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A few words from Jon Pul

HELP PROTECT RACECARS by challenging in the U.S. Court of Appeals the Environmental Protection Agency's assertion that street vehicles are not motor vehicles.

I am the co-chair of the Racing Enthusiasts and Supporters (RESC) and I filed a lawsuit in the U.S. Court of Appeals for the District of Columbia Circuit against the Environmental Protection Agency (EPA) has the authority to regulate a person from disabling, removing, or rendering inoperable any motor vehicle that is being or has been converted to a motor vehicle and is or will no longer be used on public roads.

RESC and its supporters are comprised of passionate racing enthusiasts, thousands of employees and their families that rely on racing as a hobby and passion is under attack, and without your support, they no longer exist.

In 2016, the U.S. EPA changed its interpretation of the law to state that the conversion of street cars into racecars was not a replacement for congressional action to protect racing. We need Congress to act. **This case directly challenges in the U.S. Court of Appeals the EPA's design, sell, and install parts converting street vehicles into racecars despite decades of hobbyist participation in this industry.**

Without the required funding, we cannot bring this case to court.

100% of all donations, after GoFundMe.com fees, will be used to take this critical case up to the Supreme Court and for related RESC advocacy work. Donor money used for this purpose to RESC should not be considered charitable donations. Please consult your tax advisor regarding any tax implications for your donation. Your donation may be considered a business expense. Thank you for organizing this fundraiser.

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Court: U.S. Court Of

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li, CEO, Turn 14 Distribution

Federal Court the U.S. Environmental Protection
cannot be converted into racecars.

Suppliers Coalition (RESC). The coalition has filed
District of Columbia Circuit to determine if the U.S.
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ate enthusiasts, small business owners, and
ely on auto racing for their livelihoods. Racing as a
our support, racecars, as many know them, could

of the Clean Air Act to announce a new position
could be outlawed. This lawsuit is not a
racing; rather, it is an essential step we can take
ts, towards protecting racecars while we wait for

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vehicles into racecars are violating the law,
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is case to trial.

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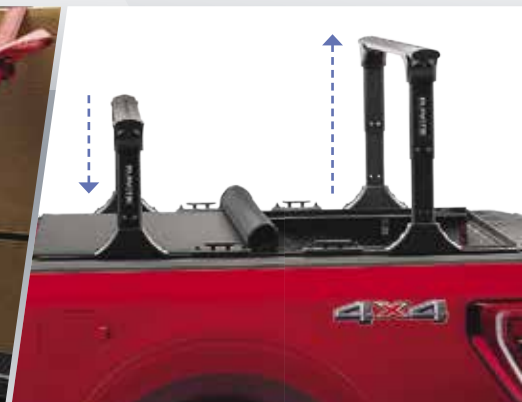
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Gladiator owners are seeking accessories that fit, work well and make a statement.

See article on page 17.

(Photo courtesy Road Armor)

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Automotive Entrepreneurs Get a Chance to Shine

With the amount of innovation in our industry, it's exciting that specialty automotive aftermarket entrepreneurs again have a chance to shine with the return of the SEMA Launch Pad competition.

Through the program, selected applicants are handpicked to receive brand exposure, access to business resources and the chance to win a grand prize package valued at \$92,000 to launch their product or service into the marketplace.

"The automotive aftermarket is comprised of countless entrepreneurs who are extremely passionate about creating new products and providing solutions for enthusiastic car owners who love to modify, maintain, restore or personalize their vehicles," says RJ de Vera, SEMA vice president of

marketing. "SEMA Launch Pad helps bring these emerging inventors to the forefront, providing a platform for them to potentially take their new creations to the next level."

Fifteen semi-finalists will be selected in June to participate in the first round of pitching and be invited to exhibit at the 2022 SEMA Show in Las Vegas in November. The top five finalists will pitch their products to a panel of industry judges during the show, where a final winner will be selected.

SEMA Launch Pad is open to business owners or company-leading executives (president, CEO, CFO, COO or VP) over the age of 18. Applicants must offer a product or service that is a functioning prototype, functioning concept or currently for sale.

Applications to participate in SEMA Launch Pad must be submitted online at www.sema.org/launchpad by June 13.

Last year's winner was Dustin Woolf, owner of Woolfpack Racing, for his standalone refrigerated nitrous system.

THE SHOP HAS NEW OWNERS

If you look on the right side of this page, you'll see some new names. We're proud to announce that *THE SHOP* was purchased by Cahaba Media Group in mid-May, along with our sister publication, *RV PRO*.

Stacy, Wendy, A.J., Kelly and I are still here and have been warmly welcomed by our new CMG teammates in Alabama. We'd like to thank Bob Wieber and everyone at National Business Media for 24 wonderful years, and are looking forward to future possibilities as we continue to bring you a unique take on the specialty automotive aftermarket.

Matthew Conroy, owner and president of Cahaba Media Group, states: "Since Matt Lyons and I acquired CMG in 2020, we have doubled the size of the business and continue to add jobs in Birmingham and now Denver. Our platform is becoming a *first call* for experienced professionals as well as people just starting their careers in publishing, and we are also seeing a lot of inbounds from publishers and business owners looking for liquidity and to sell their brands to a company committed to growing jobs in the B2B sector." **TS**

THE SHOP

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INFLATION BUSTERS

Protecting profits as costs rise.

■ By Phillip M. Perry

Inflation has taken root. Businesses everywhere are dealing with annualized cost increases of nearly 7%—the fastest pace in 40 years and significantly higher than the 1.8% average of the past decade.

The resulting upticks in operating costs can cause considerable damage to the bottom line.

“We’re in a very unfortunate situation now,” says Bill Conerly, principal of his own consulting firm in Lake Oswego, Oregon (conerlyconsulting.com). “Businesses that have always devoted their efforts to serving customers and being productive must also start worrying about covering their costs in the most effective way. That means they need to shift some of their focus to coping with inflation.”

The challenge is all the greater for its unfamiliarity: It’s been 30 years since inflation was much of a player in company planning.

Experts don’t expect relief anytime soon. They point to a number of root causes, one of which is energy.

“With the cost of oil baked into so many things, it seems we are going to see more significant inflation in the months ahead,” says John McQuaig, managing partner of McQuaig & Welk, the Wenatchee, Washington-based management consulting firm



**It's been 30 years
since inflation was much
of a player in company
planning.**

(mcqw.com).

He points to a continuing global disruption in the delivery of goods and services as yet another cause.

“Supply chain issues tend to create opportunities to raise prices because of the effect of supply and demand. When the former is crunched, prices go up by the nature of the market,” he explains.

And there’s yet a third driver of higher costs: a wage spiral resulting from the pan-

demic’s softening effect on the labor supply.

FORECASTING CASHFLOW

Of all the steps businesses can take to mitigate the bottom-line effects of inflation, the most important is better management of cashflow. Inflation tends to accelerate the drain of money from company coffers, and throttle the flow that comes in.

If left unaddressed, these dual trends can gut profits and threaten business survival.

Experts advise looking at the coming months with an eye toward estimating what will happen to cash balances.

“Proactively managing cashflow is critical right now,” says Lisa Anderson, president of LMA Consulting Group, Claremont, California (lma-consultinggroup.com).

This can be done by running periodic forecasts.

“What I would recommend is looking at your demand side and asking, ‘What are

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Today's unexpected return of inflation has changed the operating paradigm for businesses large and small.

we really going to need here?' And then looking at your supply side and asking, 'What will I have to make?' And then determining what the answers mean for cashflow. If it's going to be negative, you better borrow some money."

Such analysis, of course, involves estimates of future revenues—a practice tainted by uncertainty.

"Having a sales forecast is great, but that doesn't mean you will collect all the money you think you will," says Scott Beaver, senior product marketing manager at Oracle NetSuite. "And even if your sales forecast is 100% accurate, will the expected timeframe be met?"

Collections, not sales, determine cash on hand, and history shows that during inflationary times customers start paying slower as a result of their own cash squeezes. Planning must reflect the reality of cashflow uncertainty.

"Growing accounts receivable can put serious strain on smaller businesses that may not have the cash reserves to absorb delays in receipts," says Beaver. "For most companies, cashflow forecasts are less than 75% accurate."

One approach to anticipating likely variables is to look at historical performance. What percentage of receivables is usually collected during slower seasons? That figure

can be applied to open receivables to help estimate the likely pace of receipts.

FASTER RECEIPTS

Historical data, of course, may provide a less-than-reliable foundation for future forecasts. Whatever the estimates for what lies ahead, businesses can lessen cash squeezes by accelerating accounts receivable and stretching accounts payable.

For the former, experts advise running regular aging reports. How much do customers owe in increments of two weeks, 30 days and 60 days? Any growth in the numbers over time might indicate a steady deterioration of cashflow.

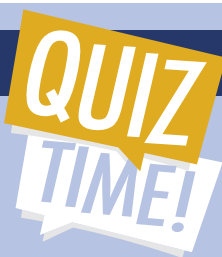
Keeping in close touch with customers can also help accelerate receipts by providing opportunities to request timely payments and helping spot emerging issues that may grow into future roadblocks.

"Maintain a good handle on what customers are doing," advises Anderson. "What are their future sales activities? Are they encountering problems that may affect operations?"

Not all customers are of equal importance, and it's smart to concentrate efforts on the most profitable. Account reviews can identify which customers should receive the most attention.

"So much of the important information

HOW WELL ARE YOU BATTLING INFLATION?



Are you taking the right steps to mitigate the costly effects of inflation? Find out by taking this quiz. Score 10 points for each yes answer. Then total your score and check your rating at the bottom of the chart.

Have you instituted the following practices?

1. Running periodic cashflow forecasts
2. Maintaining accounts receivable aging reports
3. Accelerating account collections
4. Stretching accounts payable, if appropriate
5. Keeping in close touch with customers
6. Identifying the most valuable customers

7. Increasing productive communications with suppliers
8. Ensuring the compliance of any bank loan covenants
9. Trimming inventory while bolstering critical items
10. Raising prices judiciously

What's your score? **80 or more: Congratulations.** You have gone a long way toward protecting your business from costly inflation. **Between 60 and 80:** It's time to fine-tune your financial management. **Below 60:** Your business is at risk. Take action on the suggestions in the accompanying article.



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required to monitor cashflow is tied to a selling cycle, which varies by customer,” says Frank Cespedes, senior lecturer at Harvard Business School. “Good account reviews unearth that information.”

Companies might also explore requiring bigger deposits from customers, says McQuaig. Sweeten the increase by emphasizing customer benefits, and emphasize that earlier payment helps the customer avoid higher prices later.

As for the outward flow of cash, a tried-and-true tactic is delaying the payment of monies owed.

“Good financial management on the buy side has always stretched out payables,” says Cespedes. “This is particularly so in an inflationary environment where businesses must pay a lot more attention to the payment cycle.”

Of course, stretching payables can backfire. For starters, it can mean the loss of the 5% or 10% discounts many companies offer customers that pay before their due dates.

It can also result in higher prices for goods and services.

“Extending too far makes you more of a risk,” says Beaver. “And suppliers tend to give better prices to customers that are less risky.”

There’s also dependability of deliveries to consider. Ongoing supply chain disruptions will cause vendors to favor deliveries

to customers that pay on time or early. The cost of not having essential inventory can be greater than the interest cost required to borrow money to bridge cash gaps.

In times of inflation, it pays to concentrate efforts on your most profitable customers.

MITIGATING COSTS

In an inflationary environment, suppliers of goods and services tend to raise their prices. And higher rates of inflation tend to make the increases bigger.

“When inflation is 2%, everything tends to increase by that amount, plus-or-minus a little bit,” says Conerly. “But, at 7% inflation, say, prices tend to increase by that amount plus-or-minus a lot.”

Businesses should try to get readings on anticipated future increases and shortages. This can be done by maintaining close contacts with vendors.

“Work closely with suppliers and develop good relationships with them,” says McQuaig. “What do they see ahead

in terms of product availability and price?”

There’s another advantage to close contact, McQuaig adds—suppliers may give you a little bit more favorable treatment.

For example, you might leverage any significant volume you’re doing by asking the vendor to hold inventory you would normally keep in stock. You can also ask if a price commitment now will remain firm for the duration of the season.

Also, dig deeper into the reasons for suppliers’ price hikes.

“Are goods and delivery cost increases in line with inflation?” poses Beaver. “Or, are suppliers trying to pad their own margins a little bit, just because they see inflation as an opportunity? That sometimes happens.”

An often undesirable final cost-saving move is to pursue less-expensive alternatives to pricier goods and services.

“Domestic inflation has been higher than in most of the world,” explains Conerly. “Some businesses are shifting sourcing to other countries.”

TRIMMING INVENTORY

Before inflation appeared on the horizon, businesses responded to supply chain disruptions by purchasing and holding whatever they could get their hands on. Any step to avoid running out of product seemed like a good thing.

Times have changed. Now, too many in-stock goods can tie-up cash at a time when

DEALING WITH BANKS

By carefully managing cashflow, businesses can alleviate the profit erosion caused by inflation.

In the accompanying article, experts describe how accelerating receivables, delaying payables, raising prices and fine-tuning inventory can help preserve the bottom line.

Left unattended, a decline in profits can result in a dangerous financial condition: a breach of the terms required by loan agreements.

“Banks look at covenant violations closely, so borrowers need to ensure that any squeeze in the relevant ratios—such as income-to-debt—will not create

problems,” says John McQuaig, managing partner of management consulting firm McQuaig & Welk. “Sometimes there is no quick fix for resolving them.”

It’s smart to be proactive.

“If you know you’re going to have a covenant violation, you’re better off informing the bank and explaining to them how you’re going to work your way out of it,” says McQuaig. “On occasion, they might change a ratio on a line of credit if you’ve been in good performance and they can see this is not going to remain a problem.”

McQuaig gives an example: Suppose a company experiences an increase in



interest rates because of inflation. As a result, it breaks even in a year in which it would normally have made a profit.

The company could inform the bank that its inflation-savvy customers are now willing to accept price increases. As a result, the business can increase its pricing over the coming year to resolve the covenant violation.

—Phillip M. Perry

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Steps to Successful Sales

By Jill J. Johnson

Finding a winning approach in complex circumstances.

Most people have no problem preparing for a routine sales pitch. They do their homework, find the right avenue to connect with the prospect and get ready to make the sale.

But when you have been working for months on a complex sale or are pitching a piece of new business that will elevate your client base—maybe by landing a new dealership client or race team partner—you have to up your game and polish your strategy.

THE SALES PROCESS IS A DANCE

Review all of the notes from your meetings and conversations with your prospect. What words do they use? How do they describe their problem or situation? What do you need to emphasize in the conversation?

Then re-read your proposal and think about your key points from your prospect's point of view.

Once you are in the room, let your client lead the conversation. Be deeply and completely immersed in their words, their

thinking, their jargon and their nuances.

Despite your level of advanced preparation, you also need to be prepared for the deal to stall once again. Perhaps they are not quite ready for the close. Yet.

When you are selling, think about it as you would when dancing with a new partner—you need to adjust to their steps,

balance yourself to their ability and shift your speed to match theirs. Remember to finesse yourself the same way in your sales meeting—don't push!

All too often, at the beginning of a meeting, prospective clients ask you to tell them about yourself, your services and how you can help them. It is easy to



Be deeply and completely immersed in your customer's words, their thinking, their jargon and their nuances.

Complex sales are a multidimensional chess game, with many, many plays available.



simply respond to this type of questioning approach with the same canned commentary you would use when asked what you do at a networking event.

Yet, how can you really answer the questions in a way that matches the nuances of the client's needs? You must spin this around so you can ask questions.

This should be done in a conversational manner. If you can, practice by roleplaying with a trusted ally or colleague so you can get comfortable subtly steering a conversation to gain insight.

A FLEXIBLE MINDSET

Complex sales are a multidimensional chess game, with many, many plays available. So don't assume that the meeting is going to give you the whole deal as outlined in your original proposal.

You must be flexible enough mentally to not be disappointed if the prospect takes your meeting in another direction. That way you will not get thrown if they do, or say something unexpected.

Sometimes, prospects want something smaller or less expensive than they originally said or you think they need. They might believe a different approach or fee level is better for their organization. Or, perhaps they really desire more time with you to be sure they can afford the risk of recommending you to their boss or manager.

So, ride the whitewater no matter where the sales river takes you—and stay in the boat! The twists and turns of any sales sequence are often filled with moments of anticipation, exhilaration, relief and disappointment.

Don't worry if you get a bit wet—just keep steering the boat toward your goal of getting to a *yes*.

By bringing a cognitively flexible mindset that recognizes the unexpected might occur, you will not get thrown out of the sales boat and you will be mentally agile enough to handle it. Most exceptional salespeople have learned the hard way to expect the unexpected, so they listen deeply in these meetings.

This is vital if there is a new person in the room who will influ-

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Be ready to adapt if the prospect takes your meeting in another direction.

ence the decision. This approach to expecting the unexpected keeps you on your toes so that as the meeting moves along you are able to rally, no matter where the discussion goes.

RECOVER WHEN YOU ARE BLOWING IT

Sales are often blown because something weird happened in a meeting, where the salesperson was expecting it to go one way and then it morphed into something unexpected thanks to someone new to the process who had their own agenda.

It feels like a blindsided moment, but the truth is that injecting your own expectations (and hopes for the close) into the process results in missing cues and an inability to react to the actual situation at hand.

What you want doesn't matter to your client. By staying focused on their issues and actively listening to their concerns, you will be responsive and flexible.

Bringing more flexibility into your perspective may mean asking more probing questions. These questions might uncover the real issues they are trying to address that they were not comfortable sharing at an initial meeting or in their actual decision criteria.

Take these insights and weave them into your conversation. Pay attention to the client's facial reactions, tone of voice and level of attention.

Matching the knowledge you gain about the client's pain points, real issues and essential needs can take you from the brink of failure back into the game. Circle back to their decision criteria and build your case for how you can deliver the answers they need.

FINAL THOUGHTS

Even if you only close part of your deal or get invited to the next level of meetings, you have still gotten a win. You can use the new insights you gained to adjust and modify your next approach.

You will also often discover that sometimes it was the perceived loss on the first sale that completely established the base for a bigger and better sale down the line. Cognitive flexibility combined with active listening and effectively managing disappointment are the key skills needed for successful complex selling. **TS**



JILL J. JOHNSON, MBA, is president and founder of Johnson Consulting Services as well as a management consultant, accomplished speaker, award-winning author and Business Hall of Fame inductee. She helps clients make critical business decisions and develop plans for turnarounds or growth. Visit www.jcs-usa.com.

JULY 2022

Restyling

AFTERMARKET ACCESSORIES

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The Jeep Gladiator JT pickup has exceeded expectations to become an aftermarket favorite. (Photo courtesy Road Armor)

RISE OF THE GLADIATOR

By Jef White

YES, WE ARE ENTERTAINED

Jeep's Gladiator JT pickup has made a splash and then some since it was rolled out at the LA Auto Show in 2018. Taking the go-anywhere pedigree of a Wrangler and adding a full-service truck bed, it's quickly become an off-roading favorite for longtime Jeep fans and newcomers alike.

The Gladiator has also mimicked the Wrangler in terms of accessorization opportunities. Whether intended for work or play, owners can't get enough of turning these tough pickups into something all their own.

The specialty aftermarket has hit its stride with the Gladiator, rolling out rugged, eye-catching, performance-enhancing products that add to the pickup's capabilities and allure. Suppliers share their thoughts on the effects the JT has had on the market, and where shops can expect it to go from here.

RIISING TO THE CHALLENGE

Predictions regarding the ultimate success of the Gladiator varied when it was first introduced. Even skeptics would likely now admit, however, that the new Jeep has been a homerun.



These days it's almost more unusual to see a Gladiator that *hasn't* been customized to suit the desires of its owner. (Photo courtesy Road Armor)

Hot Gladiator Products

■ HOT PRODUCT:

Trail & Tube Doors

■ FEATURES & BENEFITS:

A dual-stage locking latch and anti-rattle bump stops prevent unnecessary rattling and provide a secure latch the first time you close them.

Body Armor 4x4

Nupesh Patel

Body Armor 4x4 Brand Manager

■ HOT PRODUCTS:

TRECK Bed Rack System

■ FEATURES & BENEFITS:

Highly functional system that won a Best New Product award at the SEMA Show; patented height adjustability allows for 14-, 19- and 23-inch height modularity; patented tire relocation mount facilitates easy raising and lowering.

Road Armor

Mark Hanson

CEO

■ HOT PRODUCTS:

New JT Sport Rack

■ FEATURES & BENEFITS:

Mounts a spare tire in the JT bed; provides additional mounting options for aftermarket lights and light bars.

Rugged Ridge

Lee Riser

Senior Director of Marketing

■ HOT PRODUCTS:

Platform Roof & Bed Racks

■ FEATURES & BENEFITS:

The Platform Roof Rack attaches seamlessly with Rain Gutter Mounts and the Platform Bed Rack attaches to the in-bed channel; 100% U.S.-made; one-piece platform offers strength and functionality; no drilling or permanent modifications required.

Warrior Products

Ryan Wood

Marketing



The Gladiator's versatility is one of its greatest strengths. (Photo courtesy Body Armor 4x4)



A few touches make a big difference. (Photo courtesy Road Armor)

“The combination of the similarity to the face of the Wrangler and high ground clearance has made the new Gladiator truck incredibly popular across many demographics in the off-road community,” observes Ryan Wood of the marketing department at Warrior Products. “It was exciting to see a Gladiator on the road when they were first released, and

now they are so popular you may see one on every commute.”

Many industry veterans were supporters from the start.

“As anticipated, the Gladiator is a hot seller, and if it is anything like the JKs and JJs, which have taken off in the market, things can only get better,” says Nupesh Patel, Body Armor 4x4 brand manager.

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Any advantages Gladiators carry with them from the factory are only enhanced by the specialty automotive aftermarket, adds Lee Riser, senior director of marketing for Rugged Ridge.

“I would say it has exceeded our expectations and, much like the Wrangler, it just looks so much better when accessorized,” she says. “A few little touches make a big difference. The addition of a lift kit, tires and wheels, plus things like our Max Ter-

rain fender flares and new Sport Rack give it a completely unique and different look.”

In fact, it may now be stranger to see one in stock condition.

“The Jeep Gladiator JT has exceeded our expectations at every turn. From the smooth ride to the epitome of crawling ability, it does not fail,” says Mark Hanson, Road Armor CEO. “The one thing to point out is that it looks a bit *off* unless you outfit it with equipment that suits your style.”

AFTERMARKET DARLING

The seemingly limitless opportunities for customization have made the Jeep pickup an aftermarket darling.

“The Gladiator JT offers a blank canvas for customers to make their dream rigs,” Hanson says. “There are multiple styles of bumpers, bed rack systems and lighting options you can use to deck out the vehicle. It’s all about ruling your adventure.”

In one word, according to Wood,

Gladiator Builds Have a Military Focus

Jeeps served a heroic role in WWII, and a Hawaii car dealership’s Wrangler and Gladiator special builds are continuing the tradition.

Windward Dodge Chrysler Jeep RAM dealership in Kaneohe, Hawaii has rolled out custom **EQUIP HEROES** Edition Wranglers and Gladiators, designed to promote awareness and support for local organizations serving enlisted military personnel, veterans and their families.

“These **EQUIP HEROES** Jeeps are our way of doing our part to show our appreciation and to get the word out about the good work being done by so many here in our backyard,” says Jerry Romano, owner and GM at Windward

Dodge Chrysler Jeep RAM. “We invite everyone to get involved and help us make a difference for our heroes.”

A portion of the proceeds from the sale of each Jeep special edition will be donated to select local military and veteran non-profit organizations, he says. The program also features discounts on parts, accessories and service for enlisted military personnel and veterans.

“We will be featuring the **EQUIP HEROES** Jeeps in our showroom and at community events, and providing them for display at our charity partners’ events and functions,” says Romano. “We are proud to support our military

and veteran heroes and their families here in Hawaii.”

A recent **EQUIP HEROES** four-door Gladiator project is outfitted with a Mopar 2-inch suspension lift with FOX 2.5-inch-diameter aluminum shocks, V-6 power, 8-speed transmission, electronic-disconnect sway-bar, 4:1 low gear ratio and heavy-duty rock-rails.

On the ground are 35-inch Pro Comp all-terrain tires mounted to Rock Monster 17-inch beadlock wheels. Topside are open-air tubular doors and a mesh sun bonnet.

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EQUIP HEROES Edition Wranglers and Gladiators are designed to promote awareness and support for local military-focused organizations in Hawaii.

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Any advantages Gladiators carry with them from the factory are only enhanced by aftermarket accessorization. (Photo courtesy Rugged Ridge)



The Gladiator is popular across many demographics. (Photo courtesy Warrior Products)



it's versatile.

"Many vehicles come fully accessorized from the factory, which leaves limited choices for aftermarket equipment manufacturers and installers," he notes. "The Gladiator offers the manufacturer and shop installer endless opportunities for a wide selection of accessories to customize the vehicle to fit any lifestyle the end consumer may desire."

In fact, it has stepped forward as an influencer of new product development.

"A platform like the JT brings more innovation, and some of those new mods will lead into line extensions for the JL and

JK," Riser predicts.

In fact, some of that crossover is already happening, notes Patel.

"The commonalities the JL and JT platforms share give the aftermarket world a leg up on being able to accessorize dual platforms with one SKU. I believe the Gladiator becomes an accessory leader, which hopefully continues to grow our segment."

THE TRAIL AHEAD

Combine the overall impact the Gladiator has had on the commercial and recreational communities with the growing popularity of off-roading, and there's no doubt the vehicle is here to stay.

"One of the biggest opportunities the Gladiator presents with the addition of products like our Platform Racks is the

Now an accessory leader, the Gladiator is helping lift the entire off-road industry. (Photos courtesy Body Armor 4x4)

Explore New Heights.

The Eibach logo is displayed in white on a red, trapezoidal background. It features the word "Eibach" in a stylized, italicized font with a registered trademark symbol, and a series of horizontal lines below it.

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The Jeep Bob concept blurs the lines between Gladiator and Wrangler models and features a bobbed bed.

Blurring the Lines

The Jeep brand and Jeep Performance Parts (JPP) by Mopar revealed a lineup of custom-built 4x4 and 4xe concept vehicles at April's Easter Jeep Safari in Moab, Utah, including a concept designed to blur the lines between the Gladiator and Wrangler.

The Jeep Bob is a playful spin on the popular trend of bobbing the long overhangs of pickup truck beds to lessen weight and improve angles, according to the brand.

Based on a Jeep Gladiator Rubicon, the most noticeable traits of the Jeep Bob are what's missing. All four doors and B-pillars have been removed, while a canvas top has been stretched over the customized perforated hardtop. The bed has been bobbed 12 inches, while custom steel front and rear bumpers improve approach and departure angles.

Off-road capability is amplified by a 3-inch lift with custom off-road suspension components, Dynatrac ProRock 60

axles supported by a mix of King coils and bypass shocks, and 40-inch tires mounted to 20-inch beadlock wheels.

The multi-finish exterior paint scheme mixes gloss and matte finishes. Inside, the Jeep Bob features bright spray-lined floors and custom trimmed seats. A vented carbon hood adds a notable performance appearance and ensures improved airflow to the engine.

This article originally appeared on theshopmag.com. Visit today and sign up for the free daily eNewsletter.

ability to further accessorize with mounts for equipment such as off-road jacks, axes, shovels, awning brackets, rooftop tents and off-road recovery boards, to name a few," says Wood of Warrior Products. "The overlanding crowd wants more than just a simple rack. They are making a statement about their lifestyle, with overlanding accessories mounted to the exterior of their vehicles."

The ideas can be endless, agrees Road Armor's Hanson.

"Shops have multiple opportunities to upsell on products that range from recovery gear to lift kits," he says. "The Jeep Gladi-

ator is a multifunctioning vehicle capable of helping everyone by serving as anything from an emergency vehicle to an off-road trail master."

Once customization begins, consumers will want to follow it to the end, says Riser of Rugged Ridge.

"Shops can take advantage of the Gladiator because it now has so many options for accessories, much like the JL," she explains. "There are plenty of products that lead to great add-ons, like our bumpers, which mean winch upsells, or our new Sport Rack, which means light and light bar upsells."

And the work truck aspect of the JT can take it even further, adds Patel from Body Armor 4x4.

"This vehicle is more utilitarian than the common Wranglers because it has a truck bed. However, it utilizes the same front end as the Wrangler JL, so there is a commonality in parts and installation," he explains. "Universal parts can be outfitted to this vehicle, such as bed racks, utility bars, bed extenders and more. Whether you're solely a Jeep outfitter or a complete truck outfitter, this vehicle caters to both audiences, which allows installers to be more diverse." **TS**



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By Josh Poulson

Dealerships and Beyond PART II

More strategies for strengthening today's restyling businesses.

RESTYLING/AFTERMARKET ACCESSORIES

You may already do some retail sales, but how much thought and effort are you putting into them versus your wholesale business?

Editor's note: The following is the second in a two-part series on ways restylers that cater to car dealerships can continue to survive and thrive, both on the dealer's lot and beyond. Part I appeared in the June 2022 issue of THE SHOP.

As I stated in last month's article, this new vehicle inventory environment we find ourselves in can be quite challenging. Many restylers who have built their businesses around stock vehicles or preloads have found it difficult to maintain sales levels, simply because there are fewer cars available on dealership lots.

So, no matter how good of a salesperson you are, or how strong your relationships are with your dealerships, they simply can't give you what they don't have.

Last time I discussed a few short-term ways to counteract this trend. Now let's

look at some longer-term ideas as we all try to find greener pastures.

MORE RETAIL

You may already do some retail sales, but how much thought and effort are you putting into them versus your wholesale business?

Despite the pandemic, the economy has been strong, and people have discretionary income to spend. Our shops offer many things that drivers want or need for their vehicles.

You can usually charge a little bit more for retail, thus profit margins are higher. You also get your money faster than working with a dealer who is 30-60 days behind.

How do you grow that retail arm? First, look at what you offer and do well, and see where it fits in with the retail segment.

For instance, do you offer protection products like window film, paint protection film, ceramic coatings and/or spray-on bed-



Identify products that make sense for the retail segment.



liners? Do you sell and install safety products like back-up cameras, sensors, and/or blind-spot or lane departure warning systems? What about convenience items like leather, heated seats, sunroofs, step-up products and/or tonneau covers? Can your team offer repair services for upholstery, electronics, sunroofs or accessories?

Most wholesale businesses offer some, most or all of these products and services. So, think about how you can package and market them to retail customers.

How does your website look and function? Is it current and updated often? Is it mobile-friendly? Can people tell what you do by looking at the photographs more than by reading the words?

These things make for a better user experience and will likely grow your retail sales.

Also, make sure your contact information is easily accessible. Show appropriate products and fitments when possible. Work with a marketing company or do your own marketing through social media by posting photos of recent projects.

Don't forget to thank your current retail customers and then market to them in the future with emails or promotions that bring them back or at least make them want to spread the word to their friends.

Maintain your online reviews and try to

work with those that give you bad marks to get them changed, if possible. Don't stress over the bad ones too much, however—a couple of poor scores show that they are real reviews and not planted phonies.

Once you've attracted retail customers, it's time to reel them in. So, who do you have on your team that can take the time with retail clients to answer their questions and give them options?

I believe the best approach is having a person who is kind, who listens, and who will give people the attention they need to make an informed purchase.

In the wholesale business, the dealer usually understands the product and just needs enough info to make the car deal happen. However, in retail, the customer has more questions and wants to know all of their options before they spend money. This simply takes more time and patience.

The result of investing that extra time is the building of trust and formation of long-term relationships. This often leads to repeat business and/or upsell opportunities.

It's a process, but worth it, so if your current structure doesn't allow employees to spend the time needed to make retail customers feel informed and comfortable, figure out what you can change, or who you can hire, to make it happen.



It takes time and patience to walk retail customers through the selection and buying process.



Working with fleets usually means multiple orders and repeat business.

FLEET SALES

Fleet business has flourished over the past decade. A strong economy usually means companies are investing in their assets, which includes their fleets of cars, trucks and vans.

How can you tap into this market? Again, take a look at the products and services you offer and identify some that would work well for fleets. They could include:

- Protection products such as spray-on liners, floor and cargo mats, alarms and bumper guards
- Safety products such as blind-spot and lane departure warning systems, GPS locate and DVR cameras
- Convenience items such as remote starts, power inverters, lighting, cruise control and power windows
- Cargo solutions such as ladder racks, shelving and bins, and bulkheads
- Film products including tint, PPF and full or partial wraps

All of these are things that fleet businesses want or need, and fleet owners often have

Dealership fleet departments can often put you in touch with companies searching for:



01 SAFETY

02 CONVENIENCE

03 UTILITY ACCESSORIES

more money to spend than typical retail clients. Another big benefit of fleet sales is the chance to include multiple vehicles in each order instead of serving just one customer at a time.

Again, once you target the right products, the next step is to market them to fleet owners. A good place to start is where they buy their vehicles: the fleet departments at local dealerships.

Dealership fleet departments are always looking for ways to help their customers, and don't mind making a few extra dollars at the same time by offering aftermarket add-on sales. So, make sure you build relationships with these people. Many times, they will be willing to pass on leads for companies that might be looking for the products and services your shop provides.

Another good way to connect with fleets

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Adventure Rack Systems, a MetalCloak owned company, was founded on a rich history from the world of off-roading. Together, these two entities drive the purpose-built designs behind the entire rack system lineup that ARS has to offer. Designed specifically for Jeep JK, JL Wranglers, JT Gladiator and even Toyota Tacoma, these products withstand the punishment that other systems simply cannot. Extreme terrain and technical trails are no match for our rack systems, and we strive to ensure that your cargo finds its final destination intact and without casualty. We also strive to keep products in stock, ready to ship and backed with exceptional customer service and support. Our focus is keeping you and your customers happy prior to, during and after the entire sales, installation and implementation of our products.

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Having a business that looks like it belongs in the 21st century will help you remain relevant.

is by joining local commerce organizations where you can interact with companies and municipalities.

And, finally, there is always the old-school method of stopping by businesses that use company vehicles to drop off a flyer or business card and ask to set up a meeting with the fleet manager.

Overall, even if you get just a small piece of this huge segment of the industry, it can pay dividends for many years to come.

GO DIGITAL

We all know how quickly the world is changing. What is your business doing to keep pace digitally?

You probably rarely or never placed online parts orders 15-20 years ago, but it's likely your main source of ordering today. It's the same for your customers and how they want to shop and buy from you.

Our shop uses digital catalogs and accessory configurators that provide more information more accurately, which in turn means fewer problems. For us, paper price lists and flyers are becoming a thing of the past, to be replaced with a digital app and a mobile website that allow dealerships to find information and place orders.

These systems cut down on texts, emails and phone calls, and allow our staff to focus more on current orders.

The other vital reason why we must all grow digitally is the way vehicles are being purchased. We see now how many vehicles are presold or ordered ahead of time, as opposed to buyers strolling through aisles of cars on the lot.

These early sales make it more difficult for restylers to get their products in front of customers at that crucial buying stage. With a digital footprint, however, our accessories can be presented as part of the online or presale ordering process.

Having a business that looks like it belongs in the 21st century will help you remain relevant.

These are just a few long-term ideas on how shops can continue to flourish. The

great thing is that, because we are smaller businesses, we can adapt and pivot when needed to stay strong and profitable.

I'm sure there are more ideas out there, and I would love to hear about them. If you have questions about any of the topics from this month or last, please feel free to reach out to me with questions: jpoulson@autoadditions.net. **TS**



JOSH POULSON is the principal of Auto Additions in Columbus, Ohio, which was named Restyler of the Year, 2012-'13. Auto Additions offers a complete line of product upgrades including 12V and appearance

packages with a specific focus on the dealership segment. Josh is chairman of the SEMA PRO council and was named 2015-'16 Person of the Year at the 2015 SEMA Show.



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Reversing Course

Making money during the chip shortage.



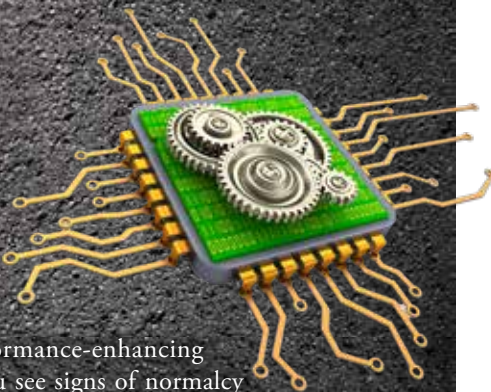
By Courtney Leigh Pahlke

The current state of the automotive restyling and car care markets is comparable to what feels like a *rat race* Olympics integrated with performance-enhancing drugs—you think you see signs of normalcy and stop to catch your breath, only to watch as the menacing rodent is given a steroid booster and you're off and running again.

We're still weathering the chip crisis—an inventory shortage thunderstorm that's added snow pellets and large hail in the forms of soaring gas prices and plant shutdowns.

According to the March 16, 2022 *Automotive News* article, *Ukraine war, chip shortage expected to trim global production by more than 5 million vehicles*, S&P Global Mobility lowered its 2022 and 2023 estimates by 2.6 million vehicles each. The forecaster now expects auto companies to produce 81.6 million cars worldwide this year and 88.5 million next year.

Aftermarket shops across the country continue to experience the trickle-down effects from the chip shortage, but there seems to be a common denominator, with businesses experiencing more of the good than the bad in the current market.



DOWNTIME SUCCESS?

The chip shortage means dealerships are carrying lower inventories, and experts don't see a return to earlier levels anytime soon, if ever.

An article on motortrend.com, *What Happened with the Semiconductor Chip Shortage—and How and When the Auto Industry Will Emerge?* states that the chip shortage crisis is improving but won't be resolved overnight. The industry is holding its collective breath that things won't backslide, and while shortages are projected to last into 2023 or longer—and may prove to be endemic—the hope is they will be more manageable as chipmakers increase capacity and automakers find ways to make cars with fewer chips or use more of the higher-tech wafers that are more plentiful.

On the heels of the pandemic, the chip shortage tested even the most prepared aftermarket businesses. Then came rising gas prices, earthquakes forcing plant shutdowns, and OEMs recognizing the economic benefits of lower inventory levels, and the challenges became even greater.

Aftermarket shops across the country continue to experience the effects of the automotive chip shortage—with many enjoying surprisingly positive results.

So, why are many restylers reporting strong sales and growth?

My brother Garrett and I own Top

Coverage LTD, a 47-year-old business with locations in Illinois and Wisconsin. We opened our newest location during the pandemic, and things have been going extremely well.

Our new team (I call them a *dream team*) had to adapt during the various pandemic mandates in a new state and with few established dealership relationships, all while cross-training internally on all our accessory offerings, as vendors couldn't fly out to see us.

As we've progressed, things have continued to change. Within our locations, one state will have cars on our dealers' lots while the other state is cleaned out. Then it will flip-flop.

This randomness has forced us to pay attention to processes and strategies that encourage consistent workflow.

ADVENTURE ADVENTURES



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Help dealerships add the accessories consumers want to the vehicles they can get today.



The first thing we've done is implement additional sales trainings with our clients and dealership staff. The emphasis is on how our products provide a solution to the long delays customers are experiencing while waiting for the exact car they want to finally arrive.

Sale trainings are also useful for addressing ways to maximize profits with lower inventories. Sure, dealerships are making money right now by selling fewer cars at inflated prices, but that will likely come to an end. If you were to buy a car right now, would you rather buy from a dealership that won't budge on price, or a dealership that may budge somewhat but also takes the time to listen and suggest

available accessories that you maybe didn't even know were options?

At the second dealership you may pay the same or a little bit more, but you're also getting more.

DEALERSHIP PARTNERS

Another way to support dealer relations is by visiting their parts counters. You may hear some interesting automotive news, and/or learn the status of inbound inventory.

Do the vehicles arriving next week lack a heated seat option or factory remote start? If you have a solution, set up a training appointment at the dealership and create marketing materials aimed directly at those

accessories the new vehicles are missing.

Remember, you're helping your dealers save a sale while making them more money. The car buyer doesn't have to wait weeks or even months for a higher trim level to arrive that contains the features they want, and their trade-in value will be higher now than if they put additional miles on their current vehicle while waiting.

You're also preventing the customer from shopping around for different car brands that have their desired items, making you a valuable dealer partner.

GET TO WORK

Reversing course on the current chip shortage by turning challenges into oppor-

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**CONSUMER
REBATE FORM**



**INSTALLER
REBATE FORM**



tunities means plenty of work.

I believe our future will require the strongest and hardest working sales staffs we've ever had, utilizing powerful marketing tools and proven installation techniques to deliver high-quality products and crystal-clear communication to our customers. Remember, one bad install at one shop that goes viral can ruin things for everyone.

Many components contribute to a shop's success, including social media and marketing, hiring quality employees, cutting costs and strengthening client relationships.

And I'll add one more to the list: collaboration.

I'm a member and supporter of SEMA's Professional Restylers Organization (PRO) council. Through PRO, shops across the

country can come together to discuss challenges and solutions, exchange vital information on products and processes, bounce ideas off one another and collaborate.

Our efforts include educating dealers about the benefits of vehicle accessorization and the vital role of restylers. Networking opportunities, industry recognition, the sharing of marketing tools and resources, and the establishment of best practices are a few other benefits of uniting for the common good.

Why not join a national team of shops that are all navigating this global chip crisis together? At the very least, you won't feel alone in your battles, and you'll have a chance to vent to people who actually understand your crazy work world!

Collaborating on new products, recognizing automotive trends and generating outside-the-box ideas to help your shop save money when every dollar counts are all topics PRO members discuss.

For more information, please contact deniselw@sema.org. **TS**



COURTNEY LEIGH PAHLKE

and her brother are second-generation partners of their father's 47-year-old company, Top Coverage. Their locations service nearly 350 dealerships in Illinois and Wisconsin, where they work hard to grow their father's empire. Learn more at TopCoverageNorth.com.



The chip shortage means dealerships are carrying lower inventories, and experts don't see a return to earlier levels anytime soon, if ever.

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COLORING THE FUTURE

Now's a good time to consider automotive & specialty paint services.

By Steve Wright

In 1980, at the age of 4, I got my first invitation into my dad's paint shop to help out. I can still remember how that little two-car garage smelled of lacquer and the way the full-size conversion van seemed to overflow the space.

I recall the countertop workspace full of paint cans, the paper hanging from the vehicle, the hiss of a leaky airline, and the scary sound of the reciprocating air compressor as it kicked on unexpectedly.

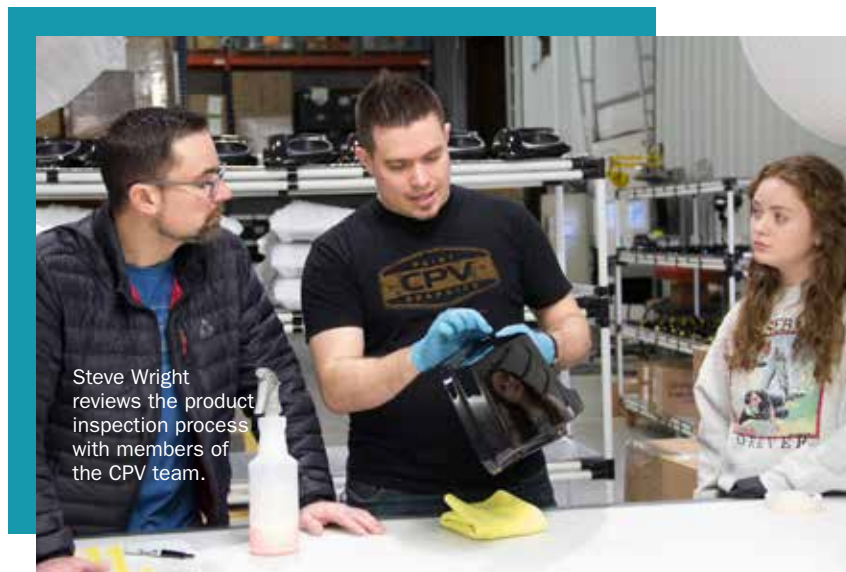
My dad (with the help of my mom) had been building his small painting business for a few years. This meant sometimes working around the clock, but, for them, it also meant a sense of gratitude for the opportunity to do something they were excited and passionate about.

Little did they know that they were laying a foundation that has lasted more than 44 years. That's four decades of providing hundreds of jobs and meeting thousands of customers, while enjoying the pride of workmanship and the dignity of hard work that this industry offers.

Our business has changed over the years, but the core competency of what we do—namely, custom paint application—remains relevant today.

Why does the automotive paint industry continue to grow and endure, even in economic downturns? Why does it provide a secure career that's seldom affected like other industries?

This seems counterintuitive since custom paint has often been accused of being an



Steve Wright reviews the product inspection process with members of the CPV team.



Video is often used as a training tool at CPV, helping to identify ways to improve painting and finishing techniques.



Demand is high for custom and high-end paint jobs, offering an exciting and lucrative career path.



excessive or unnecessary privilege. In the 1970s, when my dad decided to go for it, he was questioned by well-meaning friends and family members because he left a good hourly assembly line job at American Motors (a common pathway for many Kenosha, Wisconsin natives coming out of high school).

But he was an artist, and that assembly line seemed more like a prison to him than any type of career path. It's interesting that the American Motors plant is long gone, but our painting business is alive, well and growing.

PAINTING A POSITIVE PICTURE

“Any customer can have a car painted any colour that he wants, so long as it is black.”

This famous quote by Henry Ford referred to the Model T, a vehicle created for the masses that was only offered in black from 1914 to 1925.

I don't know what it cost Ford to paint a Model T on the assembly line, but it probably wasn't more than a few dollars, and he passed the production savings on to his customers. Back then, a paint job on a vehicle was nothing more than a way to slow down the aging process of the car's structure—to make it last longer by inhibiting corrosion.

It was considered a necessary evil. Just imagine our world today if that idea had stuck!

Vehicle painting has since evolved into a pathway for personal expression. As with

clothing style or housing choice, paint offers personalization.

While the early days of the automotive industry may not have offered the thousands of vehicle options we have today, paint was a way for people to differentiate themselves and express their personalities.

Throughout the 20th century, this appetite for expressing individuality grew. From the birth of the custom car scene and hot rodding to the creation of the chopper, the icing on the cake has always been and always will be a beautiful custom paintjob.

People who participate in these hobbies and creative expressions are notoriously industrious and hardworking. With that comes additional buying power for the things they are passionate about.

Over the years, I have had the privilege of meeting thousands of people from every walk of life who have chosen to spend their hard-earned money on a nice paintjob.

For some, it's because they love personal expression, just like a tattoo. For others, it



The ability to match colors is a crucial skill needed for the repair business.

carries sentimental value.

My favorites, however, are the people who buy a paintjob for the experience of owning something unique that displays the workmanship of a craftsman, which they can then share with their family and friends.

It becomes a residually valuable purchase and experience, and may be the main reason we see our business thrive while others are suffering from economic fluctuations. Custom paint has a way of providing a touch of happiness, interest or distraction from life's stressors.

JUMP IN

Painting is quite simple, yet extremely complex.

I have found that, in this industry, you can enjoy a good career doing little more than sanding, using body filler, priming and applying color and clear.

Or, you can have a great career doing all of that while also endlessly learning about paint, color, chemistry, sales and the business of custom finishes.

Even after doing this job for more than 30 years I have not stopped learning, because that is what I truly enjoy—being part of a progressive industry and technologies that continue to evolve. Still, I respect those painters who just want to be great at applying paint, without all the extras required by more involved custom jobs.

This makes working in this industry very attractive, because it easily supports



a variety of personalities.

Sadly, over the past couple of decades, schools have seemed to push students toward college and away from the skilled trades such as vehicle painting. But the opportunities are there.

For instance, high-end and luxury vehicle OEMs, as well as motorcycle, boat and aircraft manufacturers, are now looking to custom and/or specialty paint as an attention-getting differentiator for their products. The result is an increased demand for all aspects of beautiful paint applications.

I am very fortunate to have traveled the country as a technical advisor and consultant for the companies tasked with doing much of this work. All of them are willing to pay top-dollar to attract and retain people with skills and experience in vehicle paint and finishing. Although it requires specific training, once qualified, these workers enjoy some of the highest salaries of any of the automotive service and repair technicians in the industry.

For those interested, I suggest checking into businesses in your area that do this type of work. Industry certifications are available through the National Institute for Automotive Service Excellence, and there may be apprentice programs and opportunities in your area.

I was lucky to experience the sounds, smells and visual excitement of this industry at a young age, and couldn't be prouder of the business we've built and the art we continue to create.

If you decide to get into the business as well, be sure to let me know! **TS**

STEVE WRIGHT is president of CPV Paint & Graphics in Franksville, Wisconsin. He is a recognized expert in the industry, often hired by other paint and finishing companies to improve their application methods and quality processes. His proprietary Paint Masking tools are currently used on some of the most expensive vehicles in the country. Email him at: swright@cpvehicles.com.

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Replacement Rear Ends

Moser Engineering, Portland, Indiana, presents its line of Muscle Pak replacement rear ends. The plug-and-play solutions for replacing stock or worn-out rear ends in street cars are made in the USA and include a brand-new housing, custom alloy axles and choice of differential options and brakes. They can be powder-coated and shipped in custom lengths in as few as five days. Available applications include 9-inch, fabricated M9, Moser M88, Moser 60 and 12-bolt models.



JL Fender Flare Kit

Quadratrac, West Chester, Pennsylvania, presents its new Baja HD Fender Flare kit for 2018-'22 Jeep Wrangler JL models. The flares provide an additional 3 inches of vertical tire clearance over the factory Jeep Wrangler JL Sport and Sahara flares, allowing fitment of up to 37-inch tires with no suspension lift. Delivering an extra 5/8-inch of tire coverage over the factory JL Sport flares, the Baja HD Fender Flares incorporate the factory turn signals and daytime running light assemblies, making them completely DOT compliant.



LS Camshafts

Summit Racing Equipment, Tallmadge, Ohio, present its Pro LS Camshafts for GM LS and LS-based Vortec truck engines in 28 cam profiles for high-performance, truck and turbo applications. Precision-machined from American bearing steel on a Landis 3LB CNC grinder with CBN diamond wheels for quality, the cams feature state-of-the-art lobe designs that provide stability at high rpm with the pressures found in modern valve spring packs.



Gladiator Rack System

Warrior Products, Tualatin, Oregon, presents its Rack System for Jeep Gladiator models. The heavy-duty modular rack is made in the USA and features a one-piece welded platform for strength and functionality. It offers a low profile and is easy to install and remove using the existing bed rail tracks. The rack fits rooftop tents and is compatible with most universal-style and Warrior Products accessories.



Camaro Tilt Steering Column

Flaming River Industries, Berea, Ohio, presents a Tilt Steering Column for 1970-'81 Chevrolet Camaro models. The direct-fit, bolt-in tilt column features a licensed GM ignition key (coded), five-position tilt, hazards and turn signal, and optional cruise or dimmer. It is available in a powder-coated GM black, mill-finish stainless or polished finish, and a billet aluminum dress-up kit is included.



LS Billet Filter Relocation Kit

Hamburger's Performance Products, Whittier, California, presents an LS Swap Oil Filter System. Made in the USA, the filter relocation kit allows LS engine swaps into classic cars and trucks by plumbing oil lines from an aftermarket oil pan's -10 AN ports to a CNC-machined remote oil filter base. Three kit styles are available that include CNC-machined remote filter base, premium braided hoses, fittings, hose ferules and filter nipples.





F-150 Bumper Blackout Kit

EcoLogical, Auburn, California, presents BumperShellz bumper blackout kits, available for Ford F-150 truck applications. An easy way to completely delete chrome or color-match the front and rear bumpers, the overlays install directly over the OE chrome bumper in under an hour with no need for drilling or permanent modification. Made of ABS plastics in the USA, the sleek, low-profile accents are available in gloss black and color options.

GM Double-Adjustable Coil-Overs

Aldan American, Signal Hill, California, presents its RCX line of double adjustable coil-overs for General Motors muscle cars and two-wheel drive trucks. Made in the USA, the coil-overs offer 180 points of shock adjustment for enhanced rebound and compression tuning. Kits include cold-wound, high-tensile, hybrid-style springs for a smoother, more consistent ride quality.



F-150 Coolant Tank

California Pony Cars, Ontario, California, presents a Coolant Tank for 2015-'22 Ford F-150 models, the latest in its NXT-Generation Ford F-Series product line. Made of black ABS and designed to improve the engine's appearance, the direct-fit tank is made in the USA, matches factory components and comes with pre-applied Velcro tape for an easy, 10-minute installation.



Coolant

Red Line Oil, Benicia, California, presents SUPERCOOL Performance, a 50/50 prediluted antifreeze/coolant fortified with WaterWetter technology. Designed to maximize cooling system performance and protect against cavitation corrosion and erosion, it enhances heat transfer and reduces operating temperatures by up to 20 degrees. It can be used in all makes and models and with any coolant color, and is safe for cast iron, aluminum and brass systems.

Bronco Shock Set

Radflo, Fountain Valley, California, presents its 100% American-made OE Replacement 2.5-inch-diameter Front and Rear Coil-Over Shocks for new-gen Ford Bronco applications. The ride height-adjustable front coil-overs add between 0 and 3 inches of lift, depending on the Bronco's package and control arms. Optional features including remote reservoirs and compression adjusters provide the ability to fine-tune each corner of the vehicle for varying payloads and driving conditions.



Truck Bed Protection

Truck Covers USA, San Diego, presents its complete line of Truck Bed Covers, Toolboxes and Racks. The American Roll Cover is a retractable, durable cover that protects cargo and handles adverse weather conditions. Easy to install and operate, it works with the company's American Rack system.

F-150 Rear Sway Bars

Hellwig Suspension Products,

Visalia, California, presents two new Rear Sway Bars for 2021 Ford F-150 models. Made in the USA, the bars are designed to improve safety, handling, comfort and overall driver control. They use 1-inch diameter, heat-treated 4140 chromoly steel and feature three-hole ends for adjustability. A hammertone finish provides maximum durability. Part Number 7788 is intended for factory-height Ford F-150s, while Part Number 7812 is for use on Ford F-150s with 2 to 4 inches of rear lift.



C10 Manual Hydraulic Pedal Assembly

Level 7 Motorsports, Marion, Illinois, presents a Manual Transmission Hydraulic Pedal Assembly for 1967-'72 Chevrolet C10 applications. Designed to help fit a modern manual transmission into older C10s, the pedal assemblies are made in the U.S. and come assembled and ready to bolt in. The pedal ratio, bore sizing and plumbing are all solved.

Spark Plug Gap Tool

Allstar Performance, Watervliet, Michigan, presents a Spark Plug Gap Tool that can be used to set consistent spark plug gaps quickly and easily. Simply insert the plug into the holder, insert a feeler gauge (sold separately) for the desired gap between the ground strap and the electrode, and then tighten the knob until the feeler gauge is snug. The tool features a tough, gold anodized aluminum body.



Spark Plug Wires

Performance Distributors, Memphis, Tennessee, presents its LiveWires spark plug wires. The high-quality, low-resistance spark plug wire sets deliver all of the spark energy from the coil to the plugs. The wires are built with high-temperature sleeves that protect the plug wire from extreme under-hood temperatures. The sleeving is made from a non-flammable, heat-treated glass braid.



Sway Bars

MPD Racing, Watervliet, Michigan, offers a line of 4130 chromoly Sway Bars designed for asphalt Late Model applications. Each sway bar measures 37.5-inches long, with 48-spline ends. The bars are available in three diameters: 1-, 1.25- and 1.5-inch.



Aluminum Bead Breaker

Ti22 Performance, Watervliet, Michigan, presents an Aluminum Bead Breaker. Designed to provide the optimal amount of leverage for breaking the bead on racing tires mounted to 15-inch wheels, the durable tire tool is made from black anodized aluminum to help protect expensive aluminum rims.



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Whether you're looking to cut seconds off of your track time, need additional stopping power for your large vehicle or want brakes that are cleaner and quieter, Hawk Performance has the pads, rotors and fluids to keep you safer.



Jack Stands

Jackpoint Jackstands, Batavia, Illinois, presents Automotive Jack Stands that work with a conventional floor jack to lift a car on the proper factory jacking location and use the same factory jacking location to support the car on a secure, cast aluminum jack stand. The stands eliminate having to find an alternative spot to jack-up a car or place the jack stand because the same factory jacking location is used for both.



Two-in-One Bed Cover System

Stowe Cargo Systems, Davisburg, Michigan, presents the Stowe Cargo System two-in-one toolbox and tonneau cover combo. Features include a durable, hard panel, sealed, lockable toolbox for storing gear, and a fully lockable, weathertight bed cover. The system is built with OEM-grade locks and seals, installs easily and includes a unique hinge design that offers access to the truck bed from all three sides.



Catalytic Converters

ACAT Global, Charlevoix, Michigan, presents its Metallic Series Catalytic Converters. Available for domestic and import vehicles, the converters feature emissions control technology that complies with federal and CARB standards. Made in the USA, the metallic catalytic converters can improve gas mileage by as much as 12%, significantly reducing emissions without sacrificing performance. The company is working with



various government agencies to implement retrofit programs and replacements for stolen catalytic converters nationwide.

Toyota Security Skid Plate

DPI Off-Road Brands, Phoenix, presents a new line of Catalytic Converter and Transmission Security Skid Plates from **Scorpion Extreme Products** for a variety of Toyota truck and SUV models. Made in the USA from 3/16-inch lightweight aluminum, the plates are designed to simultaneously protect against catalytic converter theft and trail damage. They offer simple, bolt-on installation with no drilling.



Mustang GT Exhaust

AWE, Horsham, Pennsylvania, presents an Exhaust Suite for 2018-up Ford Mustang GT applications. Made in the USA, the exhausts are offered as sophisticated Touring Edition or unleashed Track Edition models, delivering horsepower and torque improvements over stock. Handcrafted from 3-inch, U.S.-sourced T304L stainless steel, the direct bolt-on systems are available with quad 4-inch tips in chrome silver or diamond black finishes.



Differentials

Auburn Gear, Auburn, Indiana, presents its Limited-Slip and Locking Differentials. Made in the USA from American steel, the lines include the GRIP-N-LOC durable, high-bias advanced LSD that takes the best features from the former HP, PRO and Racing lines, and the SELECT-A-LOC electronic-controlled locking differential available in open-to-lock or LSD-to-lock applications. Benefit from LSD performance at all speeds, and/or hit the switch for low-speed traction.





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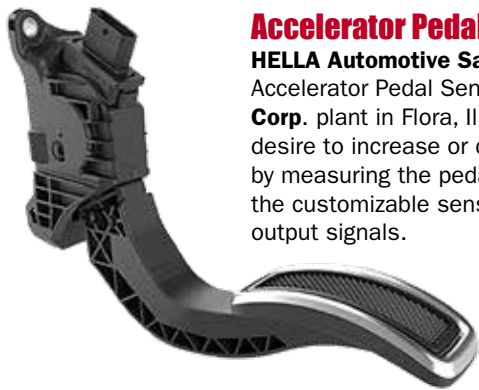
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Accelerator Pedal Sensors

HELLA Automotive Sales, Peachtree City, Georgia, presents Accelerator Pedal Sensors produced at the **HELLA Electronics Corp.** plant in Flora, Illinois. The sensors deliver the driver's desire to increase or decrease speed to the engine electronics by measuring the pedal position. Featuring a black box design, the customizable sensors are available with a wide variety of output signals.



Mini Sprint Mufflers

Extreme Mufflers, Simi Valley, California, presents its new Extreme Micro Mufflers. Designed to deliver max performance while meeting or exceeding decibel requirements for Mini Sprint applications, the mufflers are made in the USA and include no internal restrictions. All mufflers come with a 45-degree turn-out, redirecting the exhaust away from the driver. Dyno- and track-tested, they are TIG/MIG welded for durability and packed with 100% 304 stainless steel to prevent burnout.

Stiction Eliminator

Hot Shot's Secret, Mt. Gilead, Ohio, presents its Stiction Eliminator oil treatment for gasoline and diesel engines. Designed to remove stiction, sludge and varnish, the engine restorative features patented FR3 nano lubricant to reduce engine wear up to 62% more than oil alone. Made in the USA, it also restores failing HEUI injectors, and improves compression and fuel economy by cleaning and lubricating the entire oil side of the engine, including injectors, turbo, rings and oil pump.



Emergency Line Repair Kit

AirSept, Atlanta, offers its award-winning Smart Splice line repair products in a compact emergency kit for the off-road community. AirSept's Broken Line Emergency Kit has everything needed to quickly repair transmission lines, power steering return lines, heater and cooler lines, and transmission oil cooler or engine oil cooler lines in an easy-to-carry case. Made in the USA, the kit allows repairs to be made on the spot without line removal or replacement. Smart Splice is strong, durable and burst-tested up to 2,600 psi.



Bronco Bumper LED Mount Kit

TREX Truck Products, Corona, California, presents **ZROADZ** Front Bumper LED Mounts, available for Ford Bronco models. A quick and easy way to add forward-facing lighting, the systems feature simple bolt-on installation and use factory hole locations. Designed and made in the USA, the mounts are available in complete kits with light and wiring harness, or as brackets only for mounting common and popular LED light bars.

1930s-'40s Vehicle Heater

Vintage Air, San Antonio, introduces the Streamline Heater for 1930s-'40s vehicles. Designed in an art-deco style, the powerful heater system is made in the USA and includes a molded plastic cover, polished stainless steel trim and single-knob operation for safety and ease of use. Powder-coated louvers direct air out of the bottom of the heater and separate it between the driver and passenger footwells for even heating. The knob regulates both the three-speed blower fan and heater control valve.



Fender Flares

AXC, Woodland, Washington, formerly **Accel Plastics**, introduces its Defender and XLine series of premium fender flares. Initially available for a variety of Chevrolet/ GMC, Ford, Jeep, Ram and Toyota trucks and SUVs, with additional designs to follow, the flares are made in the USA from thick, durable materials and include OE-quality hardware.



Mustang Billet Fuel Hat

Snow Performance, Wichita Falls, Texas, presents Billet Fuel Hats for 2011-up Ford Mustang applications. The fuel hats come with a billet aluminum manifold that has CNC-machined passages to completely eliminate rubber or plastic lines. Engineered and built in the USA from 6061 billet aluminum, they feature a black anodized finish for durability and corrosion resistance, making them compatible with E85 and other harsh fuels. The fuel hats completely replace the factory fuel hat/bucket for easy installation.

Locking Hand Tools

Malco Products, Annandale, Minnesota, presents its Eagle Grip line of locking hand tools. Forged in the USA from premium American steel, the first six products in the Eagle Grip line include locking pliers and clamps for use in automotive applications. The tools are designed and built to meet the rigorous demands of professional users.



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Gauges

Dakota Digital, Sioux Falls, South Dakota, presents the RTX series of vehicle gauges, made in the USA. Created to incorporate OEM design elements regarding the layout, face styling and indicators, the series offers late-model features including LED backlighting available in a choice of color schemes.



Muscle Car Wheel

Wheel Vintiques, City of Industry, California, offers the 54 Series Magnum 500 Wheel for popular muscle car applications. Made in the USA, the wheel features a chrome finish with black painted windows. It is available in 14x6 through 15x10 sizes that are ideal for stock and modified muscle cars. A variety of center cap options are available.

Rear Diff Cover

PML, Inglewood, California, presents a Rear Differential Cover for 2019-'22 Ram 2500 and 3500 14-bolt applications. Made in the USA, the extra-capacity, heavy-duty cover is finned and follows a shape similar to the stock cover. It clears sway and panhard bars on 2500 models.



SxS Locking Header Bolts

Stage 8, San Rafael, California, presents two new Locking Header Bolt Kits designed specifically for side-by-side recreational vehicles using 8mm bolts.



Made in the USA, the kits are available in 18- and 24-piece packages that include bolts, retainers and clips.



Muscle Car Tires

Coker Tire Co., Chattanooga, Tennessee, offers Firestone Wide Oval Radial Tires. Manufactured in the USA, the product line is an updated and upgraded version of the original **Firestone Wide Oval** tire that debuted in 1967 as a bias ply tire. The modern radial version features the same tread pattern and sidewall markings as the original. Sizing options include popular muscle car fitments for 14- and 15-inch wheels. Choose from a 3/8-inch redline or raised white letters.

Multidirectional Shifter Adapters

Lokar Performance Products, Knoxville, Tennessee, presents its patent-pending AxiShift and AxiShift Pro shifter adapters that allow an almost unlimited range of adjustment for orienting shifter levers into the proper location. Made in the USA, both versions permit precise adjustments prior to locking into the desired position, providing 360 degrees of axial rotation of the shifter lever and the ability to tilt 15 degrees in any direction. The standard AxiShift bolts onto **TREMEC** TKO/TKX and T56 Magnum shifters.



1969 Corvette Side Exhaust Shield Kit

Paragon Corvette

Reproductions, Swartz Creek, Michigan, presents a Side Exhaust Shield Kit for 1969 Chevrolet Corvette applications. Made in the USA, the kit includes lefthand and righthand shield assemblies, plus shield braces with attaching hardware.



Crossover Tire

Nitto Tire U.S.A Inc., Cypress, California, presents its new crossover-terrain tire, the Nitto Nomad Grappler. Designed with a bold tread pattern to provide comfort on-road and traction in off-road and snowy conditions for CUVs and SUVs, the tire features the option of two different rugged sidewall designs and a 3PMS rating. It adds traction and an aggressive look, and is available in 25 sizes to fit 17- to 20-inch rim diameters.



Hellcat Fuel Pump Modules

Aeromotive Inc., Lenexa, Kansas, presents Direct Drop-In Fuel Pump Modules

for 2015-newer Dodge Charger and Challenger Hellcat models. Available with dual or triple pumps to meet high-power demands, the modules come preassembled for easy installation. They work with the factory plastic fuel tank, OEM jet siphon pickup and fuel-level sender, and utilize the OEM lock ring and gasket.



Chevy BB Clutch & Flywheel Kit

Centerforce, Prescott, Arizona, introduces an SST (Solid Street Twin) 10.4-inch Twin Disc Clutch and Flywheel Kit compatible with the Chevrolet ZZ454 big-block engine that features a 1-1/8-inch, 26-spline transmission. The SST is a true twin disc clutch, designed and engineered for vehicles producing up to 925 pound-feet of torque. The kit

includes a billet steel flywheel, two discs, floater plate, pressure plate, pilot bearing, alignment tool, and **ARP** pressure plate and flywheel hardware.



F-150 Supercharger System

ROUSH Performance, Livonia, Michigan, introduces a new Supercharger System for 2021 Ford F-150 applications. Designed to boost output to 705 hp and 635 pound-feet of torque, the system features new calibration optimized for 93-octane fuel for more aggressive tuning, and a low-temperature radiator with increased cooling capacity. An optimized billet aluminum viscous crankshaft damper improves durability and longevity of the supercharged 5.0L V-8 engine.



Performance Controller

CarBahn, San Jose, California, presents its Stage 1 Performance Controller for BMW G42 M240i, G2X M340i, M340i xDrive, M440i and M440i xDrive applications.

The plug-and-play ECU improves boost pressure in turbocharged cars to dramatically increase

horsepower and torque. It has selectable maps through a Bluetooth app that accommodate different octane levels for increased performance.



LT 6.2 Flat Top Piston Kit

MAHLE Motorsport, Fletcher, North Carolina, presents an LT 6.2 Flat Top PowerPak Piston Kit. The pistons in the complete kit are manufactured from 2618 alloy, ideal for endurance racing, land speed racing, and high-boost, high-nitrous drag racing. The pistons feature a hard-anodized top ring groove for extreme-duty engine applications and are designed for aftermarket rods. The kit is compatible with GM LT1, L86 and LT4 heads and comes complete with pins, clips and rings. The parts are manufactured in Morristown, Tennessee.



Drag Race Suspension

Chassis Engineering, Riviera Beach, Florida, presents Outlaw Adjustable Ladder Bars. The triple-adjustable drag race suspension is designed with large moly tubing, moly tube adapters and moly rod ends. Built to handle big power and heavy vehicles, adjustment of pinion angle and preload are done with the top bars, just like a 4-link. Housing brackets include several holes to adjust leverage, and several variations are available.



On- and Off-Road Tire

Mickey Thompson Tires & Wheels, Stow, Ohio, presents the Baja Legend MTZ mud-terrain tire with optimized tread design and geometry for on- and off-road use. Features include variable length and depth Sidebiters for a bold look, improved traction and protection; PowerPly 3-Ply sidewall construction for puncture resistance, quick reaction to steering inputs and stability; and a silica-reinforced T-4 tread compound for lasting tread life, cut and chip resistance, and wet handling and braking performance.



Scout II Vent Window Set

Steele Rubber Products, Denver, North Carolina, presents a Vent Window Weatherstrip Set for 1971-'80 International Scout II applications. The front door vent window weatherstrip pair is designed from the original parts for a snug fitment and seal. The pieces are fully molded from high-quality rubber and include a corrosion-resistant brass metal core for durability.



Drill Bit Set

K-Tool International, Plymouth, Michigan, offers a 29-Piece Speedy Cutter Drill Bit Set designed to remain sharp up to four times longer than conventional bits. A stepped cutter design glides through round, curved and uneven metal surfaces while eliminating the need for pilot holes and preventing the bit from walking on curved surfaces. A patented tungsten cobalt high-moly



alloy allows for easier penetration and precise cuts. Sizes range from 1/16- to 1/2-inch by 1/64-inch increments. K-Tool XD offers a full line of American-made, professional-grade tools.

Mega-Duty Hitches

GEN-Y Hitch, Nappanee, Indiana, presents its Mega-Duty Adjustable Drop Hitches that start at 10,000-pound towing capacity and go up to 32,000-pound capacity. Offering multiple drop options, the systems can be used as a pintle and/or a dual-ball hitch. Strong and versatile, they are made in the USA.





Replacement Alternator

Powermaster Performance, West Chicago, Illinois, present its powerful, new Hairpin Replacement (HPR) Alternators that produce more than 195 amps at idle and 245-plus amps at the top end. Made in the USA, the alternators are direct bolt-in upgrades for many domestic late-model applications, with the power to support high-volume fuel pumps, winches, electric fans and accessory lighting.

Engine Coating Kit

KBS Coatings, Valparaiso, Indiana, presents the KBS Motor Coater Kit for a beautiful, protective finish on engines. The all-inclusive, user-friendly system consists of KBS Klean to clean surfaces, RustBlast to remove rust and corrosion, and Motor Coater durable engine enamel available in 39 colors. The kit also includes #1 Thinner, which is used to thin Motor Coater for spray applications.



Caliper Upgrade Kit for Trucks

SSBC-USA, Elma, New York, presents the B8-Barbarian Brake Caliper Kit for 3/4- and 1-ton truck applications. Manufactured in western New York, the aircraft-grade, T6061 billet aluminum calipers include stainless steel pad clips, bleeders and eight pistons. As a direct drop-in replacement for OEM stock calipers, the kit fits high-performance, severe-duty brake pads. **TS**

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PERFORMANCE

JULY 2022

Shocks p.54

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The Marti Museum p.64



Performance shocks are an integral part of a complete suspension setup. (Photo courtesy Fox Factory Inc.)

RIDE IT OUT

By John Carollo

It's smooth sailing for the performance shocks market.

On the trail, at the track or simply driving down the street, suspension performance is critical to driver comfort and control.

Performance shock offerings allow shops to deliver application-specific setups that make each trip smoother, safer and ultimately more enjoyable.

Before stocking your shelves, suppliers share their thoughts on how the market has changed, ways shops can improve service, and how innovation and collaborations are driving product development.

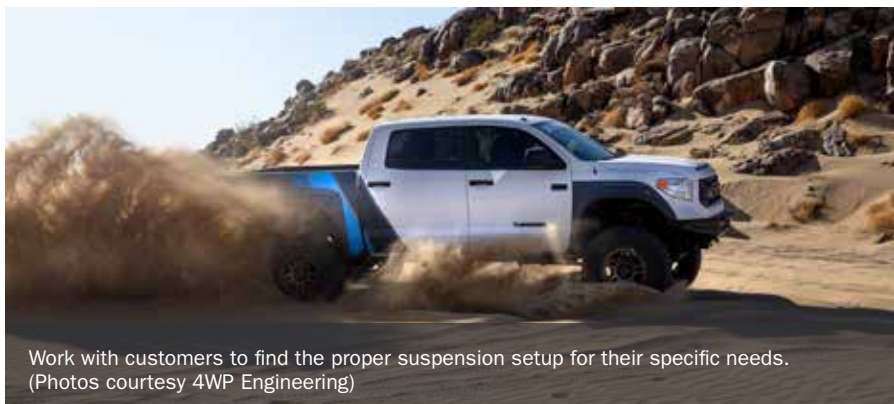
NEW TERRAIN

Whether your main shock customers are on the track or on the trail, chances are they're looking for something different than they were a decade ago.

"The biggest change in the performance shock market has been its increase in popularity over time," says Scott Spiva, who handles sales and tech for ICON Vehicle Dynamics. "Ten or so years ago, the majority of vehicles that had real performance shocks installed had them because they were regularly used off-road.

Fast-forward to today, and it has become common knowledge that these same *off-road* performance shock absorbers offer similar improvements to on-road ride quality and handling—especially on today's infamously undermaintained roads. It's easy to justify the investment in quality performance shocks in order to get the most out of any vehicle, and there have never been more options available to choose from for all types of uses."

One of the biggest uses these days is overlanding, notes Shane Casad, head of



Work with customers to find the proper suspension setup for their specific needs. (Photos courtesy 4WP Engineering)

product management for thyssenkrupp Bilstein of America Inc.

“The ideology has shifted when it comes to lifting a vehicle for off-roading,” he says. “Lifting a vehicle was more for show, but now it’s for function.”

Off-road adventurers are driving the market, agrees Gary J. Boulanger, FOX Powered Vehicle Group communications marketing manager for Fox Factory Inc., which provides OEM and aftermarket offerings.

“Control and comfort aren’t sexy marketing buzzwords, but that’s also what our desert racing athletes strive for,” he says.

“With millions of new F-150s, Tundras and Jeeps registered every year, our factories have been working overtime to keep up with demand.”

In fact, more and more suppliers are recognizing opportunities, leading to a crowded market, says Kyle Martin, sales and marketing manager for Radflo Suspension Technology.

“Over the last 10 years, the performance shock market has seen a large increase in the number of manufacturers and resellers. This increase has boosted competition and choice for the consumer, revenue for the reseller and business as a manufacturer.”

More companies mean shop owners will need to do their homework when selecting suppliers, according to Mason O’Hara, technical sales rep for ITT KONI.

“The sheer number of performance shock brands has grown significantly,” O’Hara says. “The demand for improved vehicle performance is no longer limited to just the track, trail or road. You can find a performance shock supplier for just about anything that hits the ground with wheels and tires.”

Greater competition is spurring product development, adds Mark Krumme, head of marketing at Eibach North America.

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■ HOT PRODUCTS:

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■ **FEATURES & BENEFITS:** Aluminum impact forged shock body with hard anodized finish; internal reservoir line; stainless steel shock shafts with a hard chrome coating for reduced friction and abrasion resistance; tested and tuned for specific applications.

4WP Engineering

Kris Hernandez

Suspension Engineering Manager

■ **HOT PRODUCTS:** B8 8112 & B8 8100 Bypass Shocks

■ **FEATURES & BENEFITS:** Designed for overlanding; include Position Sensitive Damping with an internal hydraulic bump zone; improve ride comfort with the ability to soak up massive suspension inputs.

BILSTEIN

Shane Casad

Head of Product Management

■ HOT PRODUCTS:

Pro-Truck Reservoir Shocks

■ FEATURES & BENEFITS:

New applications include late-model Toyota, Lexus, Ford, Chevrolet and Ram trucks and SUVs; work with Pro-Truck Coil-Over 2.0s to deliver more off-road performance and control; integrated piggyback reservoir system for increased oil volume.

Eibach Inc.

Mark Krumme

Head of Marketing, North America

■ **HOT PRODUCTS:** Performance Series 2.0 Shocks

■ **FEATURES & BENEFITS:** Bolt-on solution; torture-tested, race-proven and built to last; increase off-road capability by extending droop travel in most applications; on-road comfort with performance-minded shock valving for a connected ride; accommodate various lift ranges.

Fox Factory Inc.

Gary J. Boulanger

Communications Marketing Manager

FOX Powered Vehicle Group

■ **HOT PRODUCT:** Compression Damping Electronic Valve

■ **FEATURES & BENEFITS:** Powered by ICON Intelligent Control (IIC), CDEV is an electronically controlled valve that meters the flow of oil to regulate the amount of damping force that is created by the shock when compressed; seamlessly adjusts each shock.

ICON Vehicle Dynamics

Scott Spiva

Sales & Tech

■ HOT PRODUCT:

STR.T LT Series (Light Truck) Shock

■ FEATURES & BENEFITS:

Performance shock for 1/2-, 3/4- and 1-ton Ford, Chevrolet/GMC, Dodge and Ram pickups and related SUVs; improves comfort, control and handling when towing and hauling; twin-tube, low-pressure gas design allows for easier installations.

ITT KONI

Mason O'Hara

Technical Sales Rep

■ **HOT PRODUCT:** KYB Gas-a-Just Auto/Light Truck Shock

■ **FEATURES & BENEFITS:** Instantly and automatically adjusts to performance needs; does not fade due to aeration; available as an OE monotube replacement for vehicles that came with a monotube shock and as a performance upgrade for vehicles that came with twin-tube shocks.

KYB Americas

Andy Castleman

Brand Manager

■ **HOT PRODUCTS:** 2.5-Inch-Diameter Front & Rear Coil-Overs for New Ford Broncos

■ **FEATURES & BENEFITS:** Options available with remote reservoirs and compression adjusters; provide on- and off-road performance while allowing the user to add between 0-3 inches of lift, depending on vehicle trim and packages.

Radflo Suspension Technology

Kyle Martin

Sales & Marketing Manager

“As the shock market grows, manufacturers are continuously developing ways to introduce new damper technology at a consumer level,” he says. “From affordable, four-way damping adjustable coil-overs to real-time electronic damping control from the driver’s seat, it is an exciting time for the performance shock market.”

Andy Castleman, brand manager at KYB Americas, sees even more excitement down the road.

“Changes in the market could arise as developments such as spool valves, harmonic frequency and electromagnetic technologies become more reliable and cost-effective,” he predicts. “While currently used primarily on high-end sport, luxury and race cars, we could see them make their way into more OE—and, therefore, aftermarket—applications.”

Future innovations will improve versatility and safety, predicts Kris Hernandez, suspension engineering manager for 4WP Engineering.

“Active dampers are a gamechanger for the OEMs and eventually we hope the aftermarket will have several affordable solutions as more and more companies develop systems,” Hernandez says. “Changing the ride and handling characteristics for towing, street or dirt with the push of a button or an app on your phone is such an improved customer experience. Being able to have a suspension system that adds active safety and handling in real time while just driving down the road is a large leap in technology for not only the shock market, but for consumer safety as a whole.”

SOLID POTENTIAL

Innovation isn’t the only reason to like the performance shocks market. There are plenty of unexpected benefits to serving these customers as well.

“Performance shocks offer repeat business,” says Spiva. “Like most high-performance products, shock absorbers must be maintained at regular intervals to keep them operating at peak performance. A major benefit of ICON shocks, and many others, is their ability to be serviced, eliminating the need for expensive new shocks every few years. Selling and installing these serviceable shocks allows shops to develop relationships with their customers and provide them with peace of mind when their shock absorbers require maintenance down the road.”

Then, there's the *gateway effect*.

"Performance shocks can be *want to have* parts. They are not always *need to have* parts," Castleman explains. "Customers are willing to pay more to personalize their vehicles with better handling and control. This makes for an easier sell, compared to recommending shock replacements as a maintenance item."

Think of them as an easy add-on sale when installing larger wheel and tire combinations.

"Original equipment shocks are not designed to dampen the additional unsprung weight of larger tires and wheels, making the vehicle harder to control," Castleman continues. "Packaging a wheel/tire/shock combination can generate additional revenue while providing your customer with better vehicle control and longer tire life."

Speaking of combinations, Krumme promotes popular shocks and springs packages.

"As shocks are already a *while you're in there* part, performance springs are an easy upsell," he says. "Most performance springs mate well with the added damping control

of performance shocks. These two, in combination, create a major performance gain with changes you can feel, thus validating the customer's purchase and building trust and value in your recommendations."

And then the ball can just keep rolling. "Adding performance shocks to your lineup can lead to inquiries on other per-

formance components like upper control arms, axles, gears, etc.," says Martin "Generally, people who are interested in a premium performance shock package will be interested in doing more than just a lift, wheels and tires."

One of today's top candidates? Again, it's overlanders.



Customers are willing to pay more to personalize their vehicles with better handling and control. (Photo courtesy KYB Americas)

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Focusing on products that can be installed once and allow adjustment as the project evolves reduces the price of entry. (Photo courtesy Eibach)



If it has wheels and tires, it's a candidate for performance shock upgrades. (Photo courtesy KONI)



Where lifting a vehicle was once more for show, it's now more often for function. (Photo courtesy BILSTEIN)



Performance shocks offer benefits to all types of vehicles. (Photo courtesy ICON Vehicle Dynamics)



More and more suppliers are recognizing opportunities for performance shocks, leading to a crowded market. (Photo courtesy Radflo)

“An adventure-seeking customer typically doesn’t stop at updating just the suspension,” Boulanger explains. “A desire to go overlanding typically means several thousands of dollars in added accessories to get them there and back.”

Casad agrees.

“I would think an unexpected benefit for shops, in terms of suspension, is overland customers are demanding high-dollar suspension packages that are fairly quick to install.”

Once customers feel the benefits of performance shocks, they’re often hooked.

“A large majority of people who are interested in performance suspension, and their families, tend to have more than just one vehicle. After experiencing firsthand the ride quality and handling improvements, many customers return asking if they can get KONI shocks for their second, or third, vehicle as well,” O’Hara notes. “KONI offers a shock option for just about any type of vehicle, including cars, trucks and even some SUVs. So, the entire family fleet can be outfitted, not just their weekend cruiser.”

It’s up to professionals to steer customers in the right direction.

“Being a shop selling performance shocks opens up an opportunity to offer in-house shock servicing/rebuilding, customer-specific in-house shock tuning and shock nitrogen checks,” notes Hernandez. “You can easily gain customer loyalty if your shop educates and sells the customer on the proper package—not what’s in stock or what costs the most. Nothing will upset

a customer more than spending a large amount of money for a shock package that is not right for them.”

PROJECTS MAKE PERFECT

Suppliers highlight recent projects and programs that are helping drive awareness in the performance shocks market.

“We have seen enormous enthusiasm for our new Bronco coil-overs,” says Radflo’s Martin. “The platform seems to be extremely popular. Many owners are looking for performance shocks while adding a lift to the vehicle.”

Boulanger agrees, pointing to two recent efforts.

“The new, full-size Bronco is still grabbing headlines, thanks to our affiliation with Fun-Havers Vaughn Gittin Jr. and Loren Healy pushing the needle at King of the Hammers and Easter Jeep Safari in their FOX-equipped Ultra4 race vehicles and custom Broncos,” he says. “Also, the BDS Fire Command project began as a Ford Bronco Black Diamond Edition before being transformed into a half-cab truck that’s all about fire and rescue. BDS Suspension, a subsidiary of Fox Factory, created the off-road first responder as the ultimate off-road fire truck for the 2021 SEMA Show, and it continues to get press coverage.”

Total handling package programs have plenty of clout, says Castleman, filling the need for pickup owners looking for a more aggressive appearance.

“KYB’s Truck-Plus Performance and Leveling Assemblies are completely assembled

with struts, springs and mounts, as well as all hardware necessary for installation. Truck-Plus Assemblies are easy to install, and since the spring is already in place, spring compression is not required," he says. "They can also include an upgraded performance monotube unit such as the KYB Gas-a-Just or MonoMax."

Product versatility is attractive as well, says Eibach's Krumme.

"As enthusiasts are now more educated than ever, springs and shocks have quickly become the lift options of choice. Focusing on products that can be installed once and allow adjustment as the project evolves reduces the price of entry, which is beneficial to the growth of the market," he says. "Between our Load Leveling System and the new Pro-Truck Reservoir Shocks, we have been focusing on having something for every stage of the build."

Ford and Polaris continuing to target larger active dampers with more features on their OEM vehicles shows the potential for performance and safety upgrades, explains 4WP's Hernandez.

"These OEM programs are aiming to improve the customer experience and feel of their vehicles while improving safety and letting the customer have endless options to play with in this instant gratification/low attention span era we live in."

Trying new things can lead to the next big thing, BILSTEIN's Casad explains.

"We developed a larger-diameter monotube shock using a 60mm I.D. piston. Combining this with a leveling coil, we named this product B8 6112, and it's designed to offer ride height adjustability and increased overall performance due to the larger piston and oil capacity," he says. "It is designed for 1/2-ton trucks and SUVs that come factory-equipped with a coil-over front IFS suspension, and has become one of our fastest-growing product lines."

Spiva outlines a recent ICON project-turned-new-product.

"Our new 2.5 EXP Series coil-overs expand on the popularity of performance shocks for primarily street-driven or more casual off-roaders. EXP Series com-

bins the performance of a fully rebuildable 2.5-inch-diameter premium shock absorber with the convenience and cost-benefits of re-using the vehicle's factory coil springs and other components. It bridges the gap between spacer lifts and threaded-bodied coil-overs, providing adjustable suspension lift, custom-tuned performance and maximum wheel travel in an economical package."

Of course, designs need to keep pace with advancing vehicle technology.

"We are currently in the process of developing a number of new applications for the ever-growing overlanding market," says ITT KONI's O'Hara. "Both Mercedes-Benz Sprinter and Ford Transit have seen a boom in popularity for their agile on- and off-road use as conversion campers/travel vans. Having a shock that performs no matter the terrain is important when you are off-the-grid and vehicle-dependent for both travel and shelter. Stock height and lifted applications are in the works to improve the driving experience for those out to enjoy the journey." **TS**

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Something Special: The Deuce Turns 90

Henry Ford
stamping his
first V-8.

Celebrating the early days of Ford V-8 power. // // // By Tony Thacker

Ninety years ago this year—back on March 31, to be exact—Henry Ford introduced a new car model, often referred to as the *Improved Model A* in contemporary literature.

In fact, there was an improved four-cylinder introduced in 1932—called, not surprisingly, the Model B—but the big news was the Model 18 and its low-cost, lightweight, monobloc V-8 engine.

Four-banger Model T and subsequent Model A engines had been raced since the T was introduced in 1908. They were well-developed and back then could outrun an early Ford V-8 on most days, but engineers at Ford knew they were on the right track. It was only a matter of time.

According to Ford engineer Emil Zoerlein, “we tried various camshafts and carburetor adjustments and we finally smoothed the engine out, and the first reading we got was 65 bhp maximum.” That was



A Deuce Coupe built by Troy Ladd's Hollywood Hot Rods for customer Pat Gauntt won the Al Slonaker Award at this year's Grand National Roadster Show.

an improvement over the stock 40-hp Model A.

The one-year-only 1932 Ford quickly gave way to the 1933 Model 40 that boasted 75 hp at 3,800 rpm, due mostly to aluminum heads. More changes came

the following year with the introduction of a dual-throat Stromberg 48 carb that helped push output to 85 hp and torque to 147 pound-feet at 1,250 rpm.

Meanwhile, some say in an effort to reduce the cost of racing during the Great

Depression, the organizers of the Indy 500 introduced what became known as the *Junk Formula*. It was structured for modified two-seat production cars with a minimum weight, a maximum capacity of 366 ci and no supercharging.

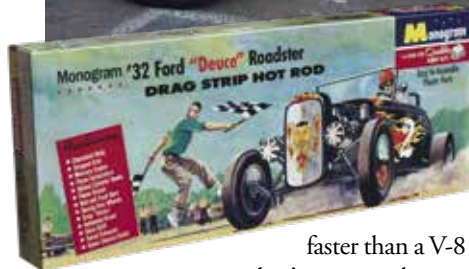
Although introduced in 1932, the real debut of the class came in 1933, and in 1934 the Bohn Aluminum & Brass Co. entered a stylish '34 Roadster at Indy laid out by Ford engineer Don *Sully* Sullivan and powered by one of his hot 21-stud engines.

The engine was fitted with Bohnalite aluminum racing heads, 0.30-inch oversized pistons with an 8.5:1 compression ratio, a racing cam and a Bosch ignition. It also sported a sophisticated looking twin-carb intake designed by Sullivan, made by Bohn and fitted with a pair of Stromberg 97s.

The engine produced an impressive 140 bhp and heralded an aftermarket for the Deuce that continues to this day.

SHOWING POTENTIAL

Because a hopped-up four banger was still



Though only produced for one year, the 1932 Ford "Improved Model A" and its available flathead V-8 engine continue to shape hot rodding trends 90 years later.

...faster than a V-8 in the '30s, speed merchants were slow to accept the bigger power plants. After World War II and 15 years of Dearborn development, however, the Ford V-8 was a 100-horse stonker.

Its potential as a race engine also offered

returning servicemen an unprecedented business opportunity.

For example, Pierre Bertrand, Vic Edelbrock Sr., Jim Harrell, Ed Iskenderian, Eddie Meyer, Barney Navarro, Robert Paxton McCulloch and Phil Weiland, to name but a few, were all soon in the racing parts business, making everything from

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cams to heads and intakes. It was a business that boomed for two decades before the OHVs took over.

However, the flathead engine and the '32 Ford remain stalwarts of the speed equipment market, and even today the big-name catalogs continue to carry parts for the Deuce and Ford flathead.

A Summit catalog just arrived in the mail and there are numerous parts that I didn't expect to see—bumpers from Bob Drake, heads from Edelbrock and headlights from Pete and Jake's. There's a complete page of '32 Ford-specific sheet metal from United Pacific Industries, as well as buggy-spring suspension offerings from Pete and Jake's. There are even 97s from Stromberg, which just introduced a new e-FIRE electronic

A variety of Deuce-related products are available, including used, new old stock and reproduction parts.



ignition for flathead Ford V-8s.

The legacy and staying power of the 1932 Ford is simply amazing, especially in the electric age. Obviously, the market is not what it once was due to the graying of the industry and lack of relatability for younger people, but dang!

To get a handle on the '32's continued popularity, we spoke to David Steele, director of the American Hot Rod Foundation, who says, "The difference between driving a stock Model A and a '32 Ford V-8 is the difference between black and white and color TV—staggering. Like a fleeting rock star, it was in production for less than one year and that fact, coupled with its unique styling and the optional V-8, makes it something special."

Mike Herman of H&H Flatheads began specializing in the flathead Ford V-8 in 2003 at age 25, and says, "The flathead business is consistent, and we are currently 70 engine builds on back order, mainly because of supply chain problems. We have cores, and if we could get parts, we could build engines."

Besides building engines, Herman has also been responsible for maintaining some of the classic flathead brands including Austin, Dixon, Navarro, Sharp and Wilson & Woods.

"Because of steady demand, we've been able to keep all of these historic brands alive and all of them are made entirely in the USA, from the casting to the machining," he notes.

Herman is not the only one producing parts for 90-year-old engines: ARP makes bolts; Best Gasket makes gaskets; ISKY makes cams, lifters and springs; Manley makes valves; Ross makes pistons; and

SCAT make cranks and rods. The list goes hand in hand with demand.

Tom Lieb of SCAT says of the introduction, "The new flathead V-8 opened up the creative, go-fast minds of the youth and a new phase of hot rodding was born. It's now a mature market."

In total, Ford America only built 275,000 of the cars in 1932, of which 185,000 were V-8s. However, the '32 Ford was also built overseas until 1935. Of the 275,000 constructed in the U.S., it's amazing how many have survived, considering the number that went to scrap due to accidents, jalopy racing, rust, etc.

That said, demand has always outstripped supply, and a large reproduction industry has grown up around the Deuce.

FROM THE GROUND UP

Specializing in used original, new old stock and quality reproduction parts is the Early Ford Store (EFS) in San Dimas, California. Started in 2001 by the late Bill McGrath and now operated by his son Michael, EFS is my go-to local Deuce speed shop, and I have never once heard them say, "No, we don't have that."

When asked how he feels about the 90th anniversary, Michael says, "I'm waiting for the 100th." (At 36 years old, he can afford to!)

In the early 1980s, drag racer Roy Fjastad began replicating '32 frame rails, and by 1982 had produced 1,300 pairs. Meanwhile, American Stamping Corp. in Memphis has been producing frame rails for more than 20 years, and owner Barry Carter says, "Since we started in 1990, we have stamped about 20,000 pairs of rails."

Osman Romero of Classic Street Rods assembles those rails into full chassis, saying, "My brother Hugo and I build two frames a week, so we've built over 1,000 in the 20 years we've been doing this."

And, of course, there are numerous other companies professionally building frames, to go along with all the home builders.

A frame is just a frame without a body,

Rolling Bones Deuces have what can be called a slightly "battered" look.



and just as there was and is a demand for rails, people are also looking for bodies, and especially Roadster bodies.

Over the years, lots of companies have stamped out '32 Ford small replacement or patch panels, but in 1997, Ray Gollahon of Brookville Roadster in Brookville, Ohio, changed the game by introducing the first all-new, all-steel '32 Roadster body. Fiberglass is fine, but steel is real, and Brookville hit a home run. The Roadster was followed in 2004 with an iconic '32 three-window coupe of the style made famous by the Beach Boys' song *Little Deuce Coupe*.

According to Ray's son Kenny, "We have sold almost 2,500 bodies since we started 25 years ago. I thought it might slow down by now, but we are 20 weeks behind with 16 coupes on order and 40 Roadsters."

United Pacific manufactures a replica 1932 five-window coupe body—think *American Graffiti* coupe—along with a closed-cab pickup and hundreds of ancillary body and trim parts including grilles, fenders, etc. It's now possible to build a complete 1932 Ford using all new parts, except for the engine block.

STILL ROLLING

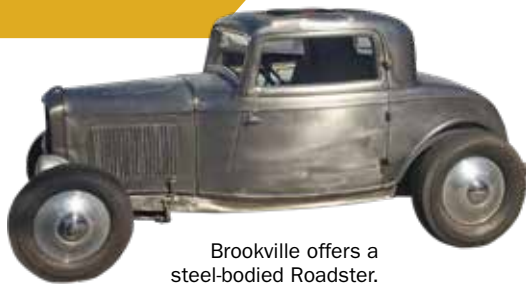
Over the years the '32 Ford has been celebrated with books, videos, endless memorabilia and special events.

In 2007, Ford helped mark the 75th anniversary with a special exhibit at the Grand National Roadster Show. Also, there was a Deuce-only class at that year's Pebble Beach Concours d'Elegance, and this year Pebble Beach will host another special class in August in celebration of the 90th anniversary.

Builders have added their style to many memorable Deuces over the years, from Boyd Coddington-style smoothsters to the new traditional style of SO-CAL Speed Shop, to the slightly battered look of Rolling Bones.

Yes, they have staying power, and the one venue in which they endure more than any other is as '32-based lake racers, which is where it all really started for the Deuce back in the day. (That said, many racers prefer the narrower, more svelte Model A Roadster body.)

No doubt, one of the fastest Deuces currently racing is Chet Thomas' Blown Gas



Brookville offers a steel-bodied Roadster.

Roadster that has gone 233.65 mph at El Mirage with son Rich driving. At Bonneville's approximately 2.5-mile long course (El Mirage is just 1.3 miles), D. Conley set the Blown Street Roadster record at 251.735 mph.

Meanwhile, at Bonneville in 2020, Matt Jewel drove his supercharged flathead-powered Deuce Roadster to a new XF/Gas Modified Roadster record of 165.558 mph. Flatheads suffer from asthmatic breathing, but Jewel's jewel employs a reverse flow concept whereby the exhaust exits from new ports machined into the block near the original intakes and opposite from where the exhaust ports normally reside.

The flathead engine is nothing if not versatile, and despite all its mechanical deficiencies, the fastest flathead on the planet powered Ron Main's *Flatfire* streamliner to 302.203 mph at Bonneville in 2002.

To be honest, no confirmation is needed that the Deuce and the flathead continue to hold a special place in our hearts—but, if it was, a li'l Deuce Coupe also won the coveted Al Slonaker Award at this year's Grand National Roadster Show.

Built by Troy Ladd's Hollywood Hot Rods for customer Pat Gauntt, the coupe is a masterpiece of creativity and craftsmanship. Penned initially by Eric Black, the coupe was four years in the making at a cost well into six figures.

Powered by a 331-ci '49 Cadillac, the coupe—evidencing strong European styling cues—actually wears a Brookville body, albeit one highly modified with body and finish by Mick's Paint.

However, that in no way detracts from the build. It's just the latest stunning testament to Henry's original *Improved Model A* from 90 years ago. **TS**



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A BLAST FROM THE PAST

Step back in time to an old Ford dealership with Kevin Marti.

By Mark C. Bach



The Marti Museum takes up 3,000 square feet, with a mezzanine of 1,000 square feet holding some rare pieces.

Kevin Marti is the go-to guy when you need to authenticate a Ford. His solitary access to Ford's records for vehicles built since 1967 allows him to issue the gold standard of provenance: a Marti Report.

But Marti is also the go-to guy if you want to see what a service department at a Ford dealership from the 1960s might have looked like. At

his headquarters in El Mirage, Arizona he has assembled a unique collection of Ford-related service gear and equipment.

Ironically, this love for all things Ford started when, as a teenager, he was looking for a Camaro or a Chevelle to purchase.

In 1973, Marti had saved \$1,700 from his newspaper route and was anxious to buy a Chevrolet. He went out with



a friend on several attempts to seal a deal on a bowtie, but it was not meant to be. When he lamented his woes to his mother, she took charge of the quest.

At that time, the local newspaper listed the car classified ads in alphabetical order. Mom circled some possible ads in the *C* section, and off they went to take a look. None of the ads were what Marti wanted, however, and with chagrin he saw that the last entry Mom had circled was a 1967 Mercury Cougar.

Mom encouraged him to check it out since they were in the area and—yes, you guessed it—it was love at first sight.

LEARNING BY DOING

Marti was a take-charge, hands-on type of teenager, and the first weekend after graduating high school he sawed off the top of his Cougar to make it into a roadster. He soon found out, however, that the missing roof structure caused some chassis instability.

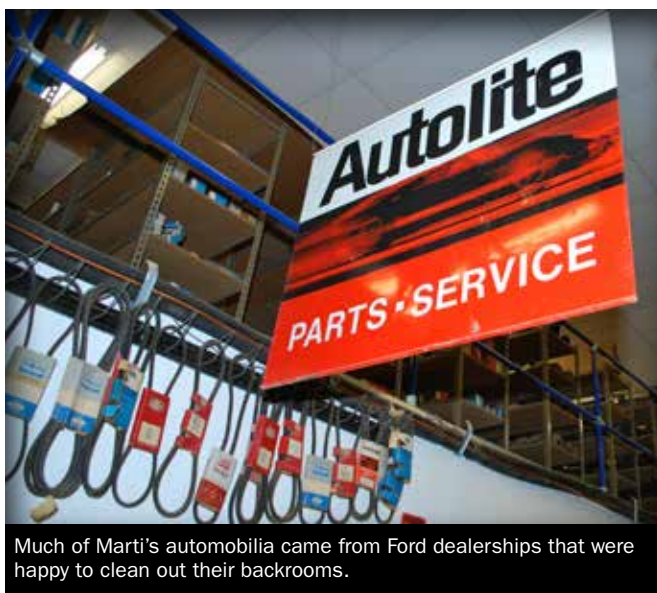
Soon he was scrounging frame supports to bolster his Cougar to fix his mistake. He enjoyed the work and the Cougar and, in 1979, bought a 1970 Cougar Eliminator.

In 1981, he was restoring the Eliminator when he discovered that Ford no longer sold stripe kits for Cougars. He searched around and found that 3M had made the stripe kits for Ford and still had the templates and designs.

He convinced Ford Power Products to allow him to buy the required minimum



Banners once proudly announced new car models.



Much of Marti's automobilia came from Ford dealerships that were happy to clean out their backrooms.

of 50 stripe kits and then placed an ad in the *Hemmings* magazine advertising for sale those he didn't need. He sold all 50 before the kits arrived, so he ordered another batch. His mail-order business of older Ford parts took off in 1982.

Marti handled a day job as a mechanical engineer for a local aerospace company and at night processed orders for the Ford parts. In 1985, he quit his engineering job to devote all his efforts to his parts supply company.

He still sells both select reproduction and new old stock (NOS) Ford parts today. The company motto is *Concourse Quality, Hobbyist Price*.

When Marti bought his first Cougar, the owner's manual had a form in the back that a customer could submit to Mercury for information about the car. Marti sent in the form when he first bought it and says he received a nice letter back from Mercury that

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Marti is especially proud of the fact that all the machines are authentic, functional pieces and not reproductions.

included many details about his new ride.

In 1990, Marti started to ask his contacts at Ford about the build history of the entire Ford lineup and discovered that all the records before 1967 had been destroyed, while the newer data was stored on computers. He pursued this treasure trove of information and finally, in 1997, he entered into a licensing agreement with Ford to have exclusive access to the data.

He spent two weeks in Detroit downloading the information in short bursts of data. His engineering skills allowed him to decipher the coding that was used to store the information.

Out of this data, he developed the various Marti Reports (martiauto.com) that outline the build history of Ford models, with three different options offering in-depth details for interested owners.

DEALERSHIP SERVICE AUTOMOBILIA

Marti bought his first house when he was 19, but it only had a carport. After enclosing it he realized he needed some garage art to decorate the walls. That started his quest for Ford automobilia.

Marti would seek out old dealerships and see if they had any old, forgotten pieces of machinery or parts sitting on back shelves collecting dust. Frequently the dealers were glad to get rid of the *junk* and charged him minimal amounts to take it away. Over the years he collected an amazing trove of forgotten mementos.

On his honeymoon, he was cruising up the Oregon coast when he saw an old Ford dealership. Being that he was newly married he was reluctant to break the mood, but his wife, Shelli, glanced over at him and said that they could stop and see what was there. Apparently, she knew well the man she had just married.

COLLECTION SEGMENTS

The Marti Museum takes up 3,000 square feet, with a mezzanine of 1,000 square feet holding some rare pieces.

Marti's split up the space into four focus points—a Ford parts counter, a waiting room for the dealership's customers, a display area where authentic banners hang from the ceiling over some of the cars that he's collected over the years, and a service area.



Kevin Marti has gained access to 1967-newer Ford vehicle records for his Marti Reports, and has also created a small museum replicating an old Ford car dealership in Arizona.

Marti is especially proud of the fact that all the machines are authentic, functional pieces and not reproductions.

1 Parts Counter

Marti uses a set of glass display cases to store some of his finds, with the back wall containing additional products. He has acquired a large inventory of Autolite and FoMoCo spare parts over the years.

He notes that, along with parts, he has accumulated dealership indicia including napkins and paper plates with the Ford imprint as well. These were often dated with the model year of the car being promoted and dealerships would remove them from use once the next model year started.

Fortunately, Marti recognized their historical value and retrieved them when he could.

2 Waiting Room

This area has a comfortable sofa that provides a view of an old Philco television, complete with functioning vacuum tubes. Philco was a division of Ford and produced sound systems, televisions and even avocado green refrigerators.

Marti located a serviceman who could repair the older television and even had a stock of the required vacuum tubes. Of course, the analog set can't receive today's digital signals over the air, so Marti compiled a collection of vintage commercials stored on a VCR tape that can be played on the TV. The museum also has a few Philco sound systems.

3 Banner Display

A variety of banners hang above some of the vehicles in his collection, including the Mercury Cougar that started this Ford fever.

Marti explains that some of the banners



would extol a particular model at a dealership. When the next model year arrived, these banners would be taken down and replaced.

Fortunately, instead of throwing them away, some dealerships stored them and later forgot about them.

4 Service Area

The final portion of the museum is set up as a typical dealership service area. Marti has an alignment rack and various machines lining the walls, including a distributor analyzer.

He was amazed that they would be set aside as new technology replaced them, since the rugged machines were usually still functional. He often found them complete with the original manuals that explain their use.

Many of the items are labeled with the *Rotunda* mark, which Ford uses to distribute dealership gear.

Marti is always on the lookout for additional automobilia, and some people contact him directly knowing of his interest. He opens his museum by invitation only, including to local schools, in an effort to share his passion for Fords and give visitors a chance to step back in time. **TS**

MARK C. BACH is a well-preserved automotive junkie with 30W oil in his veins who remembers feeler gauges and brake springs. He has a love for all things that move, especially old-school muscle cars. Bach covers car auctions and the automotive scene and writes for a variety of outlets, including *Chevy Classics*, *Round-Up Publications* and *eBay Motors*, and maintains *Route66pubco.com*.

PRECISION ENGINE

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Ring Lubrication p.74

Engine Products p.76

Flathead 8BA Rebuild, Part II

Block dressing, camshaft installation & more.

Build, text and photos by Mike Mavrigian

EDITOR'S NOTE: This is the second installment in a five-part series documenting the rebuild of a Ford flathead 8BA engine. Part I appeared in the April 2022 issue of THE SHOP magazine.

When you want an OE cast iron block to look presentable (and this old flathead was no exception), you simply need to bite the bullet and start grinding.

Using a variety of abrasives, including 2-inch-diameter Roloc Scotch-Brite pads on a die grinder, a host of 80-grit and 120-grit Tootsie Roll abrasive drums on a die grinder, and a pneumatic 3/8-inch mini belt sander with 80-grit and 120-grit belts, I removed all casting flashings and other protuberances, smoothed-out all the sharp edges and worked the exterior casting surfaces down to a uniform finish.



Our crank balanced out fairly easily, thanks to SCAT's attention to detail. A bit of weight needed to be removed by drilling each of the end counterweights.



Balancing was finalized by kissing the counterweight radius on a lathe. The result: the crank balanced in at +/- 0.5 gram.

Any minor divots or casting depressions were filled with All-Metal Filler (using liquid resin hardener) and sanded (I applied one coat, sanded, and then applied a second skim coat and sanded that). All-Metal Filler contains a high aluminum content and holds up well for engine block applications.

Any remaining imperfections (traces of the original sand-cast surface) were then filled with a high-build urethane primer and hand-sanded. This was done in stages. Apply the first coat, allow to cure, then apply a very light dust-coat of black paint and allow this to dry. Then begin to sand.

As you sand, the black will remain in any low spots, making it easy to see where additional fill may be required. Then add another coat of build primer, another dusting of black, sand, etc.

I did this three times until the surface was perfectly smooth and uniform. Primer coats were sanded using 180-grit initially, with finer grits used with each successive coat (240-, then 320-, then 400-grit, with a final wipe-down with 1,200-grit).

Once all prep was done, we applied two coats of red basecoat paint (using Valspar solid red). This was finished with two coats of Valspar urethane clearcoat.

In all, I spent about 12 hours (and about \$100 worth of abrasives plus about \$200 in paint materials) to dress the block exterior. It's a time-consuming job, but the results are well worth the effort.

Since I planned to reuse the original cast iron distributor housing (this was a pretty darned rough casting originally), I spent a

bit of time dressing the exterior surfaces. This ancient housing was covered with raised boogers, a feature of the original sandcasting.

I smoothed the exterior surfaces using a die grinder and lots of Roloc Scotch-Brite pads and abrasive *Tootsie Rolls*. I then had the housing powder-coated in a satin black wrinkle finish at Greber Machine Tool in Elyria, Ohio. The idea was to contrast tastefully against the red block, and the subtle wrinkle finish helped hide any remaining minor surface imperfections.

Although I opted not to, you can promote oil drain-back from the block upper valley by coating the valley surfaces with Glyptal G1228A, a gloss enamel designed for electric armature coating. This generally holds up well on internal block applications and provides a slick surface for quicker oil drain-back to the sump.

I don't want to worry about potential loss of adhesion of internal paint, so I decided not to paint the valley. If you want to dress the valley for improved oil drain-back, I believe it's better to invest some sweat equity and grind/polish the valley.

CRANKSHAFT BALANCING

Internal crankshaft balancing was performed at Gressman Powersports in Fremont, Ohio. No headaches presented themselves, so the job went smoothly.

Individual components were first weighed to both verify piston-matching and connecting rod-matching weights. Individual parts were weighed in order to establish our needed bobweights.

Our Egge pistons (with pins) weighed 442.5 grams each. The SCAT connecting rods weighed 412 grams at the reciprocating (big) end, and 161 grams at the pin (small) end. Total rod weight was also weighed at a repeating 573 grams.

Rod bearings (one rod's pair of shells) weighed 35 grams. Piston pin locks (pair) weighed 3 grams. Piston rings (per piston) weighed 40 grams, and we allowed an estimated 6 grams for parasitic (clinging) oil.

Considering rod big ends and rod bear-



Our balancing bobweight card results.



Our ISKY flat-tappet cam features a valve lift of 0.320" at intake and exhaust, 264 degrees duration intake/exhaust, and a lobe center of 108 degrees. Valve lash is set at 0.012" cold and 0.010" hot.

ings twice (two per crank pin), our total bobweight package was determined to be 1,545.5 grams.

Each bobweight was attached to the crank (90 degrees apart), centered onto each crank rod pin. In order to quickly center the bobweights, Scott Gressman placed a predetermined-thickness shim on one side of the bobweight and pushed the bobweight base against the shim, then tightened the bobweight base to the crank (and removed the spacing shim).

Once the crank was initially spun, we



Just like the original design, the ISKY cam features a front gear drive that meshes with the distributor gear.

were 34 grams heavy on the rear counterweight and 36 grams heavy on the front counterweight. Scott removed the excess weight by initially drilling material from the counterweight faces and re-spinning for a



Per the flathead design, three cam bearings are required. The center bearing is noticeably shorter.



New valve guides and seals.



New flat-tappet solid lifters feature interference-fit threads to hold valve adjustment.



New valve springs, retainers and locks.

An example of a valve assembly ready to install into the block.

second check.

After realizing that the imbalance was being chased along the radius of the counterweights, he moved the crank to his lathe and machined excess material from counterweight faces (saving a bunch of time as opposed to drilling), then made smaller material drill-removal corrections until he had achieved a balance of about +/- 0.5 gram (certainly much closer than really needed).

One thing to note regarding crankshaft balancing: there is really no need to drive yourself nuts in an attempt to achieve an absolute zero balance, since in dynamic operating conditions parasitic oil will cling and throw in varying amounts, so chasing a true zero balance is frankly unrealistic. Especially for a street performance engine, achieving crank balance to within a couple of grams is acceptable.

The flathead crank is an internally balanced unit (balancing the crank alone, without the need to attach the pulley or flywheel during balancing. This simply requires the use of a zero-balanced pulley and flywheel).

Once the crankshaft had been balanced, the crank was thoroughly washed and rinsed to remove any machining particles, with rifle brush cleaning through the oil passages.

Once all test-fitting and machining was accomplished, the valvetrain was addressed. Because the lifters must be in place prior to installing the valves, naturally the camshaft must be installed first.

Three new camshaft bearings (supplied by Egge) were installed to the block. The cam bearings are dedicated per location. This is straightforward, requiring aligning the bearing oil holes to the oil feed holes in the main saddles.

Once the bearings were installed, camshaft journal oil clearance was checked at 0.0015 inch on all three bearing locations.

The new ISKY flat tappet camshaft was carefully cleaned (removing any packaging surface protectant, dust, etc.). The cam was then lubricated using ISKY's supplied cam lube for all lobes, and Royal Purple Max-Tuff on all journals. The cam was carefully inserted, avoiding any nicking of the cam bearings. Camshaft free rotation was verified.

Note: the rear of the camshaft features a gear that drives the oil pump, and the front features a flange for mounting the timing gear and a nose gear for distributor drive.

CAM GEAR

The Egge camshaft timing gear was installed to the cam nose with four 5/16-by-24-by-5/8-inch hex head grade 8 bolts, along with an original Ford cam bolt locking plate.

The four mounting holes are not symmetrical, so the cam gear bolt holes will only align in one location. I applied a drop of threadlocker onto each bolt's threads, positioned the locking plate and installed the bolts, tightening to a value of 18 pound-feet.

Once the bolts were fully tightened, I bent the locking tabs against the bolt heads to prevent loosening.

Note: the aluminum center hub of the cam gear features a very slight interference fit to the mounting flange hub. Tighten the bolts evenly in a crisscross fashion to draw the hub onto the cam nose flange.

OUR CAMSHAFT SPECS

ISKY P/N 818800	
Grind No. 88	
Type: Solid flat tappet	
CAM LIFT	0.334" (intake & exhaust)
VALVE LIFT	0.320" (intake & exhaust)
DURATION	264 deg (intake & exhaust)
LOBE CENTER	108 deg
VALVE LASH	0.012" cold 0.010" hot

Note: ISKY offers several additional grinds for the 8BA flathead, including bumpsticks featuring 0.325" cam lift w/ 260-degree advertised duration; 0.364" cam lift w/ 249 degrees; 0.414" cam lift w/ 258 degrees; and 0.430" cam lift w/ 280 degrees (five grinds total for the 8BA engine).

VALVES, SPRINGS & LIFTERS

Once the camshaft was installed, each lifter was cleaned and lubed, coating the face with high-pressure lube (I used the cam assembly lube provided with the ISKY cam). I also coated the outer lifter bodies with Royal Purple Max-Tuff assembly lube.

The lifters feature hex-headed adjusters. Turn these in first, shortening the effective lifter length to avoid unwanted preload at the valves during assembly. The adjuster hex heads require a 7/16-inch wrench.

Note: the adjuster threads are tight on purpose, in order to prevent unwanted loosening during engine operation. Insert all lifters into



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The flathead design features valves in the block. Lube the assembly prior to insertion.



Once the valve assembly is inserted into the block, a retainer clip installs from inside the lifter valley to a groove in the valve guide. This keeps the valve captured in the block. A flathead-style manual valve spring compressor tool is used to compress the spring to allow installation of the clip.

their bores and rotate slightly to distribute the lube.

In order to install the intake and exhaust valves, you must first preassemble each valve. First, install a new sealing O-ring onto each guide. Then insert the valve into the guide, drop the valve spring and retainer over the stem, compress the spring (using a valve spring compressor tool) and install the keepers.

Slowly release spring tension and verify

that the keepers properly secure the retainer.

Lube the guide and O-ring seal and insert the valve assembly into the block. The O-ring will resist the entry a bit, so slight pressure will be required to fully insert the assembly.

Once the valve assembly is fully inserted, use the special flathead valve spring tool to pull the spring and valve assembly inward. Install the C-clip retainer onto the guide (into the clip groove on the guide body). Access inside the lifter valley is tight, so plan to use lots of patience.

CRANKSHAFT INSTALLATION

With the cam and cam timing gear installed, it was time to install the crankshaft.

First, the upper rear main seal must be installed. A cast aluminum rear seal housing (original Ford) seats into a register in the block. I applied a bead of Valco aluminum RTV to the outer radius of the housing and slipped the housing into the block. This was an easy fit with no interference issues.

Next, I carefully rocked the housing back-and-forth to achieve a just-below-deck position for each housing end relative to the block pan rail surface. Make sure each end is placed at the same depth: almost flush, but just below the surface.

I then allowed the RTV to cure for a few hours.

The upper seal was then installed into the



Lifters are lubed and installed into their bores prior to inserting the valves.



To adjust the valves, rotate the hex-headed adjusters. To prevent the lifters from rotating (adjuster-to-lifter threads are very tight), a special bracket holds a pair of lifters in place during the adjustment process.

rear seal housing. Instead of using the original-type white rope seals, I used square-profiled graphite braided seals, which are much easier to work with—graphite-impregnated and very flexible. Egge thoughtfully provided this improved rear seal in its very complete gasket set.

I placed the upper seal section into the rear seal housing, pressing it into the seal housing groove by rolling a clean socket wrench along the seal while pressing the seal into place (rolling it with pressure applied to a large-diameter socket wrench).

I centered the seal, leaving the same length protruding at each end. The seal is longer than needed and must then be trimmed.

Once the seal was fully seated into the housing, I used a new razor and carefully trimmed each end, leaving about 1/32-inch protruding out beyond the pan rail surface.

Next, the block main bearing saddles were again cleaned to remove any oils, as were the main bearing caps. The upper and lower main bearing shells were carefully cleaned and dried as well (remember, never place oil on the backside of a main bearing).

With the upper main bearings installed in the block saddles and the lower main bearings installed into their respective main caps, all bearing surfaces were then coated with Royal Purple Max-Tuff assembly lube, including



The cam gear installed with locking tabs to prevent bolt loosening. I also applied a dot of medium-strength threadlocker to the bolt threads.

the rear bearing's thrust faces.

With the crank timing gear installed, and after once again carefully cleaning and inspecting the crankshaft for absolute cleanliness, the crankshaft was laid onto the upper main bearings.

Note: since the cam gear was already in place, the cam and crank gears needed to mesh while the timing dots on each gear were aligned. With the cam gear's dot facing the bottom of the block, the crank was installed with its gear dot facing the top of the block.

The two dots must meet together. Once the block is rotated upright in its normal position, the cam gear dot is at 6 o'clock and the crank gear dot is at 12 o'clock).

Naturally, with the block upside-down on the stand, the cam gear was placed with its dot at an upright-view 12 o'clock position, and the crank gear was at an upright-view 6 o'clock position.

Once the dots were aligned, we made sure that the crank was fully resting on its upper main bearings. The rear of the crank may be tilted upwards just a tad because of the new rear main upper seal, but this will settle as you begin to install the rear main cap.

I applied ARP moly lube to the main bolt threads and under the bolt heads, and finger-tightened both bolts on each main cap.

I first began to tighten the rear cap, in order to settle the rear of the crank against the upper rear seal, tightening the rear cap bolts to a value of 10 pound-feet. I then snugged the No. 2 cap bolts to 10 pound-feet, followed by the front cap bolts at the same value.

I gently rotated the crank a few degrees after each pair of cap bolts were snugged. Because of the radius groove register design of the main caps, this helped to settle the cap alignments.

After all cap bolts were tightened to 10 pound-feet, I then rotated the block upright.

New original-style fiber-tooth cam gears are readily available.

With the weight of the crank on the main caps, I gently knocked the crank back and forth (front-to-rear and rear-to-front within the crank's endplay range), again to aid in main cap alignment.

I continued to tighten the main cap bolts, starting with the center cap at 20 pound-feet, the rear cap at 20 pound-feet and the front cap at 20 pound-feet. After each cap was snugged to this value, I gently rotated the crank a few degrees as before. I continued in this manner (second cap, third cap and front cap locations) to 30 and then to 40 pound-feet.

Once all cap bolts were tightened to 40 pound-feet, I then rotated the block upside down and continued my main cap bolt tightening. I tightened (in the same order as before) to 50 pound-feet, then to 75, then to 85, and finally to 100. I checked crank rotation after each tightening phase.

While the crank rotated easily with two fingers previously (without the rear seal), even with the seal in place, I rotated the crank using a beam-type torque wrench to check for rolling resistance. The beam needle hardly moved, with resistance at about a mere 4 pound-feet.

I realize that my main cap tightening procedure may seem like a bit of overkill, but I simply don't like the register design of the flathead main caps (it's not precise enough). I feel that gradually creeping up on final torque in this manner provides greater assurance of obtaining cap alignment relative to the crank centerline.

The result of my time-consuming procedure? The crank rolls like butter.

Next time we'll address the front crank seal, oil pump, rods, pistons and more. **TS**



MIKE MAVRIGIAN owns and operates Birchwood Automotive in Creston, Ohio, where he builds custom engines and street rods, and performs vehicle restorations. He has

written thousands of technical articles, as well as nine books on automotive technology during the past 30 years. Mike can be reached at (330) 435-6347 or birchwdag@frontier.com. Visit Birchwood's website at birchwoodautomotive.com.



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Piston ring seal is like soup—the rings must work with the cylinder bores, the pistons and the oil for the soup to be good.

THE HIDDEN VARIABLE

How piston ring seal is like good soup. // // // By Lake Speed, Jr.

“You can’t change what you can’t measure.”

— Paul “Scooter” Brothers
COMP Cams

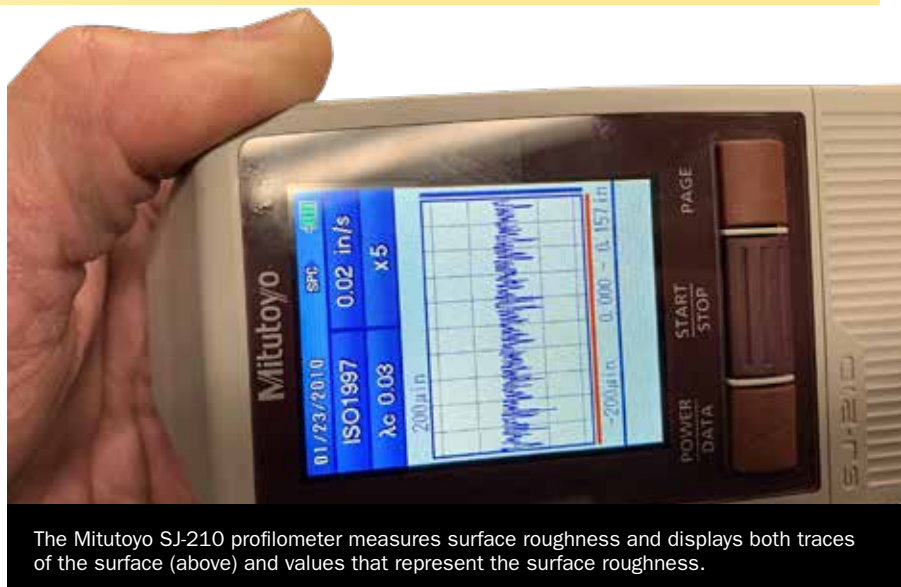
I have to admit that over the last 16 years of doing field technical support for engine builders around the world, I’ve seen situations where the outcome didn’t fit the known pieces.

Those situations have always bothered me, but over time I’ve come to learn that when the outcome doesn’t fit the known parts and pieces, you are most likely missing a variable (or two).

Piston ring break-in and the oil used for that purpose has been one of those areas with a fair number of puzzling outcomes—at least up until about 12 months ago.

For those that don’t know me, I spent 16 years working for Joe Gibbs Racing and then Driven Racing Oil. During that time, I also became a member of the Society of Tribologists & Lubrication Engineers (STLE).

Within STLE, I am a Certified Lubrication Specialist and Oil Monitoring Analyst.



The Mitutoyo SJ-210 profilometer measures surface roughness and displays both traces of the surface (above) and values that represent the surface roughness.

I also hold certificates in metalworking fluids, and gasoline and diesel fuels, so yes, I am a complete engine and chemistry nerd.

I joined Total Seal piston rings a couple of years ago, and that’s where things got really interesting.

You see, piston ring seal is like soup. It’s a combination of many ingredients that must all work together for the soup to be good. The piston rings must work with the cylinder bores, the pistons and the oil.

It’s a combination. It’s soup, not steak.

THE MISSING INGREDIENT

So, what does that have to do with hidden

variables? Simply put, cylinder bore surface finish is the hidden variable in *ring seal soup*.

I’m not talking about crosshatch angle. We can see and measure that. What I’m talking about is what we can’t see: surface roughness.

What does surface roughness have to do with ring seal soup? To properly answer that question, we first need to define proper lubrication using the 4 R’s.

Proper Lubrication is:

- Having the **Right oil** (defined as the correct type and viscosity of lubricant for the application)
- In the **Right place** (where the parts are located in the engine)

Here's an example of cylinder bore scoring due to insufficient lubrication. This was not the oil's fault, but was actually caused by poor surface finish—too much peak roughness and not enough valley depth.



- At the **Right time** (when the part needs lubrication)
- In the **Right amount** (enough lubricant to get the job done)

Motor oil is the gasket that seals the piston to the piston rings and the piston rings to the cylinder walls. This is where surface roughness comes into play. The valleys (aka Rvk) in the surface finish of the cylinder wall are what hold the oil in the right place, at the right time and in the right amount.

The hidden variable that affected lubrication, which in turn affected ring seal, has always been surface finish. Without a profilometer to measure surface finish, this variable remains hidden, because your eye can't see in microinches.

(Just for reference, 100 microinches equal 0.0001 inch. Keep that conversion in mind as we continue.)

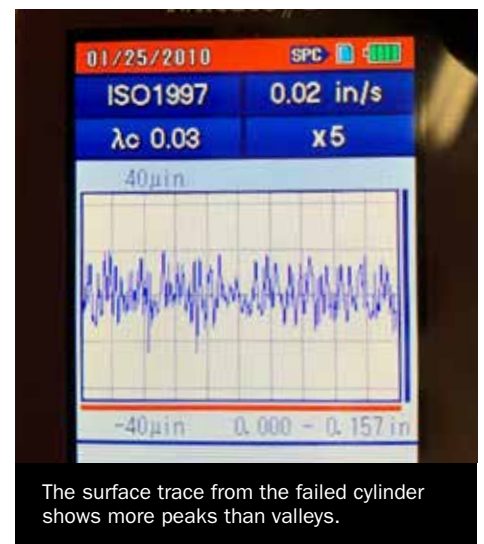
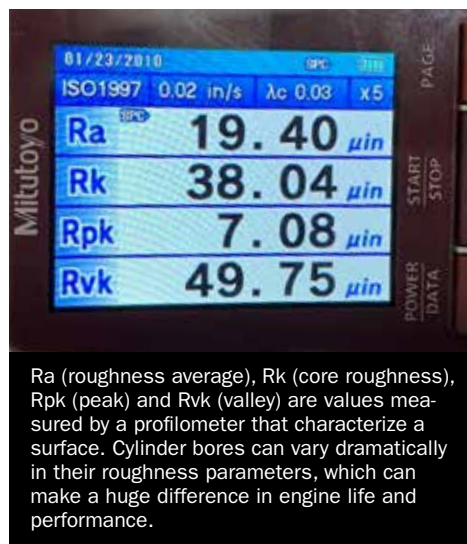
THE PROFILOMETER REVEALS THE SECRET

When looking at the graphical trace created by a profilometer, it becomes obvious that the majority of the valley in a good plateau finish is roughly 100 microinches deep.

Without enough valley in the cylinder wall finish to retain oil, ring seal soup will either turn out bad or spoil quickly.

As I have traveled around to engine shops over the past 12 months with my profilometer in my backpack, I've seen a wide variety of surface finish measurements. Between these field tests and actual dyno testing, the hidden variable is no longer hidden. You just need the correct tool to see it.

Here's an example: For several years, I wondered how a couple of shops had great success



The surface trace from the failed cylinder shows more peaks than valleys.

using a certain oil for break-in that would never work in the engines I helped build and test. In fact, I had actual engine tests with measured wear data that proved a drastic difference between the two oils in question.

So why could these shops use one oil (let's call it Oil A), but not the other (let's call it Oil B)? Why couldn't I use oil A but could use oil B?

The differences were actually twofold, but the common theme was surface roughness.

The shops successfully using Oil A had a completely different surface finish than my SBC dyno mule engine. There was a good reason for these wildly different surface finishes. While my SBC was a gray cast iron block, the other engine was a Nikasil-plated bore in an aluminum block.

These different bore materials required a different bore finish, which required a different oil chemistry to get the soup right.

Because Nikasil contains silicon nodules trapped in the metal matrix, it requires a smoother bore finish compared to gray cast iron. The smoother surface finish of Nikasil didn't need the powerful boundary layer

chemistry that the gray cast iron bores love.

At this point, you may be saying that the difference in bore material is a known and primary variable, so why bring up the secondary variable of surface finish? Well, because sometimes Nikasil engines respond well to the oil with the powerful boundary layer chemistry.

Why? It's because of the inconsistency of the surface finish.

When the surface finish is rougher, the rings are protected by the boundary layer lubrication chemistry, so the hidden variable that actually affects the soup is surface finish even over the cylinder bore metallurgy (at least in this case).

In conclusion, Scooter was right. You need to measure everything that can change the outcome of your soup. **TS**

LAKE SPEED, JR. is a member of the Society of Tribologists & Lubrication Engineers (STLE) and vice president of sales and marketing for Total Seal Piston Rings.



EFI Smart Coils

Holley Performance Products,

Bowling Green, Kentucky, presents EFI Smart Coils, available for late-model Ford Coyote and Mopar Gen III Hemi engines. The bolt-in ignition upgrades produce more spark energy while consuming less power without sacrificing voltage output. Engines receive a hotter spark at the plug to burn the maximum amount of fuel in each cylinder while using less power from the electrical system.

EcoBoost Piston Kit

MAHLE Motorsport, Fletcher, North Carolina, presents its Ford EcoBoost shelf-stock PowerPak piston kit, now available for 1.6L engines.

The kit can be used as a replacement in Ford Escape, Focus, Fusion, Fiesta ST and C-Max hybrid models to support power upgrades for grassroots rally racing or drifting. It is available in a 79.00mm bore size and has a slipper skirt-style forging that is strong and lightweight. The pistons have a phosphate coating to prevent micro-welding in the ring grooves and pin galling, along with a GRAFAL anti-friction skirt coating.



Coyote Aluminum Dry Sump Pan

Aviaid Oil Systems, Chatsworth, California, offers a Fabricated Aluminum Oil Pan for 5.0L Ford Coyote engines, 2011-current.

The new Coyote package includes the anodized aluminum pan with three scavenge ports, three AN -16 fittings with built-in stainless steel mesh filters, a combination windage tray and gasket, plus fasteners.



Bronco Sport Tuning

DiabloSport, Sanford, Florida, presents Performance Tunes for 2021-'22 Ford Bronco Sport 2.0L applications. Multiple tunes are provided on the Predator 2 7120, inTune 3 8145 and Trinity 2 9145 models, including specific 87-, 91- and 93-octane files. Gains on 93 octane reach up to 36 hp and 42 pound-feet of torque over stock.



Diesel Engine Oil

Hot Shot's Secret, Mt. Gilead, Ohio, presents its expanded line of Blue Diamond PAO Diesel Engine Oils, now with a new 10W-30 offering for heavy-duty use in diesel-powered vehicles. The oils utilize 100% polyalphaolefin (PAO) Group IV synthetic oil and high-quality Group V esters for a 100% synthetic formula.



LS-Specific Pistons

United Engine & Machine (UEM), Carson City, Nevada, presents new Pistons for LS-

based blocks in both its factory-replacement Silvolite and performance-built Icon series. Icon Premium series are designed to handle big boost applications and come standard with a Type 3 hard-anodized top ring groove and crown, along with 1.2mm, 1.2mm, 3.0mm steel top ring sets.



Wastegate Heat Shield

Design Engineering Inc. (DEI), Avon Lake, Ohio, presents a Wastegate Heat Shield that reduces under-hood temperatures. Featuring high-tech composite materials with superior thermal insulating properties to help turbos run more efficiently, the lightweight wastegate shield can be paired with a DEI Turbo Heat Shield for total turbo system coverage. Thermal protection starts with a Titanium LR Technology outer layer encasing multiple stainless steel and silica inner layers. Stainless mesh and thread ensure durability, even on the hottest engines.

Duramax Tuning

Edge Products, Ogden, Utah, presents its Pulsar tuning device for 2017-'22 GM 6.6L Duramax L5P applications. Delivering emissions-friendly performance gains, the system uses steering wheel controls to change power levels while driving. The in-line computer connects directly to the vehicle PCM, with no additional wiring harness, to control throttle response, mileage, tire size calibration, fueling, high-idle and more. The active power level (0-5) is displayed using the speedometer gauge. **TS**



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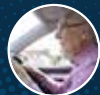
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Performance & Protection: An Armored Aston Martin

Specialized armor is a small-but-interesting market niche. Now, an upfitted Aston Martin is showing the potential of combining performance and protection.

AddArmor by Quality Coachworks recently added an armored Aston Martin Vantage to the company's growing list of high-performance armored vehicles. Incorporating the latest advancements in lightweight bulletproof armoring technology, the new AddArmor Vantage demonstrates how vehicle armoring technology can be expertly applied to the exotic car category, according to the company.

"Almost every car break-in features smashed glass, which is nearly impossible on a vehicle like this Aston Martin Vantage that has ballistic glass installed," notes Pete Blaber, AddArmor CEO and a former U.S. Army Special Operations veteran. "The

Anti-Intrusion Protection Package protects the vehicle's occupants from criminals and other dangerous potential intruders."

The Vantage incorporates AddArmor's B4 level of armoring, designed for protection without sacrificing vehicle performance, due to its overall lighter weight compared to ballistic steel. In total, the Kevlar armoring adds 450 pounds to the stock vehicle, according to the company.

Included in the package is transparent bulletproof glass in the windshield and door windows, and AddArmor's B4-level composite materials in the doors.

Once the armoring process was complete, technicians updated the Vantage's suspension to compensate for the added weight.

Other additions include a blast-resistant hardened steel roof, a blast-resistant hardened steel shield protecting the fuel tank, and an armored firewall featuring light-

weight composite materials.

AddArmor also incorporated four custom high-end run-flat tire inserts, covers to protect the exhaust tips and electric shock door handles.

"We are dedicated to keeping everything and everyone inside our vehicles safe and secure," Blaber says. "Incorporating our lightweight armoring on this Vantage was of the utmost importance to us because speed is an incredibly valuable asset in dangerous situations out on the open road."

AddArmor by Quality Coachworks offers the opportunity to armor any vehicle, from everyday SUVs and vans to rare exotics. The company's Anti-Intrusion packages are designed to stop large-caliber handguns or window smashing with blunt weapons, transforming vehicles into mobile safe rooms. **TS**



A protection package for an Aston Martin Vantage from AddArmor by Quality Coachworks shows how even exotic vehicles can be made safer and more secure. (Photos courtesy AddArmor)



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