUSTOMER SERVICE

Although motorsports and performance automotive aftermarket companies appear to be generally embracing the idea of handling customer-service inquiries through social media, some in the industry have intentionally turned their back on these methods. At first glance, such a move might appear to be unfashionably out of step. But, on closer examination, the argument can be made for such a policy in some businesses.

This is particularly true for companies with proprietary platforms that customers use to place orders, check status, and communicate problems. Such businesses may feel that monitoring and working customer service on channels outside the company's existing platform is an unnecessary distraction.

Turn 14 Distribution in Horsham, Pennsylvania, is one such company. At one point, the company did allow the option of working with customers through social media, but ultimately decided that it wasn't as effective as simply channeling those customers back to its own platform.

As a warehouse distributor, Turn 14 works only with established customers who have an account. This means that everyone it deals with is already registered and extensively documented in the company's platform. When clients contact Turn 14, the customer support team can instantly access all of this information in one centralized location. This has proven to be more efficient than jumping back and forth between a social-media platform and the company's own platform.

"We have a full-fledged team of 30 to 40 customer-support employees," said Kyle Crawford. "And we have a whole portal and ticketing system that they use to deal with any kind of customer support requests. We learned pretty quickly that the time that it took us to figure out the order number, or where the part was going, or who it was going to, and then passing that information along to our support team, made it slower than what our support team would have done if they processed a ticket through our system."

If Turn 14 customers do ask questions through social media, they're steered back to the main company platform, where they interact directly with a member of the customer-support team. Because of the efficiency and thoroughness this method provides, customers are generally fine with being routed away from social media, according to Crawford.

"We started replying to social-media messages with a pretty generic response that says, 'If you have a Turn 14 Distribution account, this should be handled through the support channel. If you don't have a Turn 14 Distribution account, you should work through the retailer that you purchased the part from.'"

At the same time, Crawford said that staying exclusively on the company's own platform provides greater security for the company and its customers. "One of the reasons we want people to work through our system is that we don't want any of the information going into the wrong hands. By having access to the ship-to address and knowing what the part number is, sure, theoretically we could look that up in our system, but we don't know who we're actually giving that information to. So by it going through our main channel we keep things secure."

Of course, ignoring social media as a customer service method may not be advisable for all companies. Many customers, particularly those of younger generations, see Facebook, Instagram, and other social platforms as an integral part of life online. But for companies like Turn 14, which has its own robust one-stop platform for serving customer needs, turning away from social media may indeed prove to be a viable option. *—David Bellm*

"WHEN A NEGATIVE RESPONSE OR INTERACTION COMES FROM A CUSTOMER, THE FIRST THING YOU DO IS NOT RESPOND RIGHT AWAY, BECAUSE YOU'RE EMOTIONAL ABOUT IT."

that varies considerably from one market segment to another. To some degree, it comes back to demographics. The enthusiast automotive market in general tends to skew somewhat older in comparison to certain other mainstream products, such as music or video games.

Although older users can certainly be technologically savvy and quite sophisticated in their use of digital devices, they nonetheless often prefer traditional means of communicating with companies. For this reason, the companies we spoke to all emphasized the need to offer multiple channels for communicating with customers. "In our posts and our direct messages, we always have a way to call us," said Ditton. "So as soon as they message us, it gives them a phone number for customer service."

Despite the challenges posed by handling customer service problems through social media, it shouldn't be a cause for fear or hesitation. Instead, our sources say companies should jump in and embrace it as just another opportunity to connect with customers.

"One time a client said to me, 'Why should I have social platforms just to give people another reason to talk about me or my business?'" said Perlman. "But that's exactly the reason why you have this social platform—so that they'll talk about you on your own turf. I would prefer a negative customer come to your social platforms for communicating with you than going elsewhere, like Yelp or Google." PRI

SOURCES

Design Engineering Inc.
designengineering.com

Impact Social Media
impactsocialmedia.com

RacingJunk.com
racingjunk.com

Turn 14 Distribution
turn14.com

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THURSDAY 12/7: 10:00 A.M. – 11:00 A.M.
ALTERNATIVE FUELS: MAINTAINING THE INTERNAL COMBUSTION ENGINE

FRIDAY 12/8: 3:00 P.M. – 4:00 P.M.
EV POWERTRAINS: CONVERTED FOR RACING

SATURDAY 12/9: 10:00 A.M. – 11:00 A.M.
EV RACING: AFTERMARKET PERFORMANCE PRODUCTS

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TECH

THURSDAY 12/7: 3:00 P.M. – 4:00 P.M.
MODERN PERFORMANCE TUNING

FRIDAY 12/8: 9:00 A.M. – 10:00 A.M.
VALVE SPRING TECHNOLOGY

FRIDAY 12/8: 10:00 A.M. – 11:30 A.M.
THE SHAKE, RATTLE & ROLL OF CRANKS & BEARINGS, *Updated for 2023*

FRIDAY 12/8: 1:00 P.M. – 2:00 P.M.
MORE THAN SKIN DEEP: HOW PERFORMANCE STARTS AT THE SURFACE

FRIDAY 12/8: 3:00 P.M. – 4:00 P.M.
ADVANCED TECHNOLOGY IN DIRT LATE MODEL RACING

SATURDAY 12/9: 9:00 A.M. – 10:30 A.M.
ULTIMATE DIRT LATE MODEL SETUP, *Updated for 2023*

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BUSINESS

THURSDAY 12/7: 11:00 A.M. – 12:00 P.M.
DIGITAL ADVERTISING: MEASURING SUCCESS

THURSDAY 12/7: 1:00 P.M. – 2:00 P.M.
STATE OF THE RACING MARKET

THURSDAY 12/7: 2:00 P.M. – 3:00 P.M.
ERP SELECTION & IMPLEMENTATION DOESN'T HAVE TO BE DISRUPTIVE

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FRIDAY 12/8: 9:00 A.M. – 10:30 A.M.
WHY A BUSINESS PLAN CAN MAKE YOU MORE MONEY

FRIDAY 12/8: 10:00 A.M. – 11:00 A.M.
WOMEN IN MOTORSPORTS PANEL

FRIDAY 12/8: 1:00 P.M. – 2:00 P.M.
LESSONS LEARNED FROM ONLINE ADVERTISING

FRIDAY 12/8: 2:00 P.M. – 3:00 P.M.
NETWORKING & MEETING NEW SPONSORS

FRIDAY 12/8: 3:00 P.M. – 4:00 P.M.
DISRUPTING OR PROMPTING: DOES THIS AFFECT HOW YOU APPROACH BUSINESS?

SATURDAY 12/9: 9:00 A.M. – 10:30 A.M.
BEAT THE ALGORITHYM BY BUILDING COMMUNITY

SATURDAY 12/9: 11:00 A.M. – 12:00 P.M.
TECH TOOLS TO INCREASE YOUR ODDS OF SPONSORSHIP

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Advanced Racing Suspensions
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Cometic Gasket Inc
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Farris Equipment Sales
FASS Diesel Fuel Systems
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GForce Performance Engineering
G-FORCE Racing Gear
G-Force Transmissions
GFX Inc
Giant Finishing
Gibson Performance Exhaust
GingerMan Raceway
GNS Auto Parts
Goodridge
Goodson Tools & Supplies
Goodyear Racing - Mickey Thompson Race Tire
Graf Gearboxes
Grand National Super Series
Grassroots Motorsports Magazine
Graymills Corporation
Green Filter
Grex Airbrush
GST Racing Seals
Guiyang Talfri Brakes Co Ltd
GUNIWHEEL
Gusher Pumps - A Ruthman Company
Haas Automation Inc
Hammer Concepts and Designs
Hangsterfer's Metalworking Lubricants
Harrop Engineering USA
Hart's Turbo
Hastings Piston Rings
Haulmark Racing Trailers
Hawk Performance
Headershield
Heatshield Products Inc
Hedman Performance Group
HEM Inc - HE&M SAW Inc
Heritage-Crystal Clean
HKS
HMS Motorsport
Holley
Hondata Inc
Hooker Harness
Hoosier Pattern Inc
Hoosier Racing Tire
Hostile Industries
Hot Shoe Racewear
Hot Shot's Secret
HotRods by Havliks
Howards Cams
Howe Racing Enterprises
HP Tuners
HPL Oil - HPT Turbo - AFIS Injectors
HRP - Hepfner Racing Products - Streeter Super Stands
Hughes Performance
Hunter Engineering Company
Hussey Performance
Huth Ben Pearson International
Hylift Johnson Lifters by Topline Automotive
Hypercraft
ICI Metals
IDIDIT
Ignite Racing Fuel
IMCA
Impact RaceGear
Impact Racing Inc
Indianapolis Motor Speedway Museum
Indianapolis Speedrome
Industrial Hard Carbon LLC
Indy Cylinder Head
Indy Power Products
InEarz Sport
Inferno USA Eyewear
Inline Tube Inc
InnoV8 Race Engines
Innovators West Inc
inTech Trailers
Intercomp
Intercooler Chiller
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IPG Photonics
Irontite Products
ISC Racers Tape
ISKY Racing Cams
ISSPRO Inc
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ItalianRP SRL
Jamison Equipment Inc
Jamo Performance Exhaust LLC
Jase Composites
Jason Dietsch Trailer Sales
JD Squared Inc
Jegs
Jerry Bickel Race Cars Inc
Jesel Inc
JET Performance Products
Jet-Hot Coatings
JGS Precision TCP
JMS Chip Inc
Johnston Research & Performance
Jones Cam Designs
Jones Racing Products
Jones Transmisson Cooling Systems
Jongbloed Racing Wheels
JPW - Jobbers Warehouse Supply Inc
JR1 Racing Oil
JRZ Suspension Engineering
K&K Insurance Group Inc
K&N Engineering Inc
K1 RaceGear
Katech Performance
KB Cores
KB Trailer Sales
KBS Coatings
KD Kanopy Inc
Keizer Aluminum Wheels
Kelford Cams
Ken Perry's Xtreme Arias LLC
Kenny's Components
Kill Devil Diesel LLC
King Engine Bearings
King Racing Products - BR Motorsports Ignitioneering
Kinsler Fuel Injection
Kirkey Racing Fabrication Inc
Klotz Synthetic Lubricants LLC
KnKut Drill Bits & Cutting Tools
KNUTH Machine Tools USA Inc
Kooks Headers & Exhaust
Koolbox Products
KRJ Race Products
KSE Racing Products
Kustom Komponents LLC
Kyowa Eidemiller
L.A.SLEEVE
Label Co, The
Lafrance Performance
Laris Motorsports Insurance
Larry Jeffers Race Cars
Laser Marking Technologies
LAT Racing Oils
Late Model Engines
Lazer Chassis - Bernheisel
League - Legacy
Liberty Engine Parts
Liberty's Gears
Lifeline Fire and Safety Systems
Lincoln Electric Company
Linde Gas & Equipment Inc
Line2Line Coatings
Link Engine Management USA Inc
LIQUI MOLY
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Livernois Motorsports & Engineering LLC
Lizard Lit Pit Lights
LOCK-N-STITCH Inc
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LSM Racing Products - Logan Smith Machine Co Inc
Lubelocker
M&M Competition Engines
M.O.M.S. Place
M1 Concourse
Mac's Custom Tiedowns
Magicmotorsport
MAGIDO USA
Magnafuel Products Inc
Magnus Motorsports
Magnuson Superchargers
MAHLE Motorsport
Mainline Dyno
Mantic Clutch USA
Manton Pushrods - Manton Rockerarms
Maradyne High Performance Fans
Martin Generators
Marwin Sports
Mast Motorsports
Masta Performance Inc
Mastercam
Masters Entertainment Group Inc
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Max Track Time
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Maxima Racing Oils
Maxwell Industries
Maxx performance
MAXX-D Trailers
Mazak Corp
MB Metal Technologies
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MEC CNC Machines
MEGA-Line RACING ELECTRONIC
Mel Hambelton Racing
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Millner-Haufen Tool Co
Milodon
Mittler Bros Machine & Tool
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Moduline Cabinets
Molecule
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Moroso Performance Products
Moser Engineering
Motec USA Inc
Motion Control Suspension
Motive Components Ltd
Motor State Distributing
Motorsports Fuel and Equipment
MOTORVAULT
MPD Racing - Ti22 Performance
MPI USA Inc
MR RACE OIL
Mullins Race Engines
Mustang Dynamometer
MY WER
MYLAPS Sports Timing
MyRacePass
Nankang Motorsport Tire
NASCAR - ARCA
National Auto Sport Association
National Sprint Car Hall of Fame & Museum
National Tractor Pulling Championships
NDRL
Neal Chance Racing
NecksGen
Neo Synthetic Oil
New England Gear Polishing LLC
Neway Manufacturing
NexGenSolutions
NHRA
Nickels Performance Distributors
Niterra North America Inc
Nitro Manufacturing Inc
Nitrous Express - Snow Performance
Nitrous Outlet
Noonan Race Engineering
Northern Radiator
Nostrum High Performance Inc
NPW Companies
Nu-Ice Dry Ice Blasting
Oasis Scientific Inc
Offroad Anonymous
Offroad Motorsports Youth Foundation
Ohio Brush Works
Ohio Crankshaft
Omni Powertrain Technologies
Online Resources Inc
OpenFender
Optic Armor Performance
OPTIMA Batteries
OptiMate High Performance Battery Chargers
OptiTorque Technologies
OTR Filters
Outerwears Inc
Outlaw Diesel Super Series
P1 Manufacturing
PAGID Racing
Painless Performance
Palmgren
Patterson Enterprise
PBM Performance Products
PDRA - Professional Drag Racers Association
PE Racing
peel 3d
PennGrade 1
Penske Racing Shocks
Performance CBN
Performance Data Systems
Performance Design
Performance Driveline Engineering
Performance Electronics
Performance Engineering & Manufacturing LLC
Performance Plus Global Logistics
Performance Plus The Leading Edge
Performance Tube Bending
Peterson Fluid Systems - Specialty Products Company
Peuphratica Precision Technology Co Ltd
PFC Brakes
Philadelphia Racing Products
Pit Pal Products
Pit-Pro Custom Carts
PJH BRANDS
Platinum Racing Products
Plymouth Tube Co
PMAS Technologies
PML Inc
Podium 1 Racing
PolyDyn Performance Coatings
Poppe-Potthoff
POR-15 - American Icon
Portatree Timing Systems Inc
Power Automedia
Powerbuilt Tools
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Powermaster Performance
PowerMist Racing LLC
PRC - Precision Racing Components LLC
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Pro Spot International
Pro Ultrasonics
ProCharger Supercharger Systems
Professional MotorSports Solutions - PMSS
Pro-Filer Performance Products
Promaxx Performance Products
ProMedia LLC
Prosub USA
ProThings Apparel
Pro-Tint Inc
PRW Industries Inc
PSI Power Inc
PTP Turbo Blankets
Pulsar Turbo Systems
Pure Drivetrain Solutions
PureForge
PWR Advanced Cooling Technology
Pyrotect
QA1
Qingdao Lakesea Tyre Co Ltd
QMP Racing
QTP Quick Time Performance
QualCast LLC
Quantum Machinery Group
Quda Auto Parts
Quick Performance
QuickCar
QuickJack
R&M Race Trailers
Race Engine Technology
Race Monitor
Race Parts Liquidators - Drop The Hammer Auctions LLC
Race Ramps
Race Star Industries
RACE TECH Magazine
Race Tools Direct
Race Winning Brands
RaceCals
Racecar Engineering Magazine
RACEceiver - Flagger
Racers For Christ
Racetech USA
Racetronics
Racing Electronics
Racing Optics
RacingJunk.com
Racingrivets.com
Radical Race Gear
Radium Engineering
Randy's Racing Filters
Raybestos Powertrain
Rayfast USA
RC Components
RCI-Racer's Choice Inc
RCV Performance
RECARO Automotive
Red Camel Racing
Red Line Synthetic Oil
Red Wood Enterprise Co Ltd
Redhorse Performance
Redline Ace
RedTide Canopies
Redwood Rally - Motorfab
Regis Manufacturing
Reich Tool & Design - Orr CNC
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Reid Racing Inc
Reid Rockerarms
REM Surface Engineering
Remflex Exhaust Gaskets
Renegade Performance Fuels & Lubricants
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Rocket Track Products
Rockett Brand Racing Fuel
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Ross Racing Pistons
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Rowe Electronics Inc
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RPC
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RT Sales
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S&S Diesel Motorsport
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SADEV Racing Transmissions
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SP Tools USA
SPA Performance USA
SPA Technique Inc
SPAL USA
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SPEED SPORT
Speedbear Fasteners
Speedmaster
Speedtek Transmission Components
SpeedTour
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SpringTools
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Taylor Motorsports Products
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THE SHOP Magazine
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Thermo Tec Automotive Inc
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Track Systems North America
Trackside Systems
TracTive Suspension
Trailer Alarms
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Trick Titanium
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Turbosmart
Turbostart Batteries
Turn 14 Distribution
Turn One Steering
Turnkey Trailers
TW Metals
UCoat It
Ultimate Awning
Ultimate Headers
Ultra Shield Race Products
Ultrasonic LLC
Ultrasonic Power Corp
UMI Performance
Uni Saf
UniSteer
United Engine & Machine
United Race Parts
United States Auto Club
United States Postal Service
United Trailers
USA East Sled Pulling
VAC Motorsports
Vahlco Racing Wheels
Van-K Wheels
Vanson Leathers Inc
VBOX Motorsport
Velocita USA
Verge Quick Outlaw Series
Vibrant Performance
Victory Custom Trailers
Viking Performance Inc
Vision Wheel
VMP Performance
VP Racing
Vyper Industrial
WABAM
Wagler Competition Products
Wagner Tuning Inc
Walker Performance Filtration
Walter US
Weddle Industries
Wegner Automotive
Wehrli Custom Fabrication - WCFab
Westhold Corporation
Westwood Cylinder Liners Ltd
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Whelen Engineering Co Inc
Whitney Tool Co Inc
Wholesale Horsepower LLC
Wieland
WIKD Motorsports
Williams Engineering LLC
Willy's Carb & Dyno Shop LLC
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Wizard Cooling Performance Radiators
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World Racing Group
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XS Power
Xtrac
Xtreme-DI
Yarde Metals
Yella Terra
YourDyno.com
Zamp
Zeitronix
ZF Race Engineering North America
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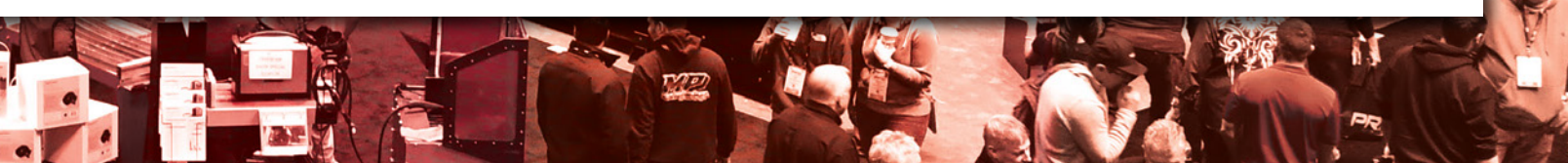
ZyCoat High Performance Coatings



CHALLENGING THE GRID

ELECTRIC VEHICLES ARE POISED TO CHANGE THE AUTOMOTIVE LANDSCAPE IN THE COMING YEARS, BUT THERE'S STILL MUCH WORK TO BE DONE TO PROPERLY INTEGRATE THEM INTO MOTORSPORTS.

By Bradley Iger

While we're still in the early days of the automotive industry's collective shift toward electrification, there's no question that EV technology is becoming a regular topic of conversation in the motorsports realm. It may still be a while before we see cars lining up at the 24 Hours of Le Mans that are motivated solely by electricity, but to be ready for that day, the pieces need to be in place to make it work.

As it stands now, much of the discussion is focused on the unique safety challenges that these types of vehicles bring to the table. At the moment, there's a sense that many organizations are taking an ad hoc approach to those concerns, likely due in part to the fact that EVs currently represent a small fraction of the car count at most events. But mounting evidence indicates that this tech will become a common sight in various racing disciplines sooner rather than later.

"We're already starting to see a lot of it in the NHRA," said Danny White of White Services Group, Indianapolis Indiana. Formerly the director of motorsports at Purdue University, White also oversaw the evGrand Prix racing program, which brings together college teams from across the country to compete in student-built, lithium-ion battery pack-powered karts. "I also think IMSA will embrace it more and more as we go forward, and I know that USAC has reached out to us about electrifying a midget for demonstration. Who knows where they might go with that, but it's clear that EV technology is taking on greater importance in motorsports."

As this interest builds, many sanctioning bodies and tracks are finding themselves at an early crossroads where they must choose between supporting this emerging technology or shying away from it, and some are choosing the latter. Although the rationale behind some of that trepidation isn't without merit, some of the biggest challenges may be easier to address than they appear at first glance.

EXTINGUISHING CONCERNS

While shock risk and vehicle weight—which, in some disciplines, could potentially be nearly double that of a typical ICE-powered entry—are significant aspects of the EV motorsports safety discussion, vehicle fire response continues to be the largest challenge facing organizers

today. The focus isn't necessarily on the driver, though. Rather than quickly igniting and rapidly engulfing an area, as gasoline fires often do, the threat of injury from a battery fire is fairly low because it typically takes much longer for the flames to spread.

While statistics have proven that EVs are much less likely to catch fire after an incident than their ICE counterparts, the concern is that once a battery fire starts, it can be incredibly difficult to put out. Along with the unique chemistry involved in these types of fires (which necessitates the use of specific fire retardants in order to efficiently respond), the battery packs used in production vehicles are usually designed as enclosed, reinforced units to protect them from damage by outside elements, and that can make it very difficult to get the fire retardant where it needs to be to put the fire out. As a result, the risk of property damage by an EV fire—be it to the road surface below it or structures around it—is a serious concern for some track owners.

Entropy Racing opted to power its EV race cars with lithium ferro-phosphate batteries, which are less volatile than lithium ion. "We took about a 15% weight hit because of that," said Charlie Greenhaus, "but we felt that this chemistry would be more readily accepted by organizations because of the safety benefits."

"Right now, there's really no definitive procedure for fighting these types of fires," said John Metric of the National Electric Drag Racing Association (NEDRA), Lake Jackson, Texas. "The perpetuating story is that you have to douse it with many thousands of gallons of water, and then that water becomes a hazardous liquid pollutant on the track afterward. And if you don't have the right equipment to respond to it, you may end up having to shut down the event."

Metric added that one response method that's gained traction in recent years is simply to pick up a burning EV with a front loader or crane and move it to a designated location in order to fight the fire while mitigating potential damage to the track. But other solutions are also beginning to emerge. The Scalar SCR1, for example, is a purpose-built EV road race car that has a fire suppression system that runs through the battery itself, allowing the agent to get

directly to the source of the fire. There's speculation that OEMs may begin to incorporate special ports into their battery pack designs to make it easier for first responders to get that agent where it needs to be in production vehicles, too.

In the meantime, companies like Rosenbauer International are also developing firefighting equipment that's meant to deal with EVs specifically. Its Battery Extinguishing System Technology (BEST) uses a low-profile design that makes it easier for firefighters to access the undercarriage of the vehicle, where most battery packs are mounted in road-going EVs. The system uses a high-pressure nozzle that can pierce through the casing. According to details from Rosenbauer, about 260–1,000 gallons of water are typically needed to bring an engulfed battery pack down to a safe temperature, a fraction of what's often required when responding to an EV battery pack fire with conventional equipment.

Fire suppression additives like the F-500 Encapsulator Agent—which is readily available on the market now—are also said to provide more effective EV fire response with traditional gear, but others cite the use

The SCR1 race car from Scalar Performance has a fire suppression system that runs through the battery, allowing the agent to get directly to the source of the fire. Photo courtesy of NASA.

"PROBABLY OUR BIGGEST CHALLENGE IS FINDING ANOTHER PERSON, ASIDE FROM THE PERSON WHO BUILT THAT CAR, WHO CAN LOOK AT IT WITH AN EDUCATED EYE AND DO A TECHNICAL INSPECTION ON IT."

of different battery chemistries as a better way to address the problem.

"The chemistry in most road-going cars is lithium-ion," noted Charlie Greenhaus of Entropy Racing, Sacramento, Pennsylvania. "That's one of the most volatile battery chemistries out there. For our EV race car, we chose a lithium ferro-phosphate chemistry because we felt it would be safer in that regard. We took about a 15% weight hit because of that, but we felt that this chemistry would be more readily accepted by organizations because of the safety benefits."

MODERNIZING THE CURRICULUM

Heyward Wagner of the Sports Car Club of America in Topeka, Kansas, told us that one of the larger obstacles facing sanctioning bodies with EV integration into their programs is simply a lack of foundational knowledge. While internal combustion cars have been commonplace for more than a century, EV platforms and technology have not, and this disparity has implications on several levels.

"I think the biggest challenge for a sanctioning body in 2023 is that a Mazda

The evGrand Prix race program brought together college teams from across the country to compete in student-built, lithium-ion battery pack-powered karts. The photo was submitted by Danny White, who was the director of motorsports at Purdue University and oversaw the evGrand Prix program.

Miata can't really get into a situation that we don't already know how to get it out of. We know how to pick one up off of a tire wall, we know how to turn one over after it's flipped, and we know how to quickly put it out if it catches fire. It really doesn't matter what a Miata does at a race track because we already know how to solve for that. Right now, as far as institutional knowledge within the organization goes, we can't say the same for a Tesla Model 3."

That knowledge base will inevitably grow as time goes on, but in the here and now, White said that specialized training for first responders is vital. "It's definitely a situation where you don't know what you don't know. You've got folks all around the country who work races, and they're first- or second-class firefighters. The problem is that this situation not only takes a firefighter, it also takes a HAZMAT technician. So, in order to effectively work an EV race, they need to be trained for that as well. There are a lot of factors involved that they may never have had to consider before, and that changes a lot of things."

Greenhaus also explained that more comprehensive EV-specific knowledge is going to become increasingly crucial for proper tech inspection as well. "Another very real problem right now is that, while we don't lie to sanctioning bodies about what's in our car or how it's designed, they wouldn't know if we did," he said. "They're either going to believe you, or they're going to spend a bunch of time and energy for a very small portion of their participants. Most of these

Entropy Racing conducts EV safety seminars with track workers. Charlie Greenhaus believes more comprehensive EV-specific knowledge is going to become increasingly crucial for proper tech inspection.

organizations just don't have the internal capacity to verify some of these things. It's not like an engineer looking at a roll cage. It's much more complex than that."

Wagner agreed. "When you start talking about the more home-built stuff—whether that's an EV swap into a platform that was formerly ICE-powered, or some sort of custom EV Formula car, or something like that—probably our biggest challenge is finding another person, aside from the person who built that car, who can look at it with an educated eye and do a technical inspection on it," he explained.

UPDATING BEST PRACTICES

Even though we're still in the early adopter phase of EVs in motorsports, sanctioning bodies are beginning to establish comprehensive rules packages that should help keep the playing field level and minimize confusion for would-be EV racers.

"The NHRA recently did their first major rework of their EV rules in more than 15 years," said Metric. "This is the first version that wasn't just basically a straight copy of the NEDRA rules. We worked together with the NHRA to put together a package that makes sense for them, and they'll be using them for this year's Summit Super Series. We had around 10 EV entries in the series last year. They were still dwarfed by the number of internal combustion cars there, but it's growing. You add a few cars each year, and pretty soon, you have a significant impact on it. The performance of these cars is very repeatable, and that's what wins drag races."

He added that the ruleset's battery design mandates should address concerns about how to properly respond to EV fires. "As far as custom drag cars go, this NHRA ruleset revision has a pretty good take on how to get water into each battery case, and the requirement of a vent on the bottom so it's venting downward. It covers the construction materials and firewall design as well. It took us months of deliberation to establish something that everyone was satisfied with, and it seems to be a good approach."

From Wagner's perspective, at this stage it ultimately comes down to proper preparation. "Autocross, for example, has existed for a very long time with the idea that if you have a fire, you're going to use a fire bottle. And you're going to call local emergency services to bring a fire truck if needed—it wouldn't be onsite. So, for an autocross event with electrified vehicles, it means things like having a specialized fire bottle onsite, along with high-voltage gloves and things like that. It's about figuring out how to get to a level of equivalency with our ICE response."

That same perspective should be shared by EV racers, he said. "I think you have to understand that, when you show up at an event with an EV right now, it's not likely that there's going to be a lot of organic knowledge already there for you. So it's going to be important for these early adopter drivers to educate themselves, so they understand things like how to jack the car up, what to do if the vehicle needs to be towed, what warning lights mean, and what needs to be done in order to make sure the car is fully off."

But as Metric pointed out, the larger integration of EVs into motorsports is likely to be a gradual process rather than the flip of a switch. "The bigger shift will happen when these cars are out of warranty, the dad is handing the car down to the kid, and the kid wants to hot rod it. At that point you're talking about hacking the computer, figuring out what can be removed from the car to lighten it, and that kind of thing. I think that when that cycle starts, things will ramp up. But when a car starts at $100,000, that doesn't happen very quickly." PRI

SOURCES

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nedra.com

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scca.com

White Services Group

BUILDING MOMENTUM

THINKING OF ADDING EV COMPONENTS TO YOUR PERFORMANCE RACING BUSINESS? THREE REAL-WORLD EXAMPLES ILLUSTRATE THE BENEFITS—AND PITFALLS—OF EXPANDING INTO THE GROWING MARKET SEGMENT.

By Drew Hardin

Whether they're perceived as the wave of the future or as soulless automatons, there's no denying that electric vehicles are becoming a bigger part of the transportation segment in general as well as the racing community. Proponents point to the electric motor's inherent ability to produce instantaneous and prodigious torque, while, especially at the high end of the market, EVs are setting new performance benchmarks that often eclipse their internal combustion-powered competitors. And that's straight off the showroom floor. Aftermarket modifications will only make these EVs quicker, faster, and stickier, traits racers have been noticing for some time now.

This growth is causing some racing and performance businesses to consider a move into the EV space. In many ways, the EV modification industry is still in its infancy, which can be a good time to join the party, particularly for a company that relishes taking part in the creative thinking necessary to further expand the category. On the other hand, a lack of product—and experience—may deter some companies from participating at all, or at least cause them to postpone entry until the market is more mature.

To help any company weighing this decision, we spoke with three aftermarket businesses that have expanded into the EV marketplace, each to varying degrees. Their real-world experiences and insights should provide important guidelines for those considering EV expansion.

THE CONVERT

"I had no interest in the EV market at all," said Bisi Ezerioha of Bisimoto Engineering, Ontario, California. "We were quite happy with the petrol stuff."

Now, performance EV conversions make up 90% of his business. "We have pivoted tremendously."

The root of that pivot was a fundamental shift in Ezerioha's business. For years, Bisimoto Engineering specialized in building exhibition vehicles for OEMs to display at trade and auto shows. "They would come to us if they had a new model that they wanted to appeal to the youth market and have us put our spin on it, make it exciting, hip, to appeal to a certain marketplace," Ezerioha explained.

Yet over time, budgets for his OEM contracts were shrinking, and Ezerioha wasn't sure why until Harmon Kardon approached him to build a Hyundai Tucson for the Consumer Electronics Show (CES).

Photo courtesy of Evasive Motorsports and Larry Chen

When he delivered the tricked-up CUV to the convention center, he saw that "the very same companies that were cutting my budgets were there in Vegas with splendor. The booths were out of control. The budgets for the cars being built for CES looked like they were multiple times what we were accustomed to. And guess what? All the cars were electric prototypes."

Ezerioha realized that "even though I was very vocal with my discontent with the EV marketplace, I couldn't help but notice what my partners were doing. They weren't even considering me as a go-to for these projects. If I wanted to remain relevant in the business, I needed to explore this technology."

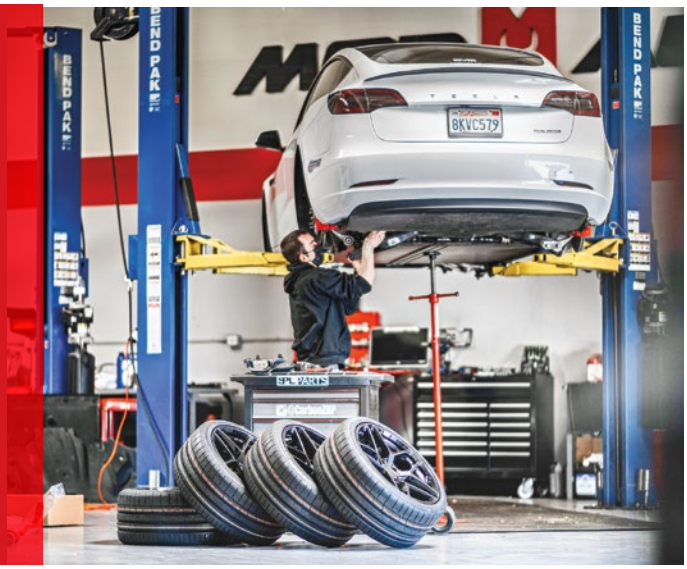
After his CES epiphany, Ezerioha "reluctantly decided to build my own EV. Since I'm a performance guy, it was my goal to build a performance-based EV." The result was an electric Porsche 935 tribute called the K3V. It's powered by a 475 kW (636 hp) single-drive custom AC 3 phase induction motor fed by LG 60-volt lithium-ion batteries. Some of the car's componentry is off-the-shelf, while others Ezerioha and his team designed for the car.

When the K3V was finished, "the first time I drove the car, I almost urinated on myself," he recalled, laughing. "It was the most amazing experience. The torque, the acceleration, the sound. It had this supercharger-like whine to it. There was no lag. I've built high-horsepower naturally aspirated cars. I've built high-horsepower supercharged cars, and those were lousy compared to what I experienced in the K3V. As an enthusiast, it checked all my boxes. Overnight, I was a convert."

That was in 2018. The media attention he received from the K3V resulted in prospective clients bringing cars for him to convert. The pandemic slowed his OEM business, and now he works solely on cars for private clients. Most of the EV conversions are being done on "cars of historical significance," he said. The nine cars currently in his shop include several Porsches and a Caterham. They are "all classic vehicles that we're upcycling with modern technology."

The cars he's building now "are quite different than what I built in 2018. They are more advanced with more safety features and more fail-safes. They're faster, and they're more exciting." Conversion costs can range from $70,000–$100,000.

While traditional ICE vehicles "still dominate" the parts sales and installation services at ModBargains, EV parts sales "are up to about 40% of our business," said Ron Hay. "It's climbed tremendously. It's a major focus for us. Our customers were there, and we started getting pulled into it."



That's pricey, but a far cry from the $240,000 Ezerioha spent converting the K3V. "Not because it cost that much at all, but because I made so many mistakes trying to figure things out," he admitted. "Many times I'd go to some of the 'gurus' in the industry to learn from them, and many of them like to keep their cards close to the chest. My biggest education came from my OEM peers at Hyundai, Karma, Canoo. They ended up being the best educators for me. Not the other conversion shops. They were not very helpful."

"IT'S SAFE TO SAY THAT THE EV MARKET IS ONLY GETTING LARGER, SO WE DECIDED WE NEEDED TO ADAPT AND SEE WHAT WE COULD PROVIDE FOR IT."

Learning from that experience, Ezerioha willingly shares what he knows. "I help anyone. I have this show every Tuesday on Instagram ["Bisimoto Tech2sdays," 12 p.m. Pacific], where anyone can ask me questions about anything, and I feel free and share all my knowledge and insight. I have no objection to helping others because it makes the entire industry get better and stronger."

Among his insights: "The chassis presents its own interesting set of problems as we build these cars. A standard 930, even the 911, tends to be quite tail-heavy. Many companies—KW, Eibach, Öhlins—designed suspension systems that can work very well with these rear-heavy chassis. Well, with our electric components and batteries, we tend to distribute weight more evenly instead of being tail heavy. When you use those suspension components in such cars, they don't handle very well. They tend to oscillate. So we had to redesign the suspension to cope with our improved weight distribution. That sounds very elementary, but it was a problem we had to solve. We can't send cars out into the field with factory style or factory upgraded suspensions that are rocking as they drive up and down the street."

When asked about advice he'd have for companies looking to enter the EV space, Ezerioha said, "Do your due diligence. This is dangerous stuff. A lot of petrol heads may be used to throwing on carburetors, intake manifolds, fuel injectors, engine management solutions, but this is a whole different animal. Most of the conversions out there are recycling Tesla drive units,

and they have 400-plus volts. The newer technologies are shooting toward 800, maybe 1,200 volts. This can kill you. Educate yourself. Seek the knowledge and experience, and partner with someone who's done it successfully. Learn as much as you can and have an open mind. It can be quite an enjoyable experience. You can create amazing projects for your customer base."

NEED TO ADAPT

When it first started selling aftermarket parts in 2002, Evasive Motorsports of Cerritos, California, specialized in Japanese performance vehicles. It still does. "We are best known for Honda S2000 and Civic Type R; Toyota Supra, FR-S, and GR86; Subaru BRZ; Nissan GT-R; and Mitsubishi Evo," said Tony Kwan. "We have competed in Time Attack since it started in the US, and this [2023] will be our ninth year at the Pikes Peak International Hill Climb."

The company has also expanded into selling parts for some domestic and European brands, "and we recently added EVs to our specialty, specifically Tesla," added Kwan.

"We saw the popularity of the EV market increasing, especially with the introduction of the Tesla Model 3," he explained. "Many customers were starting to modify this platform and even take it to the track. It's safe to say that the EV market is only getting larger, so we decided we needed to adapt and see what we could provide for it. All car manufacturers are entering the EV market, and there are many electric racing series as well. EV may very well dominate the automotive industry within the next couple of decades.

"Most of our business is still ICE," Kwan continued. "EV is only a small part of our business."

Kwan acknowledged that, "for the most part, EVs such as the Model 3 aren't easy to modify in terms of power. There's no engine to modify, and you're maxed out to what the electric motors that come with the car can produce." The company did "learn a lot" from the Model 3 it raced at Pikes Peak in 2021 and 2022. "The modifications we focused on were to reduce weight, increase cooling, and on the aerodynamics, suspension, wheels, and tires. We have worked with a lot of the best companies in the industry to develop parts for our builds."

To take weight off the Tesla, Evasive duplicated the factory doors, roof glass, rear trunk, and rear door windows in carbon fiber. "The carbon race splitter, diffuser, and wheel aero discs were custom designed by us under the EVS Tuning brand," Kwan said. "The dry carbon GT Wing was provided by our good friends at Voltex, and we designed the wing mounts in-house." Artisan Spirits made the widebody aero kit; and a set of TP-5 wheels, custom made by Titan 7 to fit within the kit's wheel openings, mounted Yokohama racing slicks. KW Suspension

"People keep saying EVs have no soul," said Bisimoto Engineering's Bisi Ezerioha, "but maybe that's because they've just experienced a Nissan Leaf or base Tesla Model 3. The 930 tribute we just finished, Moby X [seen here under construction] has so much soul I should have called it James Brown."

provided custom motorsports coilovers, and Brembo custom made brakes for the car as well. "Sparco provided the steering wheel and racing seat to help our driver, Dai Yoshihara, navigate through the corners and withstand all the G forces."

Cooling is essential on the Peak, and CSF provided additional coolers for the batteries and oil coolers for the front and rear powertrains, Kwan said. ENEOS provided specialized gear lubricants for the EV.

"Our major sponsor, Turn 14 Distribution, deserves praise as we've worked together throughout the years," Kwan added. "With their help, we were able to establish the Model 3 race program for 2021 and 2022." In 2022, Yoshihara finished with an 11:06 time, "taking second in the Exhibition Class, ninth overall, and was the fastest EV for the 2022 PPIHC. It was a great accomplishment for us."

Beyond the successful Pikes Peak program, expanding into the EV market has enabled Evasive to "service new customers and continue servicing past customers who may have purchased an EV," Kwan said. When asked if there had been any downsides, he was candid. "There's some backlash in the automotive community. Many enthusiasts aren't attracted to EVs and believe they're boring or even soulless. We understand where the argument comes from, but it's more of a different experience. Some people questioned why we were getting into the EV market, but we only want to learn as much as we can and continuously expand our knowledge of its application in a motorsports environment.

"Sometimes change is difficult but necessary in order to keep going," he continued. "That's the only way to continuously evolve your business model, no matter what industry you're in."

CATER TO CUSTOMERS

ModBargains, headquartered in La Habra, California, has been an online performance parts retailer "even before iPhones," said Ron Hay. Initially the company specialized in BMW performance, "but as our customers gravitated to other vehicles—maybe they had an Audi or a Porsche—then we slowly fell into it because our customers were pulling us in that direction."

That kind of evolution is how ModBargains began outfitting EVs as well. "We started seeing trends with consumers, especially here in Southern California," Hay explained. "It really is kind of the hub of it. Our customers were there, and we started getting pulled into it, so we decided, okay, let's cater to our customers." Six years later, "we're still growing, still learning from it. It's another horizon for us."

Plus, Hay pointed out, "regulations are changing. With the EPA and CARB doing their enforcement, doing high-performance type products is not going to happen. And a lot of new vehicles have a great amount of power anyway. So that was a dying area for us. We could see sales dropping." Parts sales for traditional ICE vehicles "still dominate," he said, but EV parts sales "are up to about 40% of our business. It's climbed tremendously. It's a major focus for us."

Parts for Tesla models make up the biggest share of his EV business, "but you're going to specialize in what's available to you. In the shop we have a Model S and a Model 3, so we have the experience of working

Tesla models are the "dominant platform" among ModBargains' EV customers, Ron Hay said. The most popular components are aerodynamic pieces, wheels, and suspension components. "Track vehicles is a growing area," he added, "as a lot more vehicles like Model 3s are going to the track. I know they have issues—how do we handle overheating?—but those are just new frontiers for us to explore."

on those." Other EVs are "coming on," he added. "I've been doing a lot of Mustang Mach-Es. They're coming on to the scene and they're doing really well."

Hay said that the most popular parts ModBargains sells for EVs are aerodynamic pieces, suspension components, and wheels. One of the biggest benefits of expanding into the EV market has been "discovering and working with new companies and discovering new products. It took us out of our comfort zone, working with new companies that are willing to go with cutting-edge stuff."

But that can be a downside, too, he acknowledged. "Because there's all that opportunity for new products, there are a lot of companies out there that are making products that, in my opinion, are not the best. That hurts consumers, and that can hurt consumer confidence.

"I want this industry to grow," Hay continued. "I want our customers to modify their cars a lot longer into the future, to make it a positive experience. So when products come out that are not as good, not of the quality that is needed, that leaves a sour taste in the consumer's mouth. It hurts us as a retailer, hurts the manufacturer of that product, and it hurts the long-term effect for this industry because those people will not recommend it."

"THE MODIFICATIONS WE FOCUSED ON WERE TO REDUCE WEIGHT, INCREASE COOLING, AND ON THE AERODYNAMICS, SUSPENSION, WHEELS, AND TIRES."

One way Hay is trying to keep the experience positive is through a vigorous education program. "I want to educate people, to make them confident in this industry," he explained. To that end, he posts numerous technically oriented blogs on the company's website and also created a YouTube channel, Talking Mods, "to help this industry out with all the different issues that come up."

He also encourages other performance aftermarket companies to "reach out to companies like ours, companies already working with these products, to get the right products that you want to have. The parts can be hit-and-miss, and trials and tribulations can happen."

The EV market in general, and EV mods in particular, are new, Hay pointed out. "You have to be patient with it, spend time with it, learn it." Ultimately, though, Hay feels "it's nothing too far off from what we've done. It's still a vehicle. It's just a little different to diagnose. There are opportunities for us all in this industry to work together. Our doors

The majority of Bisimoto Engineering's business used to be building gas-powered show vehicles for display at trade and auto shows. "Now we are 90% EV conversions and that may grow by the next quarter," said Bisi Ezerioha. "Demand is just amazing, and as the components get more ubiquitous, I'm sure the prices will go down and even more people will be open to it."

are always open for people who want help with anything that they're working on. If we can help each other, it only makes it that much easier for all of us to get into that marketplace and have an easier time with that marketplace."

Hay did make a point to say that, when a traditional performance parts company moves into the EV space, "you may have people who don't want to be part of that. It may not be the image you want. That's going to be a problem that a lot of people will face. It has to be a collective thought process to move toward the EV market."

But, he added, "you can always do it the way we did it. You don't have to be 100% EV. You can still cater to both. In my opinion, it hasn't hurt us in any way. It has allowed us to cater to people across various markets. A lot of our customers who had BMWs or a Porsche, they own EVs now, and we moved along with them." PRI

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bisimoto.com

Evasive Motorsports
evasivemotorsports.com

ModBargains
modbargains.com

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Photo courtesy of Legacy EV

ADAPTIVE LEARNING

By Bradley Iger

EVs still account for a small fraction of annual new car sales in the United States and throughout most of the world, but if manufacturers and governments maintain their projected roadmaps, we're in for a significant shift over the coming decade. Considering that there are more than one billion internal combustion vehicles on the road today, according to a Bloomberg New Energy Finance report, it will still likely take some time for battery power to become the prevalent means of propulsion, but the implications for performance shops and top-tier racing teams may prove to be more immediate.

"Our mindset at the college is that we don't expect this to entirely replace internal combustion engines," said Taylor Brooks, Automotive Technology faculty member and department chair at Saddleback College, Mission Viejo, California. "What we'll more than likely see is a mix of multiple types of technology that integrate the benefits of different types of systems into appropriate applications. I think that affects the focus for technicians. They might have a strong background in internal combustion, but we're moving toward an environment where ICE and motor generators are working in the same space. We're already seeing that in road-going supercars and at the upper levels of racing. So it would be wise for individuals who're really interested in piston-driven engines to understand these emerging technologies."

AS MORE ELECTRIFIED PLATFORMS FIND THEIR WAY INTO MOTORSPORTS, THE DEMAND FOR ENGINEERS AND TECHNICIANS WITH SPECIALIZED EXPERTISE IS POISED TO RISE IN TURN. A GROWING NUMBER OF CERTIFICATION AND TRAINING PROGRAMS ARE NOW AVAILABLE THAT ARE FOCUSED ON EVs.

Given that need for training and foundational knowledge in the electrified realm, an increasing number of schools and automotive organizations are developing curriculums that reflect this evolution in the industry. These programs are designed to help new technicians establish those skill sets, and also provide seasoned professionals with the foundational knowledge required to safely and effectively develop, tune, and maintain high-performance vehicles that utilize these technologies.

LEGACY EV

Established in Tempe, Arizona, in 2019, Legacy EV is a parts distributor and educator, said Tom Santilli. "We provide parts and kits for electric vehicle conversions, as well as the documentation and education needed to install those components safely."

Legacy EV has partnered with more than 60 different manufacturers to create turnkey solutions for those looking to integrate this technology into vehicle platforms that weren't originally designed for it. But to make it all work, the individuals who are turning the wrenches need proper familiarization as well.

"The company's president and co-founder, Mavrick Knoles, is also a Teach for America alumni," said Santilli, who is a Legacy EV curriculum specialist. "So, like myself, he has a background in education, and he recognized the opportunity to upskill, and allow automotive technicians to grow into also servicing electric vehicles. A gas-to-electric conversion is a great way to leverage an automotive tech's existing knowledge about ICE while expanding their understanding of high-voltage electrical systems."

He said that technicians will need to be fluent in both ICE and EV technology in

The Auto 231 class at Saddleback College focuses specifically on hybrid and electrical vehicle technology. EVs at the college are used to demonstrate principles including the differences between an AC drive motor and a DC drive motor. Students "get experience rebuilding the lithium polymer batteries that are in our AC and DC Switch Lab vehicles, too," said Taylor Brooks.

the coming years. In terms of the latter, the safety protocols are crucial to that fluency.

"High-voltage safety is a huge component to this learning," Santilli explained. "It can be difficult to know when you're in an electrically dangerous situation because often it is silent and not clearly noticeable. You need to have an understanding of things like how to use electrical measuring tools and an awareness of the consequences of resistance and insulation, and how to identify proper PPE and when to wear it. Creating electrically safe working conditions is something we really emphasize in our training."

Legacy EV's Certified Technician program consists of a five-module online course that covers topics ranging from an overview of EV components and safety best practices to wiring, mounting and fitment of parts, and tuning. "We cover the common parameters you'd set with this type of powertrain, data logging, and how to interpret that data in order to refine and tune the vehicle's behavior," said Santilli. "For example, when you're setting parameters for your battery management system, you're going to have to know what type of battery chemistry you're using because that will have a certain low-voltage and high-voltage cutoff, and the battery is going to operate optimally within a certain set of conditions."

In addition to these online courses, Legacy EV also provides a week of in-person training to give students hands-on experience that they can then apply to the EV conversion project they're working on. Students are also provided with support as they work their way through the build.

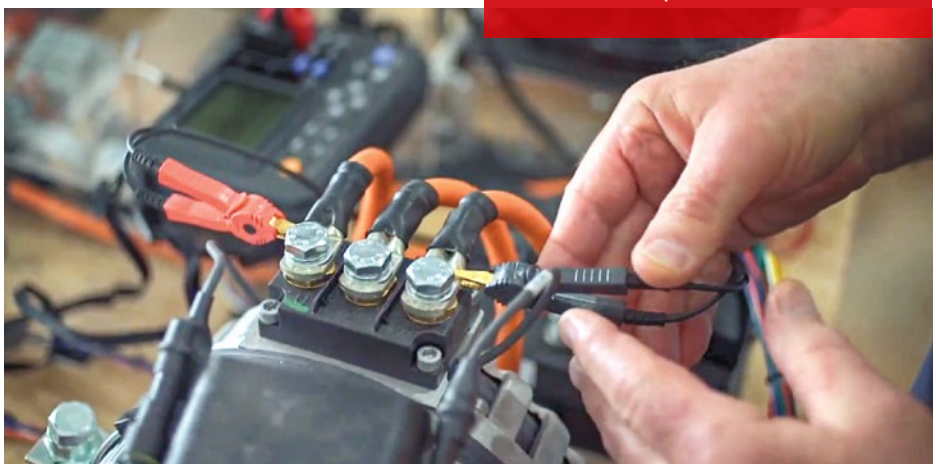
Although Legacy EV developed its certified technician training program before industry standards had been established for the technology, Santilli told us that the company's curriculum closely follows the EV testing and certification program that was announced by ASE earlier this year. "It was reaffirming to see that a lot of what we're doing runs parallel with what they came up with," he said.

Going forward, Legacy EV has plans to move further into the EV certification and education arena. "We found a 501(c)(3) called EVTEC—Electric Vehicle Technician Education Council—and we are gathering industry partners to review more than 140 standards that relate to building, servicing, and maintaining EVs," Santilli said. "By getting industry input and accepting these education standards, our goal is to disseminate them to schools so they can teach about electric vehicles in a way that's congruent with industry standards."

SADDLEBACK COLLEGE

While many community colleges have well-established automotive departments, Brooks said that Saddleback College benefits from resources that can be tough

Legacy EV's Certified Technician program is an online course that covers topics ranging from an overview of EV components and safety best practices to wiring, mounting and fitment of parts, and tuning. In addition, Legacy EV provides a week of in-person training to give students hands-on experience.



to come by at other schools. "We pride ourselves on working with the best in the industry. We have a close working relationship with the University of California, Irvine, on their alternative fuel vehicle programs, for example. The goal is to provide the best training that we can."

Saddleback offers automotive courses that cover topics ranging from engineering fundamentals to alternative propulsion systems, but the Auto 231 class focuses specifically on hybrid and electrical vehicle technology. These classes can be used for a certificate in a specified automotive field, or if a student chooses to also enroll in general education courses, the classes can be used as electives in the pursuit of an Associates of Science degree.

"231 is going to cover basic electrical theory, like understanding the differences between an AC drive motor and a DC drive motor, and we actually have two kit cars that demonstrate these two different configurations," he said. "We also go over series hybrids, parallel hybrids, and series parallel, and the drivetrain architectures of each. Additionally, we have a small fleet of Toyota Priuses that the students tear down and rebuild, and we've started teaching them how to rebuild battery packs as well. We mostly do that with nickel metal hydride batteries only because they're a little more stable and inexpensive, but they get experience rebuilding the lithium polymer batteries that are in our AC and DC Switch Lab vehicles, too."

"A GAS-TO-ELECTRIC CONVERSION IS A GREAT WAY TO LEVERAGE AN AUTOMOTIVE TECH'S EXISTING KNOWLEDGE ABOUT ICE WHILE EXPANDING THEIR UNDERSTANDING OF HIGH-VOLTAGE ELECTRICAL SYSTEMS."

Students are also given a primer to EV and hybrid technology in Saddleback's Auto 100 class, a prerequisite for every other automotive class that the school offers. A dedicated lecture and lab activities provide insight into EV and hybrid component design and purpose, and demonstrate how to safely perform a high-voltage disconnect. Brooks said that the goal is to give students a strong understanding of the technologies that are prevalent on today's roads while also establishing a working knowledge of what's around the corner.

"An older technician once gave me some really good advice," he recalled. "He told me that if a shop or a dealership wants to send

you to training, you should always say yes. So, back when I was working at a Hyundai dealership, I was sent to hybrid training after they introduced their first hybrid vehicle, and I was the only individual at the dealership who got the training. A few months later, a recall came out. One day I was in my dealer principal's office to ask about a special tool that was mailed to the dealership to do these special recalls, and the fixed operations manager was in for a visit. The fixed operations manager asked why I needed the tool, and I explained that I was the only one who was hybrid certified at the shop. He looked over at the dealer principal and said, 'Well, you heard him—give this guy a raise. He's the only one who knows how to do it, so we've got to.'"

Legacy EV's training program curriculum closely follows the EV testing and certification program that was announced by ASE earlier this year. "It was reaffirming to see that a lot of what we're doing runs parallel with what they came up with," said Tom Santilli.

NATIONAL INSTITUTE FOR AUTOMOTIVE SERVICE EXCELLENCE (ASE)

For more than half a century, the National Institute for Automotive Service Excellence (ASE) in Leesburg, Virginia, has served as a certification group for automotive professionals. As Santilli previously noted, the non-profit organization announced two new certification standards specifically related to electric vehicles earlier this year,

"EVEN IF SOMEONE HAS A LOT OF KNOWLEDGE AND EXPERIENCE IN THE AUTOMOTIVE FIELD, THIS CAN POTENTIALLY FILL IN SOME GAPS."

which now join a roster of more than 50 different tests offered by the organization.

"These standards specifically address safety in an automotive repair facility," said ASE's Trish Serratore. "We're addressing those standards for someone who is working in the office, the lot boy, the service advisor, and all the way up to the technician who is handling battery diagnosis, replacement, and recycling. EV Electrical Safety Awareness Certification (Level One) is intended for anybody who is working in a shop that is servicing EVs. It covers general safety for everyone in a facility where there is an EV present. The EV Technician Electrical Safety Certification (Level Two) test is focused on the technician, and the safety of that individual around the high-voltage system of the vehicle in the shop. We're also developing a third test that will deal specifically with those battery issues. We're really trying to be proactive about making sure that the industry understands the precautions that they should take when working around those vehicles."

Serratore pointed out that, as a general rule, ASE doesn't offer training programs in preparation for these exams; its role is to provide standards that help to design the key elements of that training. "A business can take a look at these standards and make sure that their employees are following those guidelines, and we have these certification tests that would support that," she said. "Our standards are open source, so we hope that other organizations and educators out there will take advantage of them and start building those into the training that they offer to our industry."

ASE also offers a Master designation, which signifies that an individual is certified in all of the organization's automobile tests, or all seven of its medium-heavy truck tests, but the aforementioned EV certifications are offered outside of that framework.

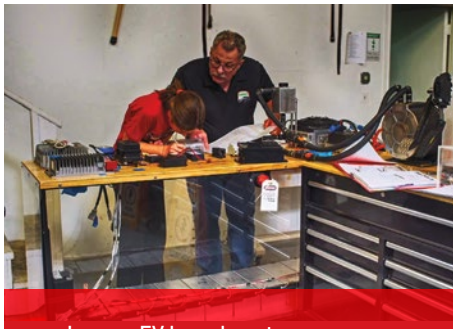
"We additionally have the Light Duty Hybrid/Electric Vehicle Specialist Certification (L3) exam as well," she said. "That is an advanced-level test for technicians who possess the skills required to diagnose hybrid-electric vehicles. With an L3 test like this, there's an expectation that the individual has already acquired significant training and knowledge with these systems. There are several different ways that an individual might get that knowledge. They might work for a vehicle manufacturer and have gone through a specialized training program, or they might be working in the aftermarket and have attended a program offered by a number of different vendors out there."

Notably, ASE provides background information on the standards and expectations involved with the two EV Electrical Safety Awareness Certification exams. "That will help you pass those particular tests," Serratore added.

MIRACOSTA COLLEGE

Paul Katson, the Automotive Technology department chair at MiraCosta College in Oceanside, California, told us that the aim of the school's program is two-fold. "Part of it is to prepare students for entry-level work as an automotive technician. But our program is also utilized by people who're already working in the automotive industry. We're ASE accredited, and so our other goal is to help folks prepare and pass the ASE examinations."

The school offers a course that focuses specifically on EV and hybrid vehicle technologies. The program covers a wide range of topics to lay a comprehensive groundwork for those who are new to the automotive realm, and it can also prove valuable for those with more experience who want to expand their skill sets.



Legacy EV has plans to move further into the EV certification and education arena. "By getting industry input and accepting these education standards, our goal is to disseminate them to schools so they can teach about electric vehicles in a way that's congruent with industry standards," Tom Santilli said.

"In our EV courses, we go over the fundamentals like EV safety, how to use a multimeter, Ohm's law—which is basically mathematical formulations to determine voltage and resistance—AC/DC current principles, and electro-magnetism," he explained. "We also discuss different vehicle platforms and the differences in their drive system configurations."

The course also covers the differences in battery chemistries, the operating principles of motor generators and regenerative braking, and troubleshooting methods, among other topics. "We cover the rebuilding of battery packs as well, and they learn how to test for bad cells," Katson noted. "Understanding how to read wiring diagrams is really important, too. Even if someone has a lot of knowledge and experience in the automotive field, this can potentially fill in some gaps."

Credits earned from the course can be applied toward a certificate of achievement in automotive technology, which consists of six courses in total. "If they want to stop there, they can stop there," he said. "Or, if they want to get an associate degree in automotive technology, they can use those classes and take some core academic classes to work toward that. Our curriculum is designed to help prepare students to take those ASE exams as well. There are a lot of different options available to them." PRI

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EV WEST

A hot-rod rebel at heart, Michael Bream found engineering freedom on the wide new frontier of EV racing with EV West. Here, he offers us his unique perspective—and candid comments—on both the immediate limitations and long-term promise of electric auto racing.

By John F. Katz

Michael Bream believes that electric power will save auto racing.

He speaks his mind with infectious enthusiasm and vintage SoCal surfer-dude style, liberally dropping "way cool" and even "gnarly" into the rapid music of his words. He chose the name "EV West" to honor the West Coast hot-rod scene of his father's youth. Dad is an engineer, too, who "always wanted to improve things, because that's what you do on an amateur race team, which we had. And when we were doing that, I felt so restricted by the regulations. I wanted to do something more open."

Bream understood that such rules were necessary to keep the sport competitive; still, he chafed against their restraint. "In 2009 we were running a BMW E30, and there was this new series called the EV Cup. So I thought I should build an electric E36." EV Cup folded before its first race, but by 2012 Bream had turned his attention to the Pikes Peak International Hill Climb, where the promoters had "carved out a class" for EVs.


1420
EV WEST

EV West got its start when Michael Bream made his first EV conversion using a BMW E30. He entered the car in the 2012 Pikes Peak Hill Climb and set a record for a street-legal electric conversion. The BMW has since been converted into an 800-horsepower electric drift car.

Friend-of-a-friend Boris Said was enlisted to pilot the electric BMW—before a forest fire in Colorado Springs delayed the historic hill climb until the same weekend as Watkins Glen. With Said unavailable, Bream decided to drive himself. He'd never even been to Pikes Peak, but he watched in-car videos until he'd "memorized the course like it was a video game. And then I went there and raced, and the car ran like a beast. We didn't have to worry about oxygen anemia at the top. It was just insane."

Bream's 400-horsepower electro-Bimmer climbed the 5,000-foot grade in 11:58.929, a new record for a street-legal electric conversion. "The coolest thing is that I spent three hours at the top, hanging out with the racers from the vintage class—the Mustangs, Cobras, 'Cudas, 911s—and they're like, 'Hey rook, how'd you do?'" Bream re-checked the board to be sure of his time. "And then this guy goes, 'You just beat our best time by 6 seconds.'

"And then people started reaching out, because in 2012, nobody was building performance EVs," he added.

BREAKING STUFF AND BREAKING THROUGH

People were building EVs, and components were available—but information regarding performance, frustratingly, was not. "It was really weird from a racer's standpoint," Bream explained. "You could go to any knowledgeable speed shop and say, 'I have a 1969 Camaro shell, and I'm thinking about an LS3 with a 10 psi turbo,' and they could tell you what it would run in the quarter-mile. Now try that with an electric. I was calling people trying to get information on a motor: Could they tell me the peak torque? 'No, but if you've got a minute, I can tell you how many CO2s you're going to save'. And I was like, 'Oh, man, electric-car people are not hot rodders like us.'

"I felt I had to relive my dad's era, because back then all their stuff was still developing. They didn't have fuel injection; they didn't have a lot of things. Dynamometers were analog and not very accurate. So it was a lot of seat-of-the-pants experimentation. A lot of their theory came from somebody trying something, and maybe it made more power. I guess I got lucky because a lot of that ethic wore off on me."

Bream firmly believes in what he calls FAFO: "Fool Around and Find Out," in a more printable translation. While prepping his BMW for Pikes Peak, he probed the limits of available components. One motor got so hot at high rpm that the commutator came apart. Another melted the varnish on its field windings. One supplier complained that Bream would break his motor and make him look bad. "And I said, 'No, I'm going to break your motor and be super quiet about it, but I'll know where the limit is.'"

Bream continued to apply the FAFO philosophy when EV West built the Electraliner, a Tesla-powered, dry-lakes streamliner. "We tested six or seven battery packs until they caught fire. Then we knew we had a battery we could easily run for six minutes, when we only needed it to run for two. So we had a 3X factor of safety.

"That's a way we offer value to our customers," by being able to answer questions about components, when other suppliers "don't even know what you're talking about."

At Bonneville in August 2020, land speed racing veteran Jim Hoogerhyde pressed the Electraliner to 238 mph, and with an official two-way average of 229.363 scored a new record for Class E2, electric vehicles weighing up to 2,200 pounds.

"A buddy of mine does portable power," Bream added. "So we took this little trailer with a battery charger and solar panels on it, and oh, man, it was killer, because The Wall Street Journal and The New York Times came out and did articles on us. It was so cool to see this land speed car on the salt with solar panels charging it. It's phenomenal to have that kind of horsepower come from something as benign as a little solar panel on your roof."

Bream returned to Bonneville in 2021 with the solar-power trailer and two electric lakesters. EV West technician Chris Spicer, recruited to drive the rebodied Electraliner, managed an impressive 196 mph in his rookie outing. Hoogerhyde saw 240 mph in Nebulous Theorem II, built in 1989 by multiple-record-holder Jack Costella and converted to electric power. Unfortunately, mechanical issues prevented a proper two-way run for an official time.

EV West has also rebuilt the Pikes Peak BMW as an 800-hp electric drift car; and supplied the 535-hp electric driveline for the 125-mph desert-racing buggy built by

"IT WAS SO COOL TO SEE THIS LAND SPEED CAR ON THE SALT WITH SOLAR PANELS CHARGING IT."

Authorized installation centers handle conversions EV West has already engineered, leaving the company free to explore new applications. "We're a parts supplier and integrator," said Michael Bream. "We identify applications where there's enough volume, where we understand the market and how many people are building on that platform."

Strategic Racing Designs and the clean-energy non-profit Strategic Recovery Institute. "The next thing I'd like to do is the Volkswagen Mount Shasta event," said Bream, citing the annual off-road winter slog from Clear Lake to Mount Shasta—exclusively for split-window (pre-1967) VW vans and pickups. "We have a 1963 single-cab in the shop, and I want to put in a system capable of really long distances. It's 400 miles over some of the toughest terrain, where I think the torque and controllability of electric drive would excel."

COMPONENTS FOR CONVERSIONS

In the beginning, racing helped promote the company. "We were so early," Bream recalled, "that we had to be every department. We had to be engineering, and marketing, and financing," a burden Bream found uncomfortable. Now that the company is better established, promotion is chiefly by word-of-mouth. "We're struggling to keep up with demand," Bream added, leaving little time for marketing.

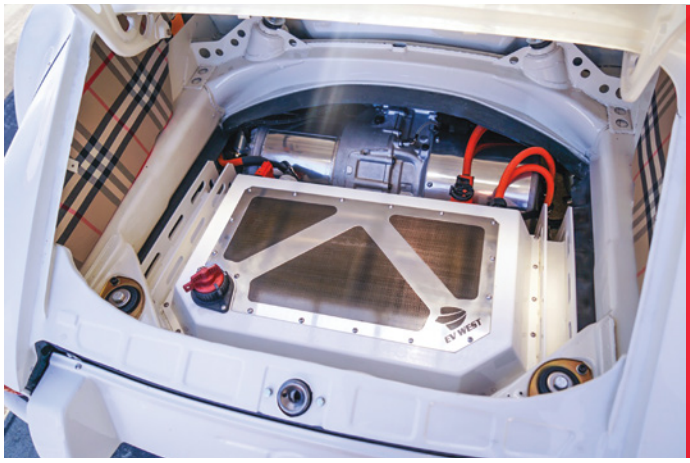
Social media also helped when performance EVs were a novelty, not so much now that they are "ubiquitous. Every really progressive car enthusiast has seen examples and read articles. So we don't

have to do promotion. The topic is so interesting that it feeds itself." EV West does work with YouTubers, "who reach out to us all the time: 'Hey, I'm building this, will you give me a discount on batteries?' And we're like, 'Heck yeah, dude, you're awesome.'"

Bream also teaches at the nearby Electric Vehicle Learning Center, a non-profit founded by three EV West customers. And he accepts interns, who have come from as far away as Poland and Chile to learn about performance EVs. With delight, Bream recalled an intern from Japan who returned home, "ripped apart a Prius, and turned it into a drift car. That's how you convince people that this technology is super-cool!"

EV West now occupies a 15,000-square-foot facility in San Marcos, 35 miles north of San Diego. A dozen full-time employees are supplemented by "subs, part-timers," and the previously mentioned interns. "We're a parts supplier and integrator," said Bream. The shop also performs a limited number of EV conversions, but as Bream explained, "We don't do conversions to convert cars,

The Electraliner streamliner put EV West's electric powertrains to the test at the Bonneville Salt Flats. In 2020 it set a record of 229.363 mph and hit a top speed of 238 mph. "It's phenomenal to have that kind of horsepower come from something as benign as a little solar panel on your roof," Michael Bream said.



Among the conversions EV West has done was to put Tesla power into this 1977 Porsche 911, which was on display at the 2019 SEMA Show in the SEMA Electrified display area.

we do conversions to engineer cars. We identify applications where there's enough volume, where we understand the market and how many people are building on that platform." Customer cars are laser-scanned, and conversion parts are computer modeled, so "while the chassis fitment is never going to change," updates to accommodate ever-more-powerful electric motors are relatively easy.

"As we do more volume," Bream added, "we can offer more things that are specific to the EV community, like flywheels for electric cars—balanced and lightweight, but with no starter ring." To make a single, custom flywheel would be cost-prohibitive, but a run of 100 is commercially feasible.

Customers requesting a conversion that EV West has already engineered are referred to one of the company's authorized installation centers: Action Vehicle Engineering in Chatsworth, California; Peace Vans in Seattle, Washington; or a third location "coming online very soon."

While the majority of EV West's business is now street performance, it continues to supply some racers, including Entropy Racing, which PRI Magazine profiled in October 2022. Able to swap batteries in under two minutes, Entropy electric endurance racers contested the 25 Hours of Thunderhill in 2021 and 2022, finishing 29th and 17th, respectively. "Because we were doing something that no one else had ever done," recalled Entropy founder Charlie Greenhaus, "we needed a reliable supplier with experience, and Michael is exceedingly knowledgeable about his product. He was interested in our project, he followed our progress, and was attentive to what we needed. He was always there for us when we needed him, and always a great resource."

Additionally, "Michael has done a bunch of good turns for us. We had a bumpy start, because of an assembly mistake by one of their suppliers, but they were very responsive and very helpful, and they took it on the chin because of that." Finally, Greenhaus noted how EV West has "spearheaded the supply chain for used Tesla parts, and that's been good for the entire industry."

ELECTRIFYING THE FUTURE

While Bream firmly wishes that "politics and policy were out of the conversation," he also believes that "the way we've been doing things is not sustainable." And "because I'm an engineer, I'm in it for sustainability. I need to get this fuel out of the ground, and I need to refine it, and I need to transport it to my car. The job of an engineer is to make processes as efficient as possible—and to be open to the idea that maybe this type of fuel isn't the most efficient. Maybe if we switched to another type of fuel, we could capture it easier. What if you could put a stick in the ground with a fan blade on it—oversimplifying—and make fuel? Or put fuel collectors on your roof and collect it?"

He readily admitted that electric power is not ready "to sustain everybody's needs right now." Battery technology is still a major barrier. Bream speaks of the "cruelest irony" of a "fuel so light you can't even measure it," that requires a "fuel cell" made with lead,

"the heaviest thing you can think of. But if you're an engineer, you look at theoreticals. We've already replaced lead with 'lithium' batteries made mostly from aluminum, nickel, and copper. And every year they are making improvements. Theoretically you could have a battery that runs the Indy 500 or Baja 1000 with a single charge." The electric "fuel" required to go the distance still doesn't weigh anything.

"So right now, electric cars are really good at tough environments where there is less oxygen, and they're really good if the race is 10 minutes or less." On the other hand, "we've hit the theoretical max for gasoline. Combustion-car records are falling, for good." EVs now own the record at Pikes Peak and the Nürburgring. And "they are flirting with 1.9- and 1.8-second 0–60s that would make your eyeballs hurt.

"So we're in the early-adopter phase, where EVs are just a couple of percent" of the total performance market. "But they are the latest thing, so you're probably going to see annual increases of 50% for the next decade."

He continued, "And in the long run, nobody's going to care about the type of fuel you use. You may think it's a big deal, but it's not. It's like the transition from gas to diesel, or from carbs to fuel injection. And it will open new avenues for racing. You could have indoor racing, because emissions are no longer a big deal, or late-night racing because noise is no longer a big deal. And it's going to save racing. I don't think people fully understand this, but the corporate sponsors are pushing for carbon neutral." They care about public perception, whether the racers do or not. "Once you realize where the push is coming from, then it's like, 'Oh, yeah, it's inevitable,' because they always get what they want."

Of course, there will be doubters, whiners, complainers, and (if you can forgive the pun) resistors. But Bream has a message for them: "This is just the first inning. So cool your jets and hang out. Drop some popcorn, buckle up, and watch this, because this transition to sustainable energy—it's going to be epic.

"Nobody has ever seen anything like it," concluded Bream. PRI

MAKING

Photo courtesy of Global Time Attack

Autocross and time trial competitions leverage many of the strengths of a burgeoning technology, but EVs also present organizers with a new set of challenges.

By Bradley Iger

While the auto industry continues to ramp up development and production of battery-powered road cars, their embrace in the motorsports realm has been a significantly more gradual affair. Factors ranging from vehicle cost and aftermarket support to fast charger availability and the current limitations of the technology have all attributed to EVs' measured adoption rate in the racing world, but there's an increasing number of segments where they're gaining ground.

Autocross and time trials, in particular, are two segments where EVs have shown significant promise thanks to the disciplines' formats as well as potential performance advantages that the

INROADS

technology can provide. As more of these vehicles show up to events, sanctioning bodies and organizers are responding in turn to create a place for them within their class structures, establish a level playing field, and ensure the safety of everyone involved.

SPORTS CAR CLUB OF AMERICA

"At the national level, I think we're still in an early adopter phase, but it's not surprising to us that we're seeing more people showing up with electric vehicles," said Heyward Wagner of Sports Car Club of America (SCCA), Topeka, Kansas. "It's the people who're often the first to dive into new technologies and ideas. At the regional level, what we're seeing is that a significant portion of the people who're coming to us with EVs and electrified vehicles are different types of enthusiasts than we normally get. They're more in tune with technology in general, and the car itself is the conduit into motorsports interest more so than we've traditionally seen."

In 2021, the SCCA introduced Electric Vehicles Experimental (EVX), a provisional autocross class that, in terms of vehicle preparation, takes much of its inspiration from the Street and Street Touring classes. But the ruleset also takes EV-specific considerations into account.

"We have this emerging market of people who're really into this

Global Time Attack classes EV entries as it would any other car. "There are no horsepower limits in any of the classes," said Jason Dienhart. "The way we classify cars is largely based on the stickiness and width of your tires, how much aero you've added to the car, and weight reduction efforts."

stuff, and we want to give them a place where they can congregate and run," Wagner explained. "EVX is a little more open from a rules standpoint so that people can play with the cars a bit, but it's intended to be something that you can do with a car that you drive on the street every day. The idea is to bring in common aftermarket bolt-ons that are currently available for EVs, things like 200-treadwear tires, control-arm kits, camber kits, and so on. Part of the concept behind EVX was to create a space for these cars while this market matures."

Wagner said that the SCCA's long-term goal is to integrate EVs into larger, pre-existing classes where they can compete among other EVs as well as internal combustion-powered vehicles. At this stage in the market's development, the challenge is less about making the technology competitive and more about developing best practices that satisfy the entire field.

"We've classified Tesla Model 3s in B Street and A Street in the past, right alongside internal combustion cars. We've done that because that's a core value to us—we classify cars based on their performance potential, not based upon their drivetrain. The challenge is that these cars are programmable, so the performance might change between the time we classify it to the time it's being used to compete. But it's important to us to get this figured out because part of what makes SCCA interesting is having a diverse field of cars competing against one another. To us, that's kind of the Holy Grail of motorsports."

He noted that the SCCA's current approach encourages EV racers to focus on modifications outside of the powertrain. "Because of the weight of the cars, they're really alignment sensitive—they need a lot of camber to really work well. Suspension is probably the biggest space where we're seeing aftermarket development right now."

On the time trials side of the equation, the SCCA has been integrating EV entrants into existing classes from the outset, most of which land in the Sport and Tuner

As NASA integrates EVs into its events, it is working on technical compliance procedures. "All of these EVs have their own proprietary software solutions, and it's not easy to plug into those systems to make sure that a participant is operating the vehicle with a declared tune," said Jeremy Croiset. NASA's solution is to require EVs to "remain in stock configuration, aside from some allowed minor modifications."

"WE CLASSIFY CARS BASED ON THEIR PERFORMANCE POTENTIAL, NOT BASED UPON THEIR DRIVETRAIN."

categories. "Because we're still in the infancy of all this, nobody at the amateur level is really building a car to its 'full potential,' so most of them end up in those classes. We have seen a few that have gone to the Max category, which allows a broader range of modification, but that's less common."

In terms of safety, Wagner pointed out that although the National Highway Traffic Safety Administration data indicate that EVs pose less of a fire risk than internal combustion vehicles, the SCCA has faced some difficulties that originate from outside of the organization. "We're working closely with the facilities to make sure that we're in alignment with their expectations, but there are a lot of tracks that are shying away from electrified vehicles right now, so we're trying to manage that. There's a lot of concern that, if you have an electric vehicle fire, nothing will put it out. So some tracks are saying that they don't want electrified vehicles at their track at all because of fire risk, while other tracks are saying that EV drivers need to sign a specific waiver that holds them accountable for any damage the vehicle does to that track. And there are other tracks that don't have a concern about EVs at all. From my point of view, this is really the most interesting part of the conversation right now because we don't know enough yet in order to make good policy. There's a lot of 'wait and see' going on right now with the tracks. Nobody wants to be the guinea pig."

GLOBAL TIME ATTACK

The first EV entrants at events for Global Time Attack (GTA) in Torrance, California, began appearing roughly four years ago, and in the time since, the series has seen a steady uptick in these vehicles at events across the country. While most are street-driven examples, GTA series director Jason Dienhart said that they've also seen builds

50TH ANNIVERSARY OF THE SCCA SOLO NATIONALS

Back in the early 1970s, autocross competitors were faced with an array of different rulesets created by various independent entities across the United States. Organizers within the Sports Car Club of America (SCCA) and elsewhere were keen on establishing a unified standard, but the catalyst that gave birth to the SCCA Solo Nationals originated from a rather unlikely source.

"I think the idea to do a national event came from Schlitz Beer, actually," Heyward Wagner said. "It was originally kind of a promotional thing, and the SCCA saw an opportunity to use that as a bit of a lever to start kind of unifying the sport and get to one ruleset."

Over the past five decades, the Solo Nationals has been through several distinct eras that have helped to shape the event into what it is today. "I remember [SCCA historian and hall of famer] Rocky Entriken telling me that at the first Nationals, it was basically like a normal, regional SCCA autocross event," he explained. "Nobody knew what to do yet, or how to build a car for it, so they basically just brought the car they had and just figured it out as they went along."

After the event moved to Salina, Kansas, in 1983, the Solo Nationals entered a new, more competitive phase. "I think they had about 400 cars showing up at that point," said Wagner. "That quickly grew to about 600 or 700 as interest increased, and that's when we started to see the commercial impact on the sport."

Suddenly tire manufacturers were directly involved, the OEs were taking notice, and support was coming in from suspension companies. "We think of that as kind of the 'tire war' era," he said. "At that point there were several tire companies contracting drivers, trying to get class wins. There were a lot of bragging rights tied up in that."

The Solo Nationals later moved to Topeka, Kansas, which paved the way for what Wagner considers to be the event's modern era. "Now it's more about the overall experience. It has kind of matured into this tailgate party, autocross family reunion kind of thing that's fun and inclusive."

More than 1,200 drivers are expected to compete at this year's 50th anniversary event, which will take place September 4–8, at Lincoln Airpark in Lincoln, Nebraska, and the SCCA plans to celebrate the occasion in grand fashion. "There will be a welcome party on Monday night where we'll honor our hall-of-fame members and other folks who have won major awards over the years. On Tuesday we're going to have a gala that will include speakers from different eras of the event, and we'll also be visiting the SCCA Solo Nationals installment at the Museum of American Speed there in Lincoln. It's really the centerpiece of the event this year." *—Bradley Iger*

"A significant portion of the people who're coming to us with EVs are different types of enthusiasts than we normally get," said SCCA's Heyward Wagner. "They're more in tune with technology in general, and the car itself is the conduit into motorsports interest more so than we've traditionally seen."

that are near the forefront of EV innovation.

"Evasive Motorsports, for instance, built a Tesla to compete at Pikes Peak, which Dai Yoshihara drives. They've taken that car to a couple of our Global Time Attack competitions, and they recently brought it out to our Super Late Battle at Circuit of The Americas as well. Since it's a Pikes Peak build, it fits really well in our Unlimited class in GTA. There's also Unplugged Performance, which specializes in EV tuning and building EV race cars. They've also done a couple of cars that have competed at Pikes Peak, and they brought a car out to the Global Time Attack finals at Buttonwillow Raceway last year. So we're starting to see really dedicated hill climb builds that also effectively translate to what we do."

He told us that Global Time Attack approaches classing EVs like it would with any other car. "They're integrated into existing classes because we take a pretty traditional approach to time attack. The big thing with us is that there are no horsepower limits in any of the classes. To generalize things, the way that we classify cars is largely based on the stickiness and width of your tires, how much aero you've added to the car, and how much you've taken out of the car in terms of the interior and other weight reduction efforts."

EVs are held to the same safety ruleset as other vehicles in the series, and Dienhart said that GTA organizers have been diligent about booking their events at tracks that maintain an EV-friendly policy. But when it

NASA created TTEV (Time Trial Electric Vehicle) "because there just wasn't a really good way to bring these cars into our other classes," said Jeremy Croiset. "But we are working toward that goal."

comes to figuring out where and when to charge the cars, that responsibility ultimately falls on the drivers.

"At this point, some of the experienced racers have kind of integrated that into their strategy," he said. "Like, 'OK, if I'm running at such and such track, I know I need to drive down to Starbucks and charge up a couple of times throughout the day. With our series, there's usually 45 minutes to an hour and 15 minutes between a group's sessions, and each group normally gets four sessions a day. That means there's a chance you'll miss a session while you're charging the car, and you just have to plan for that. So with tracks like Buttonwillow adding Tesla Superchargers, it adds an incentive for those guys to run at those particular facilities."

NATIONAL AUTO SPORT ASSOCIATION

Like the SCCA and Global Time Attack, National Auto Sport Association (NASA), based in Las Vegas, Nevada, has also seen a steady increase in EV entrants. Organizers noted that time trials were becoming a particular area of interest for these racers, but there wasn't an effective way to integrate these cars into the organization's existing class structure, so they created one to provide a space for those competitors.

"We started TTEV (Time Trial Electric Vehicle) because there just wasn't a really good way to bring these cars into our other classes," said NASA CEO Jeremy Croiset. "But we are working toward that goal. Right now, a big part of the focus is developing the capability and expertise to ensure that our technical compliance procedures can be done to the same level that we're using with the ICE-powered vehicles. All of these EVs have their own proprietary software solutions, and it's not easy to plug into those systems to make sure that a participant is operating the vehicle with a declared tune and things like that. So, in the TTEV category, we make it pretty clear that participants can run specific vehicles like the Porsche Taycan, Tesla Model 3, and Tesla Model Y in stock configuration, aside from some allowed minor modifications for things like cooling. Outside of that, it's pretty much as the car is delivered from the factory."

NASA has also been working with EV manufacturer Scalar, which is currently developing a race car that can be entered in wheel-to-wheel competition. Rather than relegating it to a one-make series, the goal is to run the cars alongside the likes of modified Corvettes and Porsche 911s in the Super Touring 2 class sprint races.

"They're taking brand new Toyota GR86s,

"WITH TRACKS LIKE BUTTONWILLOW ADDING TESLA SUPERCHARGERS, IT ADDS AN INCENTIVE FOR THOSE GUYS TO RUN AT THOSE PARTICULAR FACILITIES."

taking out the ICE powertrain, and converting the cars to an EV powerplant," Croiset explained. "They recently ran their first race under NASA sanctioning at our HyperFest event at Virginia International Raceway. From the standpoint of a sanctioning body, you're looking to achieve this delicate balance because you don't want to chase away your current competitors with a car that can overachieve in its class, but you also want to give the newcomer a shot, so they have the ability to grow."

Importantly, Scalar appears to have taken some of track organizers' primary concerns into account during the development of its EV powertrain. "They're kind of leading the way in that regard," Croiset said. "One thing that's particularly interesting about the Scalar SCR1 is that it has an integrated fire suppression system that runs through the battery. So if there is a fire or a suspected fire and you activate the system, the agent itself can run into and through the battery. They've also developed additional safety elements into the battery design, like thermal barriers between the cells to help mitigate thermal runaway."

Croiset added that the current challenges that EVs face in motorsports are largely temporary, and it's simply a matter of time before those are resolved. "I think it is the way of the future, and right now we're just dealing with a situation where innovation hasn't kept up with the side of the market that's driving consumers to buy street cars. As we see more and more EVs running at the race track, I think it will drive more innovation on the motorsports side to develop those solutions." PRI

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globaltimeattack.com

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drivenasa.com

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POWER BY NUMBERS

INTAKE MANIFOLD DESIGNERS RELY ON A VARIETY OF TOOLS WHEN DEVELOPING NEW PRODUCTS, WHETHER USING COMPLEX MATH FORMULAS OR SIMPLE GUT INSTINCT AND EXPERIENCE.

By Mike Magda

Even with considerable technology and computing power available to the aftermarket, some companies still prefer to develop new intake manifolds or improve on existing manifolds by leveraging practical knowledge gained over the years.

"We're actually old school," said Mark Fretz of Brodix, Mena, Arkansas, explaining how the company is working on a new 18-degree cylinder head for the big block Chevy, with a dedicated intake manifold to soon follow.

"We still take each individual piece out of the core boxes in our foundry," said Fretz. "We may take the center spider from one manifold, and we'll build new core boxes for the inrails and the side rails. We can build a new valley, add material to the intake face, and then machine for that specific cylinder head."

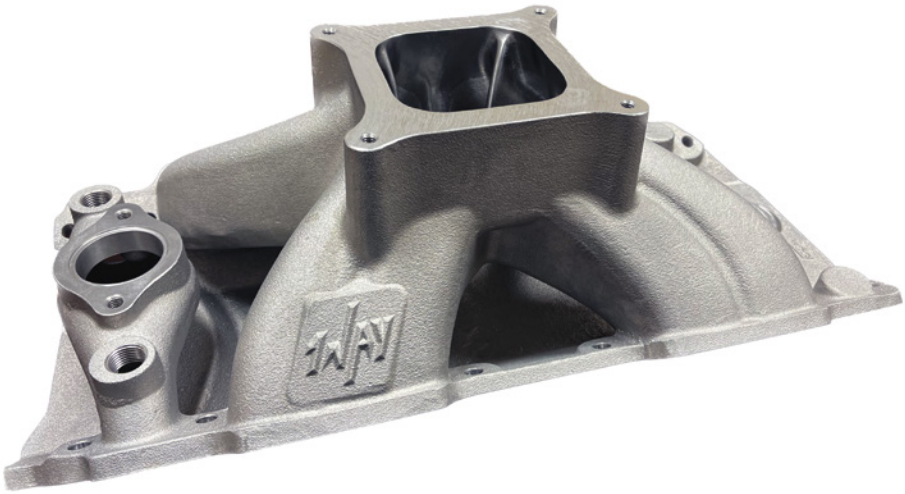
"It's a lot of seat-by-pants work," agreed Tony McAffee of Dart Machinery, Warren, Michigan. "There were some formulas we used in the past with carburetors—they came into play because of a gear change, and you don't want to lose all your signal to the booster. So you kind of have to keep that plenum volume at a percentage of cubic inches.

"Now, with better carburetors with much improved venturis, that's kind of going away," continued McAffee. "Then, with fuel injection, there is no signal needed to the venturi. Some of the rules are tossed in the garbage."

"We're still using what we've proven in the past while verifying new ideas through testing," said Corey Spainhoward of Holley, Bowling Green, Kentucky, which recently introduced two new intakes for the Ford Coyote platform.

With advancements in CAD software, CNC machining, and 3D printing, new and exciting designs are appearing in the racing market, but often for select customers or even the designer himself.

"WE'RE STILL USING WHAT WE'VE PROVEN IN THE PAST WHILE VERIFYING NEW IDEAS THROUGH TESTING."



1 Way Technologies developed a new four-barrel intake to support the cylinder head it developed for big block modifieds. "These cars have to accelerate off the corner and require a wide torque curve," said Jeff Jones. "That means runner size, taper, and plenum volume all become big factors to develop an intake manifold for that environment."

"The newest things I'm building are for my own cars," reported Mike Weinle of Weinle Motorsports, Cleves, Ohio. "I'm building a billet Pro Stock manifold and I'm building a sheetmetal manifold for a late model dirt car engine with a 4.5-inch bore space. Both are something new that I've never built before."

OPTIMIZING DESIGNS

Regardless of the methods or design theories, today's intake manifold engineers have similar goals: improve runner and plenum design to optimize airflow to the cylinder heads. High-end race shops and the OEMs will utilize advanced computational fluid dynamics (CFD) computer simulation to test different designs. Often these programs validate the old-school approach that still leads to improved power numbers.

"It does seem like the higher horsepower and higher rpm range are where most of our customers are interested," said Spainhoward.

The increased emphasis on boost has also shaken up the intake manifold industry, introducing new sets of challenges to distribute air effectively and equally to all the cylinders under high pressure. Conventional wisdom once boasted that a plenum under pressure shouldn't have distribution problems; however, that thinking just hasn't been proven completely true. Designers are still toying with throttle-body location and mounting angle in addition to experimenting with different plenum shapes to better control air distribution. Often the front cylinders miss out as the air rushes in on a manifold with a front-mounted throttle body.

"The more you give the air a chance to actually make that turn and not starve the front two cylinders for air, the better the design," said McAffee, who recalled a story about equal distribution to the runners when working for the late John Lingenfelter. He would switch between EconoDragster and A/Dragster classes by changing between single- and dual-carb tops on his tunnel-ram intake.

"With the single four-barrel we would have trouble with the outer four cylinders running lean, while it was perfect for the center four cylinders," continued McAffee. "We had tried air dams in the roof and started playing with shear plates, and it wasn't until we and other people started playing with the pent-roof design that we started making serious power."

As noted earlier, cylinder head development is driving much of the intake these days, as are sanctioning body rules. 1 Way Technologies in Washington, Indiana, is developing a package to work with big block modifieds that run on Northeast dirt tracks.

"We have a cast four-barrel intake now in production that we developed for that tour," said Jeff Jones. "We developed this intake around a SR-20 style cylinder head that fits their ruleset."

Under the rules, the intake had to be cast and limited to a 4150-type carburetor. The heads were also limited on valve angle and other specifications.

"The port placement becomes critical, and then the intake becomes a big factor as far as getting runner shapes and sizes to fit," explained Jones. "Manifold height wasn't an issue, but plenum volume was a definite factor as these cars have to accelerate off the corner and require a wide torque curve. That means runner size, taper, and plenum

Holley 3D prints prototypes of new intake manifold designs for dyno testing and fitment validation.

"THE HIGHER HORSEPOWER AND HIGHER RPM RANGE ARE WHERE MOST OF OUR CUSTOMERS ARE INTERESTED."

volume all become big factors to develop an intake manifold for that environment."

For the most part it was a clean-sheet design since there were no intakes available that fit that cylinder head. 1 Way cut up existing intakes, modified the sections, and welded them together to build early prototypes before transferring the dimensions into CAD to develop the tooling.

"From concept to tooling probably took six or seven months," said Jones, adding that the design was driven by a combination of math and experience. "It's based on the portfolios that we have learned over the years. We have minimum cross sections that we feel like we need and where the runner takes off out of the plenum. We know that if you get outside of certain cross sections, you're going to have to turn a lot of rpm that may make a lot of horsepower but not be very drivable on the race track."

BLANK CANVAS

Much of the intake manifold industry is still recovering from the high product demand experienced during the pandemic, along with the supply chain and labor challenges that disrupted production. Many new product development projects were put on hold or delayed when engineering teams were spread thin.

"We've been so slammed just trying to keep up with orders that we really haven't released any new product in two or three years. The Australian market is really big right now, and in the US market every aspect from street cars to offshore boats, sprint cars—it seems like every segment is staying busy," said Fretz, noting that the Brodix philosophy tends to design heads and intake manifolds that can be easily modified by head porters and engine builders. "We provide a blank canvas for the guys to finish how they want. We're not trying to compete with the end user. We provide a good platform that the porting shops can expand on."

With that in mind, Brodix offers different plenum volumes for standard manifolds. "A couple years ago we did our new big-plenum manifold where we shortened it just slightly and made everything wider, bigger, with more of an open top," Fretz continued. "That added volume for the large cubic-inch engines, and the new 18-degree conventional head will be on that platform. It will need the large-plenum manifold."

Over at Bill Mitchell Products in Edgewater, Florida, the emphasis is also on keeping up with demand for shelf-stock items. "We upgrade and make revisions as we go along to make the intakes perform better," said Bill Mitchell. "The Ford manifolds have gotten popular for us, and some of that is simply because more Ford guys have found out that we have that intake. And the marine guys love our brass water jacket piece. That's something I don't believe anyone else has."

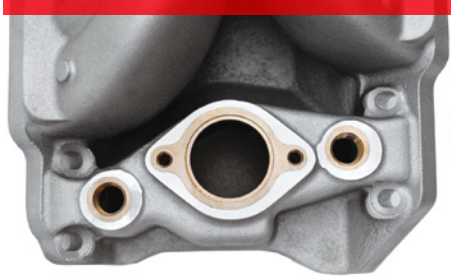
The marine intake is designed for big block Chevy and is available for both the 9.800- and 10.200-inch deck heights. The key feature is an integrated brass water jacket to prevent corrosion in saltwater environments.

"The 9.800 guys all want a 4150 carb flange. Not very many wanted a Dominator, but they all did on the tall deck," said Mitchell.

Recently, Mitchell brought the intake manifold machining in-house where the company's cylinder blocks are finished. "We already had the machines to cover it. The manifolds are a much nicer piece now."

Not all new intakes recently introduced are cast. Edelbrock in Olive Branch, Mississippi, just released a new XTS fabricated sheetmetal intake for the 7.3-liter Godzilla engine found in Ford heavy-duty pickups. In

This Bill Mitchell Products BBC marine intake features brass water jacket inserts to prevent corrosion in saltwater applications.



"THE MORE YOU GIVE THE AIR A CHANCE TO ACTUALLY MAKE THAT TURN AND NOT STARVE THE FRONT TWO CYLINDERS FOR AIR, THE BETTER THE DESIGN."

addition to improving power for racers and engine-swap projects, engineers wanted to ensure customers could fit the XTS under the hood of a stock pickup. Also, camshaft development for the Godzilla coincided with the intake manifold project.

"Because it's a truck manifold, it was really hard to get torque out of an improved one," said Jeff Krangnes, noting that the decision to construct it with sheetmetal was driven by time to market and no need for tooling development. "The stock throttle body is 85 mm, but we have the intake set up to run 102 mm."

The camshaft engineers from COMP Cams were also involved in the project, so there was synergy in analyzing the flow characteristics of runner length and plenum volume.

"We ended up changing the runner lengths two times to get where we were happy, and we have a larger plenum than the stock manifold," said Krangnes. "It's definitely more of a race manifold. It's meant for the guys who drop Godzillas into Fox bodies."

As with other companies, Edelbrock is working on new cylinder head projects but not releasing details. Those heads will eventually spawn new intake manifolds as well as new carburetors. In addition, Edelbrock may trim some existing intake manifolds to simplify the lineup and avoid consumer confusion. "Plus, we're trying to push our racing a little bit more," added Krangnes.

Holley had a head start when developing the recently introduced Hi-Ram and Ultra-Lo Ram intakes for the Ford Coyote platform.

"We were able to get CAD data from Ford through our relationship with SEMA. By using their CAD models, we can optimize the ports," explained Spainhoward. "We can ensure fitment with all the engine components."

The new Ford Godzilla XTS intake manifold from Edelbrock is tuned for a higher rpm with shorter runners than stock. It's constructed from lightweight sheetmetal with billet flanges and finished in black powdercoat.

The modular intakes are designed to share the same base, then the front and tops can be designed to suit the different needs of the user.

"For the Ultra Lo-Ram, we wanted it to fit under a stock hood with stock engine mounts. The modular design also allows engine builders to easily access the runners for porting. A slightly different machining on the Hi-Ram allows people to use intercoolers for their boosted applications," said Spainhoward, noting that Holley used 3D-printed protypes for dyno testing and fitment validation.

As further testament to the popularity of carburetors, Holley released a low-rise, single-plane intake for the Gen III Hemi. It comes in black or natural cast finish and will support a 4150 carb or self-contained EFI throttle body such as the Holley Sniper system. There is also an EFI version that comes with fuel rails and multi-port injector provisions.

"The single-plane manifolds that we currently offer for LS1 and LS3 do really well. A lot of people like the retro look for swaps with a modern engine into an older chassis and not the plastic manifold," said Spainhoward. "The runner length is optimized for mid-range, and even though it's a low manifold, we still have a nice transition into the ports of the Chrysler head."

RESULTS DRIVEN

While the bulk of intake manifold sales and development is driven by the needs and pocketbook of street enthusiasts and weekend warriors, they will benefit from lessons learned designing new race manifolds. Whether seat-of-the-pants creativity or formula-driven vision, the prime motivation is to try something different with the goal of making more power.

Weinle's efforts to design a trick sheetmetal, single-four-barrel manifold for a Chevy ROX-style 460-cubic-inch late model engine with 4.500-inch bore spacing will focus on more size.

"I've got a billet manifold on there now. I figure my advantage is to build one with a little more plenum and a little bit longer runner," said Weinle. "Also, I want to raise the manifold up a little higher—more of a drag-race style."

Weinle is working with a Pro Stock engine builder who is a disciple of longer runner lengths, and that's where much of the design theory is generated.

"You see more torque with a longer runner. I built a Super Stock intake for a guy in Sweden, and we were definitely able to go longer and bigger and make it work," said Weinle, adding that equal distribution with the runners is the main challenge. "I'll be honest, this manifold is not for a short track. You can't lose three lengths on a restart. You can definitely get away with a bigger manifold on a big track."

For his Pro Stock intake, Weinle has fabricated the runners and port plates so far. Next comes CNC machining elements of the plenum. "I'm actually building it for myself, and it's going to cost every bit of five grand, but it's going to be pretty sophisticated," promised Weinle.

Bottom line, racers are eager to try new tricks in the area of intake manifolds.

"I'm working with a couple of race teams on Pro Mod and the Outlaw 632 projects," said McAffee. "A lot of rules are myths. Sometimes you can change those rules, and sometimes you can do nothing more than confirm what they really were to begin with. You try to break the rules often, and most of the time you get spanked. But once in a while, you find that little something and you start picking at it.

"You still have to confirm the myth and the stories, and what you've always thought in the past wasn't indeed the truth. It may have only been the truth up until then," McAfee noted. "The cylinder head design and camshaft profiles are changing, and now you have to readdress all those myths and the rules. You have to at least test the waters." PRI

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FROM THE OUTSIDE IT'S A ROLLING BOX ON WHEELS. INSIDE, A RACE TRAILER IS PURPOSE-BUILT TO SUIT THE SPECIFIC NEEDS OF A RACING DISCIPLINE. HERE'S HOW IT'S DONE.

By Drew Hardin

"If you can dream it, we can build it." *—Chad Boespflug, Flying A Motorsports, Cuba, Missouri*

"Building a race trailer is like building a custom house. What do you want? Do you want refrigerators? A microwave? Sleeping quarters? A couch or fold-down bench? How do you foresee yourself using the trailer?" *—Wayne Quackenbush, Capitol Renegade, Beltsville, Maryland*

These two trailer dealers summed up in a few words the level of personalization that's available when ordering a race trailer these days. From spare-part-specific cabinetry to family-friendly amenities, trailer manufacturers have figured out ways to make

INCHES

just about anything fit around the race car.

That level of customization can be hugely important to racers. Beyond just the ability to hold the car, pit vehicles, and spares, trailer layouts can be fine-tuned to save a racer time, that most valued commodity at the track.

As we found out talking to these and other dealers and trailer manufacturers, how racers equip their trailers can vary quite a bit depending on the racing discipline. The inside of a sprint car trailer, for example, looks very different from one carrying a dragster or a Trans-Am car. That's not just due to the size and shape of the car, but also the logistics of the various racing series.

A road race trailer "is not as specific as a sprint car trailer or a modified trailer," said Mitch Bender of Bravo Trailers. "One trailer would work for almost all road racers—other than the choice in size and whether it's a tag or a gooseneck."

SPRINT CAR

In sprint car racing, "things happen and happen fast," said Quackenbush, "so when you get to the track you have to be prepared for quite a bit in a short period of time, from hot laps to time trials, heat races, features. Once things start, there's not a lot of downtime, unlike other forms of racing. Your trailer layout is critical to being consistently competitive. It needs to be organized. Parts, equipment, tools, and spares all have to be quickly accessible."

At the most basic level, a sprint car trailer is different from other trailers "because the sheer size of the car is different, especially when it has a wing on it," Quackenbush said. "You need additional height in the trailer to roll the car inside, unlike a sports car or something like that where you don't need a tall trailer unless you're stacking them one on top of the other with a lift."

"For a winged sprint car you want a minimum of 105.5 inches at the back door so you can load without taking the wing off," said Josh Garner of inTech Trailers, Nappanee, Indiana. The trailer's overall interior height will be taller as well—generally a minimum of 9.5 feet, Garner said—to accommodate the wing and to allow an additional chassis to be stored in the front bunk. "Sprint car teams find a way to use absolutely every inch of the trailer."

Some race cars, such as dirt late model cars, are also wider than the ramp door's standard width, "so we can widen the opening by up to 5.5 inches to allow for a car to get in easier," Garner said.

"Most sprint car racers will pit out the back of their trailer versus the side of the trailer like a drag car," said Mike Nichols of Haulmark, Elkhart, Indiana. "We'll outfit the back with two to three lights for that pitting situation, along with swing-out air hose reels and swing-out tool holders."

A sprint car's racing schedule also influences the trailer's layout, said Boespflug. "Most dirt track sprint car guys are going to race four times as much as a drag racer. Some guys race 60–70 races a year. They may be on the road for three months at a time, racing four to seven nights in a row. To prepare for that, they have to have a lot of spare parts."

"A lot of thought has to go into the layout of a sprint car trailer," said Quackenbush, "and if you're not familiar with sprint car racing, you can get it wrong quick. If it's off an inch or two here or an inch or two there, it all won't fit. It's a game of inches squeezing it all in there."

Even the trailer's side door figures into the planning. "On the sprint car trailers we make it just big enough to walk through, because you need wall space inside the trailer for

This is the interior of a sprint car trailer from Flying A Motorsports. "The cabinet design is specifically laid out for spare parts to have a location to mount to the wall with hangers, and the cabinets are also meticulously thought out to make sure the sprint car, pit mule, and a small four wheeler will fit," said Chad Boespflug. Also note the triplet overhead to load a spare car into the bunk and tire racks for extra tires and wheels.

cabinets, tire racks," Quackenbush said. "We're maximizing every inch we can get. Most sprint car racers now carry enough parts in their trailer to build at least one spare car. The touring series guys and even some high-profile weekly racers that race two to three nights a weekend will even carry a spare car in the trailer. So we put trolley systems to load a spare car either up in the gooseneck of the trailer or build it with a loft for the spare chassis."

> *"YOUR TRAILER LAYOUT IS CRITICAL TO BEING CONSISTENTLY COMPETITIVE. IT NEEDS TO BE ORGANIZED."*

"Every cabinet has a different depth for the parts that are secured to the wall inside—steering gears, radiators, torsion bars, shocks, gears—all those things have to be planned for," Boespflug said. "Since the parts in those cabinets aren't touched every day, they keep them from getting dirty and dusty from being at a dirt track. You can wipe the walls of the cabinet down and not have to wipe the nooks and crannies of spare parts that could collect a thick layer of dust over a weekend."

Quackenbush also noted that "we all carry side-by-side utility vehicles with tool boxes that we roll out of the trailer, so we have to lay it out so a spare car, the mule, the complete car, and all your spares can fit in the trailer."

The length of a typical sprint car trailer "really depends on how serious the end user is," said Quackenbush. "Some sprint car guys will race 100 times a year, so bigger is better. For a local Saturday night racer who wants to be organized and competitive but is going home every night, we'll build gooseneck trailers that are 36–40 foot, but traveling guys have trailers that are 42-, 44-, 46-foot in length. Tag trailer sprint car guys are 28–32 foot."

At Flying A, "we go from a 26-foot tag to a 48-foot gooseneck and anything in between," said Boespflug. "It's all about accommodating the customer's needs.

"A lot of thought has to go into the layout of a sprint car trailer," said Wayne Quackenbush, "and if you're not familiar with sprint car racing, you can get it wrong quick." This Capitol Renegade demonstrator illustrates how a winged sprint car—and all its related gear—loads into the trailer.

Budget comes into play, too. We can do a 48 loaded to the gills, but it's going to be significantly more expensive than the 26-footer. It depends on what you're trying to do."

PAVEMENT LATE MODEL

Like sprint car racers, pavement late model racers pit from the back of their trailers, "so all your air outlets, electrical outlets, things like that have to be oriented to the back of the trailer," said Quackenbush. "Those pavement late model guys have big pit carts, so you have to lay out the interior of the trailer so their big war wagon will fit up in there. They'll want plenty of tire racks for spare tires and rims."

For these racers he said Capitol Renegade builds "a lot of 42-foot gooseneck trailers, air conditioned, and insulated with double doors at the back so they can go in and cool off. Those guys are at the track all day, and it can get pretty brutal in the summertime."

"With a lot of the ARCA, road course, asphalt, and even some dirt circuits, the racers want to go as short as they can" with their trailers, said Nichols. That's because many of them "live out on the road, and they tow with a toter home or RV. They can only go up to 65 feet in length, so we accommodate that big RV with a short 20- or 24-foot stacker to keep them under that 65-foot DOT length."

DRAG RACE

A drag race trailer is simpler than a sprint car trailer, Boespflug said, "because they're carrying fewer parts and spares than the sprint car guy who needs to be able to race for 20 nights on the road straight through."

"The first consideration for that market is the length of the trailer," said Brad Bell of Formula Trailers, Bristol, Indiana. "It depends on the mod class they're in, and the length of the wheelbase. For Top Fuelers, those are 32- to 34-foot-long trailers. Door cars will be in smaller, 24- to 28-foot trailers."

"Most drag teams want the longest trailer they can get," confirmed Nichols. "We build tag trailers out to 34 feet and goosenecks to 48 feet."

One of Haulmark's most popular options is its Dragster Lift, according to Nichols. He described it as a tube framework that goes in 6 to 8 feet before the end of the trailer. The dragster is then rolled in backwards and the front wheels are then placed in the lift while the back wheels remain on the floor near the cabinet. Then a second dragster can be moved into the trailer beneath the dragster with the nose lifted in the air.

Haulmark also accommodates drag racers in a less visible way. Beneath its rubber coin flooring is "felt backing saturated with adhesive," Nichols said. "That's specifically designed for door cars, bracket cars. When you pull the car out of the trailer, if you get wheel jerk because you can't really feather the clutch, it causes ripples in a lot of floors." The adhesive floor backing "helps to keep the floor perfect for the life of the trailer."

Bell said each of Formula Trailers' dealers sets up drag race trailers "a little bit different. They all have the same components—floor coverings, house electric, wall coverings, ceiling coverings—it's just a matter of where they'll put the cabinetry. Guys doing 32-footers use cabinets that are normally about 2-feet deep and put them on the driver side from the rear to the front wall. But another dealer buys a lot of 34-footers and puts the cabinets across the front. That trailer still has the same 32 feet of usable length from the rear of the trailer to the front cabinets."

"Drag racers are always working on the curb side of the trailer, as are most other racers," said Garner. To protect crews from the sun, inTech preps trailers for customer-installed awning kits, "and we do a lot of fully automatic awnings that allow the guys to

"IT'S CRUCIAL WHEN RUNNING FOR A CHAMPIONSHIP THAT YOU HAVE THE TRAILER EQUIPPED WITH EVERYTHING YOU NEED TO KEEP THE RACE CAR ON THE TRACK."

work under there without having to worry about walking into an arm in the awning."

When inTech installs door caddies on the side doors, "the crew wants them easily accessible from outside the trailer," Garner said. "If you look from the inside of the trailer, it looks like they're mounted a little bit low, but when the door is propped open, they're perfect for working outside the trailer." inTech also offers fold-down shelves that are mounted in its custom wheel well cabinets and form an interior desk. "That way they can communicate back and forth with the car outside. They have monitors on the inside of the trailer and can have them hooked up outside."

One amenity more popular with drag racers than other disciplines is a bathroom in the trailer, said Mitch Bender of Bravo Trailers, Bristol, Indiana. "As a general rule, drag racers like to stay at the track. We do a lot of drag racing trailers that will have a bathroom up in the front. And with a gooseneck they make the upper rise area into a sleeping area."

"We are doing more and more bathroom applications, bathroom and shower combinations, mainly for drag racing customers," said Bell. "They have the amenities of home. Everybody is more comfortable that way, especially if they're bringing family with them."

The gooseneck style of trailer in particular "allows them to turn the trailer into a multi-purpose vehicle," Bell said, "with sleeping arrangements and a kitchenette. These types of trailers take the place of a motorhome, so they don't have to have a large tow vehicle on the front, and these trailers are cheaper to purchase than motorhomes themselves. It just depends on their budget."

As of July 1, Haulmark introduced a bathroom model "that makes it easy for the racer," said Nichols. "We always had a bathroom package, but now it's one model with a stand-up shower, porcelain toilet, and sink in the front of the trailer. It's a point-and-click package that will be easy to add."

ROAD RACE

A road race trailer "is not as specific as a sprint car trailer or a modified trailer," said Bender. In fact, he believes the "most general trailer" is one built for a road racer, as "one trailer would work for almost all road racers—other than the choice in size and whether it's a tag or a gooseneck." Bender is himself a road racer. "I owned Pace American before Bravo, so I've been doing this since 1986. Pace was started to help pay for my own personal racing."

When Bender loads his road race trailer, he packs "a CTECH pit cart, golf cart, and then the race car will go into the trailer. We also carry a scooter and electric bikes. I have to load my golf cart first, and then the race car goes in behind it. What often happens is people like to pack up all their stuff and they go socialize and ride around in the golf cart, so some people try to load it last at the back of the trailer. I don't have that ability because I have to center my car over the axles for weight distribution."

"What it boils down to for us first of all is, can we build them a trailer that will work?" said Garner. "Sometimes just being able to load a road race car can be a challenge because they have pretty low clearances." inTech asks prospective buyers to fill out a car clearance sheet. "It has 15 different measurements on it that we'll load into a program, and we'll determine whether or not we can load it, first of all, and if we can, what it's going to take. It could take a 4-foot ramp, it could take up to a 10-foot ramp. The size of the rubber bumper that goes underneath the door could go from 1 inch up to 4.5 inches, so there's quite a variance. Once we make sure all that's going to work, we can start designing the trailer around the car."

Victory Custom Trailers of Almont, Michigan, specializes "in many different levels of custom trailers and motorcoaches," said Steve Chrisman. "We typically keep stackers, goosenecks, and tag trailers in stock for our customers, along with several custom builds we do during the year." When we spoke to Chrisman, Victory had started building a custom trailer "for a top-tier Trans-Am team. This trailer will be built around the team's needs, for such things as a spare car and several parts they will be carrying, including carbon-fiber body parts, bumpers, noses, hoods, and spare race engines." The 48-foot gooseneck trailer will have an "8-foot interior height, 60-inch double doors, awnings, custom cabinets, a computer workstation for an engineer, and many other custom options the team

Featherlite's specialty trailers are custom built for professional, semi-pro, and serious amateur racers who require a big rig to travel from race to race. Layouts can include office space for those pro teams that travel with a cadre of engineers.

When inTech installs door caddies on the trailer's side doors, "the crew wants them easily accessible from outside the trailer," said Josh Garner. From the inside they look like they're mounted a little low, "but when the door is propped open, they're perfect for working outside the trailer."

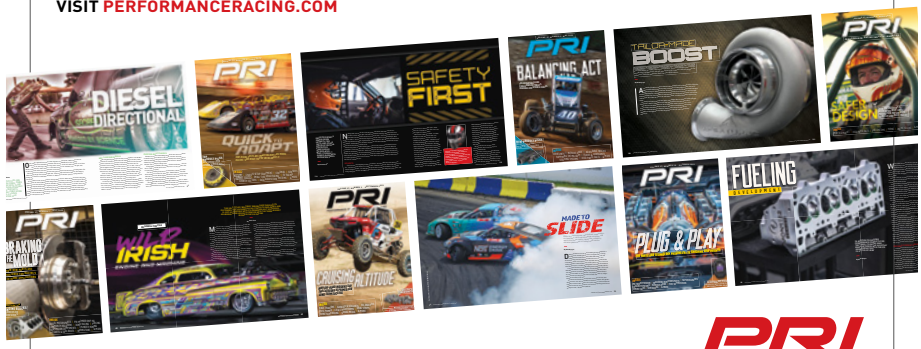
is requesting. It's crucial when running for a championship that you have the trailer equipped with everything you need to keep the race car on the track."

SPECIALTY TRAILERS

"A lot of similarities and a whole bunch of intricate differences" is how Mark Ackley of Featherlite Specialty Trailers in Cresco, Iowa, described trailer design for the top tier of hobby, semi-pro, and professional racers using tractor/trailer rigs to haul their cars.

At one end of this spectrum are, for example, vintage racers, "businessmen with lots of wealth and a huge interest in racing," as Ackley described them. "Those folks are not engineer based. They want to go to the track, have a great trailer to put the car upstairs, and have a modestly equipped shop down below with limited parts. The lounge areas are more about creature comforts at the track during the day."

On the other hand, "the professionals in IMSA, NASCAR, and IndyCar have an enormous number of engineers. Those professional folks have taken the kingpin area of the semi-tractor and made it into an office for six, eight, 10, 12 people."



As with the other trailers we've discussed, car size affects the trailer layout, but in a different way. Because most cars are carried on the upper deck, and the bottom deck is dedicated shop and office space, "what we put upstairs we take away downstairs," Ackley said. "IndyCar trailers have a lot shorter upper deck because their cars are so much smaller in height, while drag racers are much taller. If we want a trailer that can be used across multiple disciplines, it has to have at least a 55-inch upper deck, which is what NASCAR is, so it applies to the lower-level series as well."

The sprint car trailer "is very unique from all of the other racers," Ackley said. "They're so tall with those wings that they cannot go on the upper deck. They go on the bottom deck, and they generally have ramps versus lift gates." A sprint car "is so wide that we go to a single-tire, triple-axle configuration that allows just the front end of that car to drive between the fenderwells on the bottom floor."

Pit configurations play a role in trailer design. "IMSA, Indy, and NHRA work out of the side of the trailer under an awning," Ackley said. Electric outlets are added "at the awning rafter locations on the side of the trailer, and there's additional lighting on the trailer's exterior underneath the awning. Sprint car guys, who pull up and work at the back of the trailer right at the ramp, are lighted up very well at the rear of the trailer."

To adapt to the unique demands of NHRA racing, "where they have limited time between runs and are in and out of the trailer between runs, we actually drop the floor in front of the axle 6 inches toward the ground. That creates an easier path for those folks to get from working on the car to the shop and back out to the car."

FINAL THOUGHTS

"One thing I focused my efforts on, when I was racing 60–70 races a year, was paying attention to time management," said Flying A's Boespflug. "Time is money. If it takes you an hour to load at the shop, an hour to unload at the track, an hour to load after the race, and then an hour to unload at the car wash or at the shop, that's four hours. If you can do that in an hour, you've saved yourself time for sleep, time to work sponsors, time to manage other things, or have a normal life when you get home. Loading your trailer so there's a designated location for each spare part, where things have a rhythm and a flow, makes it easier to save that time."

"I have been in the motorsports business, or some sort of racing activity, for the last 45 years of my life," said Capitol Renegade's Quackenbush. "I raced pavement late model cars and sprint cars. I know people who drag race and who road race. Having the experience of somebody who knows racing versus the guy selling cargo trailers to landscaping companies makes a big difference in the end result of what you're going to get. Trust the people who've been there."

"Racers buy from racers," said Formula Trailers' Bell. "That's why the PRI Show is so important. When we go to the PRI Show, we have in our booth our dealer representatives, and they are actual racers. They speak the language. They know what these racers' needs are. So we can gather a lot of knowledge on the front side, when a customer comes in and inquires about a race trailer. We ask, 'What type of racing are you doing? What series is it?' We have these types of trailers readily available on our lot, or we can custom build you one to meet your needs." PRI

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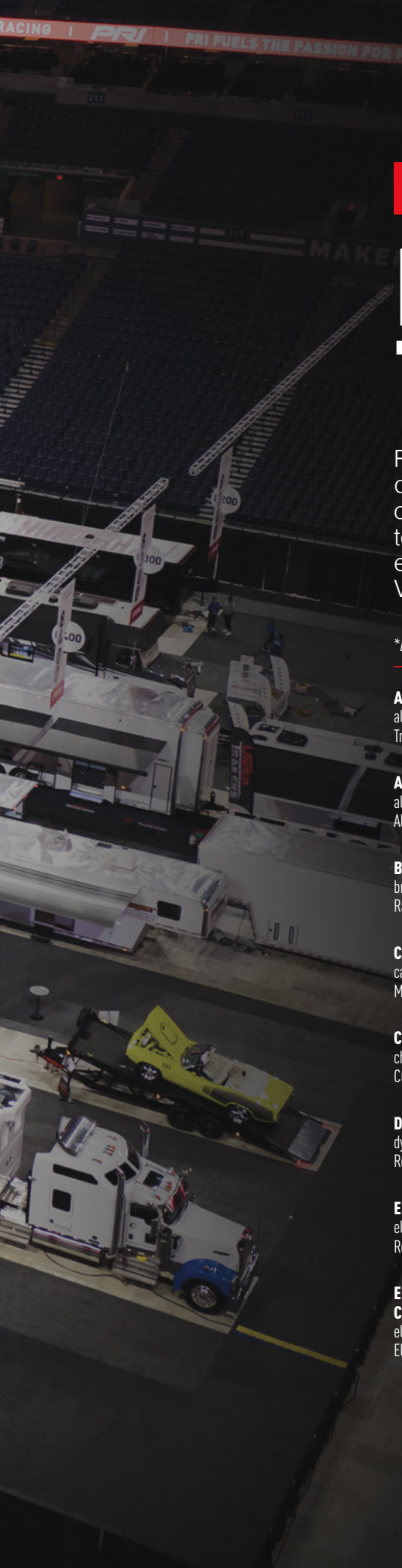

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Race Trailers

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capitolrenegade.com
Motorcoach, Toterhome, Trailers

CHICO CUSTOM TRAILERS
chicotruckandrv.com
Custom Built Trailers and Mule Pit Carts

DYLANS RV CENTER
dylansrv.com
Renegade RVs, Dynamax RVs, and/or Nexus RVs

ELDORADO TRAILER SALES
eldoradotrailersales.com
Renegade, Showhauler, & Bolt Custom Coaches

ELLIOTTS CUSTOM TRAILERS AND CARTS
elliottscustomtrailers.com
Elliotts Custom Trailers and Carts

FEATHERLITE TRAILERS
fthr.com
Car Haulers and Custom Specialty Trailers

FLYING A MOTORSPORTS
flyingamotorsports.com
Motorhome

FORMULA TRAILERS BY NOVAE
formulatrailers.com
Enclosed Race Trailer

HAULMARK RACING TRAILERS
haulmark.com
Two Enclosed Racing Trailers

INTECH TRAILERS
intechtrailers.com
All-Aluminum Custom Motorsports Trailers

JASON DIETSCH TRAILER SALES
jasondietschtrailersales.com
Trailers

KB TRAILER SALES
kbtrailersales.com
Trailer

MAXX-D TRAILERS
maxxdtrailers.com
TDX, T8X, H8X, DTX, A6X

MOTORVAULT
motorvault.com
Futura Lowering Trailers

R&M RACE TRAILERS
rmtrailer.com
Race Trailer and Trailer Accessories

RPM TRAILER SALES
rpmtrailersales.com
Custom Aluminum Trailers

TURNKEY TRAILERS
turnkeyindustries.com
53' Turnkey Race Trailer

UNITED TRAILERS
united-trailers.com
Trailers

WINNEBAGO
winnebagoind.com
US Manufacturer of RVs

WINTERS TRAILER SALES
winterstrailersales.com
Trailer

SEALING SCIENCE

GASKET MANUFACTURERS ARE PUTTING VAST RESOURCES INTO DEVELOPING PRODUCTS THAT SEAL BETTER, LAST LONGER, AND ARE EASIER TO WORK WITH. A BIG PART OF THAT QUEST STARTS WITH THE TYPES OF MATERIALS USED.

Photo courtesy of SCE Gaskets

By David Bellm

It's one of the most tortured components in a race engine. Many racers don't give it much thought, but when a head gasket fails, it can wipe out an engine, take a team out of a race, and wreck an entire weekend in seconds. And there are dozens of other gaskets in a race car, any of which can wreak havoc in countless ways.

Although these modest-looking parts may seem simple at a glance, that's deceiving. Sure, gaskets don't have any moving parts, and they don't gleam with the eye-candy, jewel-like sheen of a freshly minted set of cylinder heads. But gaskets are, in fact, extremely precise components. They're the result of a vast army of engineers applying more than a century of collective experience, modern science, and the hard lessons of races gone wrong.

Gasket manufacturers are constantly developing new products and using new materials in the quest to deliver the most effective products possible.

Central to the effectiveness of any gasket are the materials that go into it. On everything from oil pans to cylinder heads, gaskets are a meticulous blend of different substances, all carefully selected by engineers to deliver optimum performance. Although the basic functions of gaskets may not change much, development is never-ending nonetheless.

Many of today's racers are pushing the limits of power to sky-high levels, so gasket manufacturers see their products hammered to the limits day in and day out. As if the never-ending quest for more power isn't enough, racers and ordinary drivers alike nowadays expect that everything on a vehicle will be a tightly sealed unit, free from leaks, drips, and fluid losses.

To cope with these demands, gasket manufacturers are in constant development mode, seeking new materials and new ways to use them, in the quest to deliver the most effective products possible. The results are new, innovative ways of using materials and steady, constant improvement in the science of sealing.

HEAD GAMES

In the world of gaskets, head gaskets generally get the most attention. When something goes wrong with a head gasket, it tends to cause big, dramatic failures, compared to something less demanding like a valve-cover gasket. Even more significant, head gaskets are the sole barrier separating combustion, coolant, and oil from each other, an extremely demanding role unlike that of any other gasket.

In general terms, the primary materials used for head gaskets aren't anything new. The most popular head gaskets for most engines nowadays are multi-layer-steel (MLS) gaskets. These sophisticated components are designed largely around dealing with cylinder-head lift. In all engines, cylinder heads lift off the deck surface as much as several thousandths of an inch in every combustion cycle. This places obvious demands on the gasket, which must maintain a perfect seal every cycle, thousands of times per minute, despite the clearance that it sits in changing as much as .003-inch along the way.

Making this phenomenon even more challenging from a gasket-design standpoint, cylinder head lift doesn't occur consistently across the head and deck surface during combustion. The amount of lift can vary considerably depending on proximity to head bolts, clearance between cylinders, and a wide range of other factors. Presented like that, it might seem almost impossible to seal such a thing effectively. But that's one of the fundamental advantages of the MLS concept.

"Each and every combustion event is unloading the gasket," said Aaron Hunter of SCE Gaskets, Mount Pleasant, Tennessee. "The beauty of MLS gaskets is that they act like a spring that tracks with that. But it varies. Take for example a Ford Coyote. They've got four bolts per cylinder, and the bolts are relatively close to the cylinders. The LS is a little bit further out from the cylinder, the Subaru is really far out from the cylinder. So you have to look at the right gasket materials for each application based on the position of the clamp load. And then also how much clamp was available, but we also try to make sure that we can get all the clamp load we need."

As the name implies, the primary ingredient in a multi-layer-steel gasket is

steel. Each of those steel layers is designed for a specific purpose. Some layers have embossing that allows the steel gasket to take on the spring action needed to compensate for the head lifting off the deck during combustion. Along with this, stainless steel is used for its ability to resist corrosion in the harsh environment head gaskets are subjected to. That isn't just a matter of longevity. The ability to resist corrosion enables the head gasket to control coolant pressures effectively.

"The reason that stainless is typically chosen comes down to impingement," said Tim Golema of MAHLE Aftermarket, Farmington Hills, Michigan. "In the olden days when they made metal gaskets, they had problems with the tin-plated steel they used when you would run the coolant. Back then, in many cases, the coolant was just water. When you would run it through the gasket, that hole would corrode and get larger and larger. Eventually, you had a problem with coolant distribution. You'd overheat because you weren't able to put the coolant where it actually needed to be. Now we use various grades of stainless steel to prevent that. While today we don't use much water in production cars, a lot of guys in the race car world use water, and then they put the conditioner in there so they can get the temperature higher."

Due to their unique combination of strength and malleability, copper head gaskets are ideally suited to the harsh engine environments in the most extreme forms of motorsports, such as fuel drag racing and tractor pulling.

Although the use of stainless steel in MLS head gaskets is a given nowadays, from

"THE OEs ARE TEACHING US. AND IT'S NOT WRONG, BECAUSE THEY HAVE R&D BUDGETS THAT ARE WAY LARGER THAN THE BIGGEST GASKET SUPPLIERS."

there, the choices get rather complicated for engineers. To achieve the requisite amount of sealing, clearance, and compensation for head lift, engineers carefully choose the number of layers, the grades of stainless steel, the heat-treating of those layers, and whether or not those layers are folded over to double them. These measures are all chosen in an effort to control the load that cylinder-head bolts put on the gasket, so combustion, oil, and coolant are all sealed effectively.

"We're trying to balance the load on the head gasket so we, for sure, have 50% of that load sealing combustion," said Golema. "You don't want to leak that—it's exploding and it's hot. That way you'll also have load left to maintain the seal for the oil and the coolant. If you waste all your available bolt load at sealing combustion, you'll end up leaking coolant or oil. So the various grades of the stainless steel are that way in an effort to distribute that load evenly across the cylinder at the given amount of bolt load.

"Different grades of stainless steel are typically used," continued Golema. "Some of those layers are just a spacer layer. So it may be .006 or .007 thick. Now you may have another layer that has two mechanical beads on it, or maybe four mechanical beads on it. Those mechanical beads are what does the load distribution. In addition, there are some layers that are folded upon themselves, in an effort to create, we'll call it a double stack. So if that layer was .006, it overlays upon itself again, and makes that .012."

Of course, much of this exotic, complex engineering is completely hidden from view. That's not only because the layers of an MLS gasket are thin, and they're welded or riveted together, but because they're also typically coated over their entire surface. Like the layers that lie beneath, this coating gets vast amounts of thought put into it, too.

"The coating on an MLS gasket can almost be in somewhat of a fluid state," said Hunter. "You can see on the MLS gasket after they've been clamped down and used. In some spots, there's no coating left—it's been scrubbed off. On other spots the coating is there, but it's actually been pushed away. So it's interesting to play with different coatings, because you have different levels of hardness, different viscosities, and different resistance to chemicals. That can help to get the clamp load exactly where we need it in the right

Gaskets are a meticulous blend of different substances, all carefully selected by engineers to deliver optimum performance. That's more important than ever, as racers are pushing the limits of power to sky-high levels.

amount so we can seal the most power, while also maintaining a solid fluid seal."

MLS gaskets have become the de facto standard for most performance applications, and our sources say there's still a lot of room for continued development with this technology. But alongside MLS gaskets, there's still demand for copper head gaskets in motorsports, particularly for extreme applications.

Copper head gaskets offer a unique combination of strength and malleability. This allows them to withstand brutal combustion-chamber pressures, while still being able to conform tightly to deck and cylinder head surfaces for good sealing. Copper head gaskets are also sold in a wide range of thicknesses, which allows racers to make relatively quick adjustments to the engine's compression ratio simply by switching to a different gasket. In addition, copper head gaskets can also be reused, unlike other types of head gaskets, which are typically designed for one-time use.

Yet there are a number of disadvantages to copper head gaskets as well. One veteran supplier in the industry noted that he spends plenty of time talking potential customers out of using his copper head gaskets, simply because he doesn't want the potential issues and backlash of dissatisfaction from customers who don't know what they're getting into with them. Foremost among copper gasket's disadvantages is the additional machine work and prep required to run them; a groove must be machined into the deck around each cylinder bore to allow the use of an O-ring.

"Honestly, there are more disadvantages than advantages to copper head gaskets nowadays," said Richard "JR" Clark of Clark Copper Head Gaskets, Blaine, Minnesota. "You wouldn't really want to run copper on the street. Besides the fact that you have to have an O-ring and a receiver groove on the deck, copper is also very temperamental toward water. So you can't run as much water pressure. The other thing with copper is it isn't going to take up the little voids other kinds of gaskets will. So you've got to have a pretty flat surface to get it to seal properly."

That's not to say that copper head gaskets don't have their place. Copper is ideally suited to the harsh environments such engines are routinely subjected to in the most extreme forms of motorsports. "There's still a very large demand for copper head gaskets," said Clark. "Mostly in tractor pullers, or in drag racing, for fuel cars."

NEW IDEAS FOR OLD CHALLENGES

Although head gaskets face the toughest demands of any gasket in a vehicle, engineers and manufacturers aren't ignoring the rest of the engine. For instance, a failed oil-pan gasket probably won't cause the immediate destruction of an engine like a head gasket can, but it can still sideline a car in certain situations.

One way manufacturers are preventing such problems is with one-piece gaskets. Many classic engine designs that are still being modified and raced extensively today were originally designed with multi-piece gaskets. These were difficult to seal completely even when the proper use of sealants and installation techniques were carefully heeded. Nowadays, racers generally prefer simpler, faster methods, so they're increasingly receptive to single-piece gaskets designed to replace these trouble-prone legacy designs. "It's just about using up-to-date technology to make these engines seal better. It makes a difference," said Sergio Duarte of Flatout Gaskets, Mundelein, Illinois.

"THERE'S A WHOLE RECIPE FOR EACH AND EVERY MATERIAL BLEND, AND IT ALL DEPENDS ON WHAT YOU'RE TRYING TO ACHIEVE."

Although elastomeric materials made from silicone and other similar materials are becoming increasingly the norm, classic composite "paper" gaskets are still used in many applications, and the technology continues to be developed. "Composite gasket material is still a very relevant material," said Hunter. "For lack of a better term, it's called a 'paper' gasket material. But it's not paper. It's actually full of all sorts of really sophisticated technology. There's a whole recipe for each and every material blend, and it all depends on what you're trying to achieve."

Many of the developments in all types of gasket materials come from OE manufacturers. With the billions of dollars they collectively spend on engineering and development, gasket technologies have improved considerably thanks to their work. The performance aftermarket often builds upon these designs, improving them or borrowing and reappropriating them to other applications. "The OEs are teaching us," said Hunter. "And it's not wrong, because they have R&D budgets that are way larger than the biggest gasket suppliers."

Nonetheless, two aspects in particular of OE gasket designs are largely shunned by racers and the gasket manufacturers that supply them—built-in gaskets and factory engines that are 'glued' together with liquid sealers instead of gaskets. Although these make sense for bottom-line-obsessed automakers, they don't work well for performance applications, in which users need to disassemble and reassemble engines with complete confidence that parts will stay sealed.

"Gaskets make the engine serviceable in a friendly manner," said Hunter. "When stuff is glued on, you're sitting there working with a razor blade, shaving stuff off. And you're probably gouging the surface. At the same time, you're so focused on what you're trying to clean off the surface that you're not paying attention to what you clean off. You can end up putting debris, including metal shavings, down into the crankcase or the timing area, which should be a cleanroom environment."

At the same time, better components are increasingly being used by racers, according to our sources, which is greatly improving the sealing of engines in general. Although flimsy, thin stamped-metal components are still used by some racers,

The right head gasket materials for each application are based on the position of the clamp load, said SCE Gaskets' Aaron Hunter. It varies considerably, he explained, depending on the number of bolts per cylinder and how far away from the cylinder they are.

the poor sealing surface and inconsistent shapes are relegating them to stock restorations, for the most part.

"You see a lot of guys are going to a higher quality oil pan material now, whether it's a cast aluminum pan or it's got a nice, thick, welded flange," said Hunter. "I'm a fan of that. It means my gaskets are going to seal, and people will quit blaming the gasket for leaking on an oil pan that's been put on 30 or 40 times and over-torqued each time, to where the bolt hole is all stretched out and it doesn't distribute clamp load properly."

Keeping up with what's happening in the field is said to be one of the vital keys to developing gasket materials and designs more effectively. Manufacturers continually work closely with engine builders and racers to get their input. Although this tends to be done with an eye on developing parts that have the potential for high production numbers, engines of all types are of interest to gasket manufacturers, as they seek to learn the nuances of different powerplants and the needs of the racers who field them.

One important aspect of these partnerships is the ability to examine used gaskets after engine builders or racers are done with them. This post-mortem investigation can yield vital information regarding the performance gasket materials and where they can be improved.

"We ask for gaskets back so we can take a look at them," said Hunter. "Because a lot of these performance guys, especially street performance, burn up pistons all the time. Some of those used gaskets are in perfectly fine condition and they performed well. But it's still very interesting to look at the gasket, study it, and ask, 'What happened here? Can we improve on it? Is it doing everything we expected it to do? Are we satisfied with its performance?'"

Whether it's a relatively simple valve-cover gasket or the endlessly complex head gasket that resides just inches away from it, gaskets are an unseen world that many racers take for granted. The fact that these unsung components work as well as they do is a testament to the vast amount of engineering, study, and thought that goes into their design. Much of that starts with the materials they're made from. PRI

SOURCES

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MEMBER CHECK-IN

UNITED RACE PARTS

With strong sales and a number of high-visibility international projects, United Race Parts has found success serving the behind-the-scenes needs of race teams big and small.

By David Bellm

United Race Parts founder and CEO Thomas Decker, right, initiated the Golden Gun award at the 2022 Indianapolis 500 as part of the annual Pit Stop Competition.

Success or failure of a race team is often decided in the pits. That's the fundamental principle that paves the way for the success of United Race Parts. Partnered with Greaves 3D Engineering in England and Dino Paoli in Italy, this Troutman, North Carolina-based company specializes in equipment for pits, garages, and the general support of race cars.

Founded in 2015, United Race Parts has steadily grown to 10 employees, working out of an 8,000-square-foot building. The first big break for the company came in 2017 when it beat out dozens of rivals for the contract to provide wheel guns for NASCAR, when the sanction switched to a leasing arrangement aimed at blunting rapidly escalating costs among competing teams.

Although accomplishments like the NASCAR contract certainly boosted the fortunes of United Race Parts, it nonetheless has its share of challenges, like any company. The biggest hurdle being faced right now is the quest to complete its new building, which will be 7.5 miles down the road, in Mooresville, North Carolina. At 21,000 square feet, the new building will more than double the size of its current facility when completed. The additional space couldn't come soon enough for the rapidly growing company.

"It will give us some more room for growth because we're basically bursting at the seams right now," said company founder and CEO Thomas Decker. "Our current building is really good for us in the middle of the season, when things slow down a little bit. But in the really busy months of the offseason, it becomes inefficient just from the amount of stuff we have to have in the building."

The new building was originally slated to be finished in late 2022, but a variety of local-government bureaucratic setbacks and other factors beyond the company's control have pushed the project well into 2024. It's been frustrating for Decker, but he describes it with a calm professionalism that belies the stakes of the effort.

Throughout this and other challenges along the way, he says PRI has proven to be a loyal partner and a highly effective tool for the company's growth. From day one of United Race Parts' history, Decker knew that having a booth at the PRI Show was an absolute must. "It was November 2015 when I started the company. We were at the Show a month later."

He's also quick to point out that benefits from exhibiting at the PRI Show can come in unexpected ways—brief interactions can plant seeds that bear fruit months or even years later. Such was the case with a short

Being a part of the NASCAR/Hendrick Motorsports Garage 56 team at Le Mans was "a huge privilege for us," said Thomas Decker of United Race Parts. "What we provided really helped set the standard there."

PRI Founding Member United Race Parts bills itself as "Pit Equipment Headquarters," supplying race teams—like Meyer Shank Racing, seen here—with tools and support for IndyCar, NASCAR, and IMSA events.

conversation at one Show, which proved to be a pivotal conversation that won him an excellent customer. "I'll never forget, one year we had a particular piece of equipment from Greaves on display at the PRI Show. Six months later, in June, a customer called me from Le Mans and asked about it. We were able to get two of them to the track the next week for him. They ended up winning their class at Le Mans that year, and now they've become a showroom customer for us. They have almost every piece of equipment we make. And it all started from one 10-minute conversation we had with them at the PRI Show."

Having long been sold on the value of PRI and exhibiting at the PRI Show every year, he was eager to sign on as a PRI Founding Member when the program was introduced. "I liked the perks package that came with Membership—always being at the front of the line to make sure we have early access to certain ads or to certain bookings. It just felt like it was key to keep our company on top."

"YOU JUST NEED ONE MOMENT OF BRAVERY TO CHANGE YOUR LIFE."

Armed with the greater visibility that PRI membership gives his company along with the can-do spirit that's made him successful already, Decker continues to make inroads deeper into the international racing market. Recent successful A-List projects are bringing increased visibility, powerful connections, and measurable business gains. Included among those efforts was providing all of the support equipment for the Garage 56 Le Mans team fielded by NASCAR, IMSA, and Hendrick Motorsports in 2023.

"The Garage 56 project was a once-in-a-lifetime opportunity for us," Decker explained. "It was a huge privilege to be able to play a part in it. I think what we provided really helped set the standard there, when all the other teams turned up to the track and looked at how the team was operating. But it was a massive effort. At one point from all our partners, we had 22 people onsite working on it."

Through it all, Decker handles the challenges of running and growing his business with both patience and passion. The road to where he's at now had its ups and downs. But the courage and determination of Decker and his United Race Parts crew epitomizes the drive for success that runs throughout PRI.

"Don't get me wrong. It's not easy," he said. "But you just need one moment of bravery to change your life." PRI

PRI TECH

LITHIUM BATTERY CONSIDERATIONS

Is a lithium battery the right choice for your race car? What you need to know before making the switch.

By Chris LaCouture

A critical but often overlooked component in any race car is the battery. While racers have been using lead acid and absorbent glass mat (AGM) batteries for decades, with advancements in lithium technology, more lithium batteries are coming to market.

Traditional wet cell lead acid, AGM, and lithium all have their pros and cons, therefore choosing the right battery for your needs is critical to the performance and longevity of your battery. The key items to consider when shopping for a battery include:

- Cranking power
- Size and weight
- Amp hour capacity
- Battery Management System (BMS)
- Types of lithium

Lithium is significantly more energy dense than lead acid, which means you can pack a lot more cranking power in a smaller and lighter package. Most customers are accustomed to using cold cranking amps (CCA) as the metric for how "strong" a battery is. CCA, however, is the measure of a battery's ability to crank for 30 seconds at -17 degrees C. Unless you're racing in below freezing temps like that, you'll instead want to focus on pulse (or peak) cranking amps (PCA). This describes the max output of the battery at 25 degrees C (or 77 degrees F), which better represents most racers.

The typical 602 and 604 crate engine requires about 1,000 amps

of cranking power. As you start moving up in displacement or compression ratio, you'll need to move up in cranking power. For engines with compression ratios higher than 13:1, you're going to need 1,200 or more cranking amps. Remember, more cranking amps are required to spin over a larger motor or push through the resistance of higher compression. Another benefit of lithium over lead acid is that it delivers that cranking power faster, meaning your engine will start easier and more consistently.

AMP HOUR CAPACITY

Once you know how many cranking amps you need for your engine, you can start looking at size and amp hour (Ah) capacity. A huge benefit of lithium over lead acid is lighter weight. As an example, the E3.502 lithium battery weighs 80% less than the equivalent cranking amp AGM battery. From an Ah capacity standpoint, this is where it is important to size the system not only for your current setup but slightly over it, leaving room for future upgrades and modifications to the car.

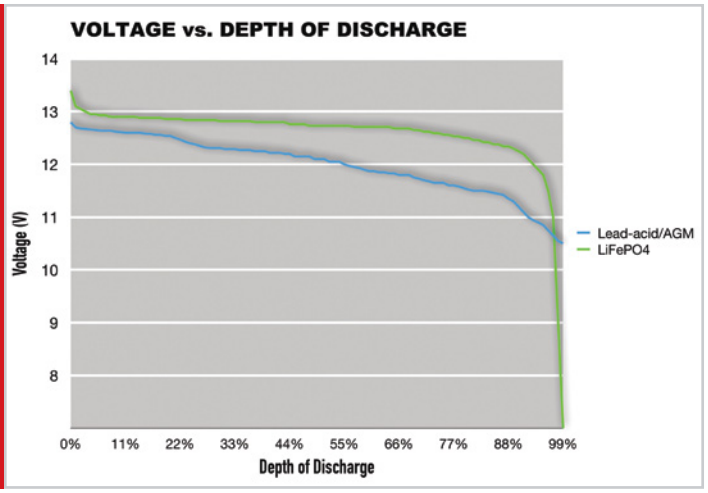
A major benefit of a lithium battery over traditional lead acid or absorbent glass mat (AGM) batteries is lighter weight. Lithium iron phosphate (LiFePO4) batteries are so light that, in many instances, two are still half the weight of one lead acid or AGM battery.

Making the switch from lead acid/AGM to a lithium battery can be complicated. Lithium batteries require a lithium-specific charger as well as an appropriate battery management system. Battery manufacturers can offer information regarding specific applications.

A key difference between lead acid/AGM and lithium is the amount of usable Ah capacity due to voltage drop. Lead acid/AGM batteries have approximately 50% usable capacity at 12V, whereas lithium batteries have roughly 90–95% usable capacity.

A 50 Ah AGM battery only has 25 Ah at 12V. Once the battery drops below that, problems arise. Fuel injectors don't spray consistently, cooling fans and fuel pumps begin running slower, all of which hurt performance. A lithium battery that's rated at 32 Ah has around 30 Ah of usable capacity. When comparing specs, at first glance a 50 Ah AGM seems like it has more capacity than a 32 Ah lithium, but it's actually the opposite.

For instance, on a dirt late model application that is carbureted with minimal electronics beyond a cooling fan and gauges, you don't need a lot of Ah capacity. However, a fuel-injected drift car with multiple cooling fans, data acquisition, driver cooling suit, and so forth will need more



This graph compares the typical voltage vs. depth of discharge curves between a lead acid/AGM battery and a LiFePO4 battery. Note the lithium-based battery not only has higher voltage but a flatter decline.

capacity to keep up with the electrical loads.

This is even more important for those not running an alternator. A common mistake we see racers make is going for the lightest battery without considering the cranking and load requirements for their application. This not only creates the possibility of draining the battery dead or not starting the engine but overstressing the battery and reducing its useful life.

Deep cycle batteries offer a deeper draw than traditional lead acid/AGM however this deep draw still reduces number of life cycles. Lithium batteries can be drawn to near zero without impacting cycle life.

SAFETY AND LONGEVITY

This brings us to charging. Lithium batteries do require a lithium-specific charger for off-vehicle charging. Most standard automotive alternators will charge your lithium battery without issue, but you'll want to consult each battery manufacturer's recommendations before installing. For example, E3 Lithium starter batteries have a maximum alternator charging input of 160A. To get the longest life out of your battery, you'll want to keep it on a maintainer when not in use. Never leave a battery deeply discharged, as this will damage the cells and reduce life.

There are many different types of lithium chemistry being used in batteries, including lithium ion (Li-Ion), lithium polymer (LiPo), and lithium iron phosphate (LiFePO4). LiFePO4 is significantly more stable than Li-Ion and LiPo, making it the safest option. It is also more energy dense, making it ideal for race battery applications.

In addition to using a stable chemistry such as LiFePO4, you want to be sure the battery is equipped with a battery management system (BMS). The BMS is a circuit board that provides a wide variety of features such as short-circuit protection, over-charge/discharge protection, and overheating.

One of the most important features of a BMS is cell balancing. Lithium batteries are built using multiple cells, and these cells need to stay balanced. If there is a mismatch in cell charge, the entire battery will have lower usable capacity. Suppose that once the battery is charged, one cell is short by 5%. The entire battery will not be able to fully discharge that remaining 5%, so cell balancing is critical to the longevity of your lithium battery.

The complexity of the BMS varies by manufacturer, so be sure that the battery you're considering has all the features you're looking for.

While shopping for a battery can seem pretty straightforward, making the switch from lead acid/AGM to a lithium battery can get complicated. Don't hesitate to reach out to the manufacturer directly to help answer all your questions and help size your setup appropriately. PRI

Chris LaCouture has been the Director of Engineering at E3 for 13 years, working in areas such as quality control, design, manufacturing, racing, and more. He graduated from the University of North Florida with a Bachelor of Science in Mechanical Engineering. LaCouture is the in-house technical expert at E3 and is currently helping design some of their batteries that will be on the market in the near future.

ADVOCACY CORNER

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

Edited 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 new movements in the fight to maintain a technology-neutral approach to motor-vehicle technology, and how PRI is spearheading a grassroots campaign for industry resources and support.

SEMA PRESIDENT AND CEO MIKE SPAGNOLA PROVIDES COMMENTS TO EPA OPPOSING PROPOSED STANDARDS

SEMA President and CEO Mike Spagnola testified and provided written comments to the US Environmental Protection Agency (EPA) opposing the agency's proposed new federal emissions standards for motor vehicles model years 2027 to 2032. The proposed rulemaking seeks to have battery electric vehicles make up 67% of all new vehicles sold in 2032 and ignores the many other technologies that can get us to lower emissions faster. PRI extends a huge thank you to the industry members and enthusiasts who sent more than 7,700 letters to the EPA.

"Thousands of small businesses and their employees will be adversely impacted by this proposal's overly aggressive push to electrify America's automotive sector," said Spagnola. "There are many options on the road to zero emissions. American-grown biofuels, carbon capture, and innovations in engine production are all aimed at this shared goal. The specialty automotive aftermarket has also led the way in fuel innovations and conversions of old vehicles into new and cleaner technologies and is committed to playing a central role in the evolution of automotive technology, including the parts and products that power our vehicles. However, this proposal embraces electrification as the technology of choice to the detriment of many of our members and their innovations."

PRI and SEMA have also coordinated a grassroots and media campaign, and highlights include:

Spagnola and Kim Pendergast, CEO of Magnuson Superchargers; Rob Simons, principal with Automotive Consulting Services; Billy Brooks, director of Engineering for Cobb Tuning; Dan Millen, owner of Livernois Motorsports; Mike Copeland, CEO of Arrington Performance; Laurel Moorhead, regulatory compliance engineer with Transfer Flow; and Keith Cavallini, owner of Green Diesel Engineering testified before the EPA in May about the proposed rule, speaking about how it would impact their businesses and the importance of the EPA maintaining a technology-neutral approach to motor-vehicle technology.

Ian Lehn, the founder and CEO of BOOSTane, spoke to ABC News 5 in Cleveland, Ohio, about how the EPA's proposed rule could unfairly tilt the market toward electric vehicles (EVs) over the next decade. He also wrote an op-ed that was published on Cleveland.com.

West Virginia state lawmaker and SEMA member Gary Howell (R-WV) penned a powerful op-ed piece against the proposal for Maryland's Cumberland Times-News.

Spagnola wrote an op-ed for the Washington Examiner and was interviewed on the Smoking Tire Podcast.

The Atlanta-Journal Constitution published an op-ed from Chelsea Allen, owner of Crush Customs, and Nick Caloroso, national sales manager for Driven Lighting Group.

The EPA is expected to issue its final rule later this year or early next. Through PRI and SEMA's grassroots and education efforts, the work on this issue will continue over the coming months. While the EPA can issue its final rule, Congress still oversees the agency and its actions, so we expect this fight to make its way to Capitol Hill and continue well into 2024.

For more information on these efforts, visit **sema.org/advocacy/ice-bans**.

HOUSE COMMITTEE PASSES PRI-SUPPORTED BILL PROTECTING ICE TECHNOLOGY

In a win for motorsports, the House Energy and Commerce Committee has passed H.R. 1435, the Preserving Choice in Vehicle Purchases Act, and H.R. 4468, the Choice in Automobile Retail Sales (CARS) Act. In addition, US Senator Markwayne Mullin (R-OK), the co-chair of the Congressional Automotive Performance and Motorsports Caucus, introduced S. 2090, a Senate companion bill to H.R. 1435.

These PRI- and SEMA-supported bills seek to preserve vehicle choice for consumers and prevent the federal government and the state of California from choosing only one form of technology (such as electric vehicles) over the many others to achieve their emission reduction goals.

PRI and SEMA have strongly supported the bills, which are designed to prohibit the US Environmental Protection Agency (EPA) from issuing regulations that would ban the sale or use of new motor vehicles with internal combustion engines (ICE) in California by 2035. As a reminder, this could

PRI Track Ambassador Tom Deery is attending events around the nation to promote resources available to the industry.

lead to other states following suit, as 17 others have followed all or part of California's previous clean-car rules.

"PRI believes that vehicle owners should not be directed toward a specific technology, but rather be allowed to choose the type of vehicle that best serves them," said Eric Snyder, PRI Senior Director of Federal Government Affairs. "It's important that members of Congress hear from you about how important it is that the American people, not the federal government and California, are able to choose the technology that powers their vehicles. We need to make sure that this issue is a top priority for the racing community and performance parts businesses."

Ask your Congress members to support the Preserving Choice in Vehicle Purchases Act at **https://p2a.co/qasAcva**.

OHIO INTRODUCES BILL SUPPORTING INTERNAL COMBUSTION ENGINES

There's a new opportunity for Ohio racers and enthusiasts! The state has introduced PRI-supported legislation (H.B. 201/S.R. 155/H.R. 198) which would prevent any state or local government unit from restricting the use or sale of motor vehicles based on the energy source used to power the motor vehicle, including ICE technology. H.B. 201 awaits consideration from the House Transportation Committee, and S.R. 155 was offered in the Senate. H.R. 198 awaits consideration from the House Transportation Committee.

"PRI and the racing community across Ohio have a vital stake in the outcome of these bills. If Ohio adopted California's internal combustion ban, it would be costly and burdensome for motorsports teams and businesses, which are a major economic driver for the state," said Christian Robinson, PRI Senior Director, State Government Affairs & Grassroots.

Industry members are encouraged to voice their support for the bills in a few clicks by visiting **https://p2a.co/DMm4tNV**.

PRI TRACK AMBASSADOR CONTINUES GRASSROOTS CAMPAIGN FOR INDUSTRY SUPPORT

PRI track ambassador Tom Deery continues to visit industry events, including a winged sprint car race at Eldora Speedway, Street Car Takeover at Lucas Oil Indianapolis Raceway Park, and the 57th annual Redbud 400 pavement late model event at Anderson Speedway. Deery is bringing awareness to PRI's advocacy efforts, with a focus on the Race Track Promoter Helpline available to track owners, operators, promoters, sanctioning body officials, and related motorsports professionals. Industry members can contact 202-847-6593 and **PRILegalHotline@performanceracing.com** for access to relevant legal resources, peer-to-peer discussions, grassroots campaigns, lawyer referrals, along with additional support. PRI

INDUSTRY NEWS

SEMA HALL OF FAMER BOB AIRHEART PASSES AWAY

Bob Airheart

SEMA Hall of Fame inductee and industry innovator Bob Airheart has passed away.

Although Airheart operated his own rep agency, the Airheart name is also well known in the brake industry. Trains, buses, and race cars have all been stopped by Airheart, a company owned and operated by Bob until it was sold. He also worked for Hurst and Cragar.

FORMER PRESIDENT AND CEO OF VSI, FRED VAN SENUS, 79

Fred Van Senus

Fred Van Senus—the former CEO and president of Indiana's Vehicle Specialties, Inc. (VSI) and Van Sensus Auto Parts—has passed away at 79.

Van Senus Auto Parts was a family business until its sale to Auto-Wares in 2012. Van Senus and his brother, Fred, also founded, owned and operated the high-performance distribution company VSI for over 35 years before its sale to Meyer Distributing in 2014.

In 1998, SEMA recognized VSI as the Warehouse Distributor of the Year.

NEW ENGLAND AUTO RACING HOF TO HONOR SIX INDUCTEES

The New England Auto Racing (NEAR) president April May Preston-Elms has announced the organization's 2023 Hall of Fame class.

Brad Leighton, Ted Marsh, Mike Ordway Sr., Andy Santerre, John Stygar, and Mike Weeden will join more than 275 members currently enshrined in the Hall of Fame. In addition, Veterans Committee inductees include Al Hammond and Joe Howard.

The class will be inducted on Sunday, November 5, at the Log Cabin-Delaney House in Holyoke, Massachusetts.

FORD UNVEILS NEW MUSTANG GT4 RACE CAR

Mustang GT4

Ford has unveiled the Mustang GT4, which is based on the all-new 2024 Mustang Dark Horse. It features Multimatic DSSV dampers, a Holinger dog-ring gearbox, paddle shifters with pneumatic actuation, natural fiber body panels, as well as a unique aero package developed to meet GT4 category targets.

PORSCHE EXTENDS FORMULA E COMMITMENT

Porsche and Formula E have announced the sports car manufacturer has extended its involvement in the ABB FIA Formula E World Championship through Season 12 in 2025–2026.

The TAG Heuer Porsche Formula E Team will continue to compete in the premier, all-electric motorsports championship through the GEN3 era racing the Porsche 99X Electric car. Porsche also confirmed it will continue to play an active role in shaping the successful future of Formula E and is already involved in the design of the fourth generation of race car, which will enter the championship in Season 13.

GM ACQUIRES BATTERY SOFTWARE STARTUP; HIRES NEW MARKETING HEAD

General Motors (GM) has announced that it has acquired substantially all the assets of Israel-based battery software startup ALGOLiON Ltd. for an undisclosed sum.

The acquisition was led by the newly formed Technology Acceleration and Commercialization (TAC) organization, a group within GM that works to identify emerging technology that can support GM through investments, acquisitions, or partnerships.

In related news, GM has named Norm de Greve as senior vice president and chief marketing officer.

MIDDLEGROUND CAPITAL ACQUIRES XTRAC

MiddleGround Capital, the operationally focused private equity firm, has announced its European office has completed the acquisition of Xtrac, the manufacturer and supplier of transmissions for top-level professional motorsports and specialist high-performance automotive applications.

Xtrac headquarters are in Thatcham, United Kingdom, with US locations in Indianapolis and Mooresville. MiddleGround Capital also owns Race Winning Brands.

CAL WELLS III NAMED CEO OF LEGACY MOTOR CLUB

Legacy Motor Club—the NASCAR Cup Series racing team formerly known as Petty GMS Motorsports, currently owned by Maury Gallagher and Jimmie Johnson—has appointed Calvin "Cal" Wells III as CEO.

Wells started his professional career by founding Precision Preparation, Inc. (PPI) in 1979 and soon earned a relationship with car manufacturer Toyota. Over the next 25 years, PPI dominated the off-road and open wheel segments and won at the highest level in the NASCAR Cup Series.

FORREST LUCAS, CEO AND CO-FOUNDER OF LUCAS OIL, TRANSITIONS TO CHAIRMAN

Lucas Oil Products—the Indianapolis, Indiana-based distributor of high-performance automotive additives and lubricants—has announced the transition of Forrest Lucas from CEO to chairman of Lucas Oil.

In his new role, Lucas will step away from the day-to-day activities and move into an advisory role to help guide the company's strategic direction. The transition also gives Lucas and his wife Charlotte more time to focus on the Lucas Cattle Company, the Lucas Ranch, and other personal initiatives.

BRIAN FLYNN NAMED EXECUTIVE VP, GM AT SONOMA RACEWAY

Motorsports business veteran Brian Flynn has been named the new executive vice

president and general manager at Sonoma Raceway, the road course and 1/4-mile drag strip in Sonoma, California.

With 30 years of senior motorsports and business management experience, Flynn will serve for the first time as a sports venue executive after consulting for 18 months with Sonoma Raceway on its high-performance driving, karting, and hospitality experiences.

Since 2018, Flynn has served as CEO of Marty Snider and Associates, a video production company based in Charlotte.

From 2009 until 2018, Flynn served as CEO of Petty Holdings LLC.

CRAIG SCANLON APPOINTED AS NEW CEO OF K&N ENGINEERING

K&N Engineering in Riverside, California, has announced the appointment of Craig Scanlon as the company's new CEO, replacing outgoing CEO Randy Bays.

As the new CEO of K&N Engineering, Scanlon will help implement transformational growth strategies, foster high-performance teams with a strong culture of accountability, and showcase exceptional business acumen encompassing sales leadership, brands, operations, R&D and financial management.

Scanlon spent 18 years at Polaris.

PARELLA MOTORSPORTS APPOINTS MICHAEL PRINTUP AS PRESIDENT OF SVRA

Michael Printup

Parella Motorsports Holdings (PMH), in Southlake, Texas, has announced Michael Printup will join the company as the president of the Sportscar Vintage Racing Association (SVRA).

Printup will oversee the day-to-day operations of one of the oldest and largest national vintage racing organizations. Printup brings nearly three decades of motorsports experience to the role and is best known for his work as president of Watkins Glen International (WGI), where he has spent the last 15 years.

MICKEY THOMPSON TIRES & WHEELS ANNOUNCES JOHN BODART AS PRESIDENT

John Bodart

Mickey Thompson Tires & Wheels—the provider of racing and high-performance tires and wheels for street, strip, truck, and off-road applications based in Stow, Ohio—has announced John Bodart has assumed the role of president.

Bodart has more than three decades of experience in the tire industry, including Cooper Tire, where he played a critical role in the integration of Cooper Tire with Goodyear Tire & Rubber Company.

CARS TOUR HIRES NEW EXECUTIVE DIRECTOR

The Solid Rock Carriers CARS Tour has announced motorsports industry veteran Kip Childress as the series' executive director. Childress will work alongside CARS Tour Series Director Jack McNelly in overseeing operations and track events.

Childress is a third-generation official who has spent the past 14 years with NASCAR in various roles in its regional touring series, the NASCAR Xfinity Series and most recently, the NASCAR Cup Series as the assistant director.

FREDDIE QUERY JOINS ASA STARS NATIONAL TOUR AS COMPETITION DIRECTOR

ASA STARS National Tour officials have announced that veteran short-track racer Freddie Query will join the series as the competition director. Query will take a lead role in blending the rule packages for the CRA Super Series, Midwest Tour and Southern Super Series from technical rules to procedures.

UCRA WELCOMES NEW SERIES RACE DIRECTOR

The United Championship Racing Alliance (UCRA)—the dirt late model racing series with events in Georgia, Tennessee, and Alabama—has announced Dustin Golden as its new series race director for the 604/Crate Late Model tour.

Golden has experience managing on-track racing action, both behind the wheel and in the scoring tower, primarily at Boyd's Speedway in Ringgold, Georgia.

ATCO DRAGWAY (NJ) CLOSES

Atco Dragway, the NHRA-sanctioned 1/4-mile drag strip in Atco, New Jersey, has shuttered its doors.

The facility opened on Memorial Day in 1960 and was the oldest drag strip in New Jersey. At one point, the track held the title of one of the busiest in the country, hosting over 265 events in one year.

QUALCAST ADDS BUSINESS DEVELOPMENT MANAGER

QualCast, the Nashville, Tennessee-based worldwide distributor of engine valves, valve seat inserts, valve guides, valve springs and related components, has announced the appointment of Kimberley Douglas as business development manager.

Douglas is based out of Nashville and brings over 15 years of global distribution, logistics operations and transportation account management experience to QualCast.

JON PALARCHIO JOINS NITERRA

Niterra North America Inc. [formerly NGK Spark Plugs (U.S.A.) Inc.] in Wixom, Michigan, has announced Jon Palarchio has joined the company as the director of supply chain management of forecasting.

Palarchio, who will serve as a senior leadership team member, will be responsible for developing analytical tools for the successful prediction of aftermarket demand and deploying best practices for OEM raw and fab authorization requirements. PRI

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

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RUBI SURF 1.7 SPECIFICATIONS

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Cutter head diameter: 14.0 inches (356 mm)

RUBI SURF 1.9 SPECIFICATIONS

X-axis workhead travel: 56 inches (1400 mm)
Cylinder head length: 47 inches (1200 mm)
Cutter head diameter: 16.5 inches (420 mm)

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anviltrailermfg.com

Anvil's trailers come standard with a ramp rear door, leaf spring axle, V-nose front, 12-volt dome light, radial tires, E-Z lube hubs with grease caps, silver modular wheels, welded safety chains, galvanize roof, aluminum fenders, semi-screwless, and more. The company offers stacker trailers and racer packages.

Contact: 912-493-9040

ARE DRY SUMP SYSTEMS

drysump.com

ARE has been designing and manufacturing cast aerospace alloy precision machined dry sump oil pans and components since 1977. Products include more than 50 different dry sumps, mostly CNC machined from A356 T6 aircraft aluminum, as well as dry sump pumps, drives, filters, tanks, and Spintric air/oil separators.

Contact: 916-652-5282

ARP

arp-bolts.com

ARP offers new harmonic damper balancer bolts. Its 12-point bolt is used with a deep socket and offered for a variety of domestic and import engines. Also available is a large hex-headed bolt that is forged to accommodate a standard 1/2-inch square drive breaker bar or ratchet wrench. Manufactured from a premium grade 8740 chromoly steel and heat-treated in-house to provide a tensile strength of 190,000 psi.

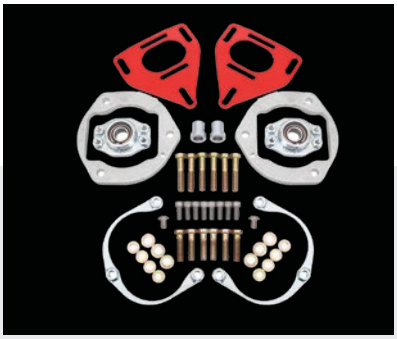
Contact: 805-339-2200

AUTOROD CORPORATION (ARC)

autorod.net

The ARC Sensor Integration Module-8 and Sensor Integration Module-8-ECU are designed for EFI applications, in which the user wants to wire multiple sensors back to the ECU. This product allows users to bring a single Sensor Power and Ground to a board and it's distributed through the board to handle up to eight individual sensors. Included with the SIM-8 is a 10-conductor shielded wire that carries Power and Ground.

Contact: 732-851-5095



BMR SUSPENSION

bmrsuspension.com

BMR caster camber plates are designed to add caster and camber adjustability and fix alignment issues on a lowered Sixth Gen Camaro. Manufactured from CNC laser cut 3/16-inch steel plate, the WAK360 is specifically designed to accommodate factory-style coil spring configurations, where the WAK361 is precisely tailored for coilover setups.

Contact: 813-986-9302

FITECH FUEL INJECTION

fitechefi.com

The Go-Spark Advanced CDI features adjustable spark energy output: 275 mJ for the street or 585 mJ for the strip, rev limiter settings for burnout, launch, and max engine over-rev protection, and adjustable start retard for quick, easy cranking to ease the load on the starter single nitrous/step retard input for safe nitrous oxide system use. It's digitally controlled for precise timing control, plus much more.

Contact: 951-340-2624

JESEL

jesel.com

Jesel camshaft belt drive systems are designed for accuracy and durability. Jesel offers camshaft belt drive systems for more than 45 unique applications, including for a 24-hour endurance race, a four-second pass down the drag strip, and many things in between.

Contact: 732-901-1800

PROFORM PARTS

proformparts.com

The Chevy big block water pump adapter is crafted from aerospace-grade 6061-T6 billet aluminum and black anodized for a sleek look. These adapters work with most BBC electric water pumps. They feature -12 AN O-ring female ports for back to radiator flow, 1/8-inch NPT female ports that allow easy plumbing connection of a steam tube, and includes all necessary gaskets and mounting hardware.

Contact: 586-774-2500

VORTECH SUPERCHARGERS

vortechsuperchargers.com

Vortech released the V-13 94C, an all-billet heavy-duty gear case centrifugal supercharger. Designed to be a direct upgrade for the V-7 supercharger units, the V-13 94C is a continuation of durable, high-efficiency supercharger compressor stages.

Contact: 805-247-0226

DIABLOSPORT

holley.com/brands/diablosport

The Trinity 2 MX data monitoring device for Ford Mach-E and Lightning EV owners provides real-time monitoring of critical vehicle data, including battery life, energy consumption, motor and battery temperatures, and more. Other features include user configurable layouts, the ability to test and record 0–60, 1/4-mile and more, plus read and clear Diagnostic Trouble Codes (DTC).

Contact: 866-464-6553

AD INDEX

PERFORMANCE INDUSTRY REPS

PERFORMANCE INDUSTRY REPS

READ PRI'S MISSION STATEMENT AT
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SOCIAL STATUS

A closer look at social media tools that allow racing and performance industry members to boost engagement.

Numerous social media tools are available to help manage and schedule posts to multiple platforms, creating greater efficiency and organization for social media marketers. These tools can streamline the workflow, help save time, pull analytics reports, and more.

Many of these tools offer free plans with the option to upgrade to a paid plan for more features. Some of these programs include Sprout Social, Agorapulse, Brandwatch, Later, and many more. Deciding which tool is right for your company depends on your key needs. "Each experience I've had, from the native platforms to third party apps and what I use now, I've learned they each have unique strengths and can be equally beneficial depending on the goals of the individual or business utilizing them to manage their social presence across platforms," noted Sal Nicosia, social media manager at Specialty Equipment Market Association (SEMA), Diamond Bar, California.

Let's take a closer look at some of the options.

Edelbrock Group in Olive Branch, Mississippi, currently uses Agorapulse mainly for its user-friendly elements. "It feels a lot like what most people are used to when using direct social media apps," explained Roddy Merritt. "While there are some limitations within the platform, the ability to schedule across multiple platforms, including TikTok and YouTube, are very helpful."

Agorapulse has some unique features, like competitor analysis and social listening. Additionally, "Agorapulse has great chat and customer service features, and this would be one of the main reasons for choosing the platform," Merritt said.

Nicosia at SEMA has used various third-party management tools including Sprout Social and currently Brandwatch. "Brandwatch is a more advanced tool that allows large businesses or organizations to manage social and utilize the standard features of a social management tool with the added layer of brand management," he explained. "It allows users to create data dashboards that show social stats, top performing posts, sentiment of accounts based on keywords, and more. The tool is designed to allow for campaigns to be scheduled, and posts can be incorporated across the time span of the campaign.

"My favorite feature in Brandwatch is the 'Iris Assistant,'" Nicosia continued. "This AI-powered, in-app feature helps improve captions by making text longer, shorter, suggesting synonyms and even emojis that can be used to help create more eye-catching social copy. Brandwatch also has integrations to other outside applications such as AirTable, where forms can be created for stakeholders to request social media posts and even provide assets and copy to the social media or marketing manager/team."

Turn 14 Distribution in Horsham, Pennsylvania, utilizes Facebook/Instagram's native tool, Meta Business Suite. It "has a robust offering that covers our Facebook and Instagram accounts semi-seamlessly and for free. It's nice that it has the built-in functionality to repost, tag pages, and schedule while offering metrics across both platforms," noted Kyle Crawford, digital media manager. "We also use Later for enhanced analytics, additional channel scheduling, and our trusty Linkin.bio referral."

John Comeskey, digital marketing manager at Forgeline Motorsports in Dayton, Ohio, has developed his own social media scheduling system. He uses a cloud app called Evernote in combination with Google Drive cloud storage. "Within Evernote, I create a Note for each possible post. These posts are lumped together within Notebooks (aka folders) specific to working ideas versus actual scheduled posts. Once I decide to insert that post idea into the actual schedule plan, then I simply move it into the 'Current Planned Posts' Notebook and amend the title of the Note with the date. Then all of my scheduled posts become listed within the 'Current Planned Posts' Notebook in order by date," Comeskey explained. "Each Note contains the post title with date, the full written post description, a link to the Google Drive folder that contains the images, and a checklist for each social channel to where it should be posted."

These are just a few of the options that exist, but several others include Buffer, HubSpot, Reputation, Khoros, Zoho Social, SocialBee, Crowdfire, Social Pilot, MavSocial, Sendible, Tailwind, Sprinklr, and more.

Decide the key social media needs of your organization and which features would be most beneficial, as well as your budget. Then choose the most efficient social media scheduling and management tool for your team…or develop your own! PRI

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