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Suppliers team up with other suppliers, automakers to reach goals


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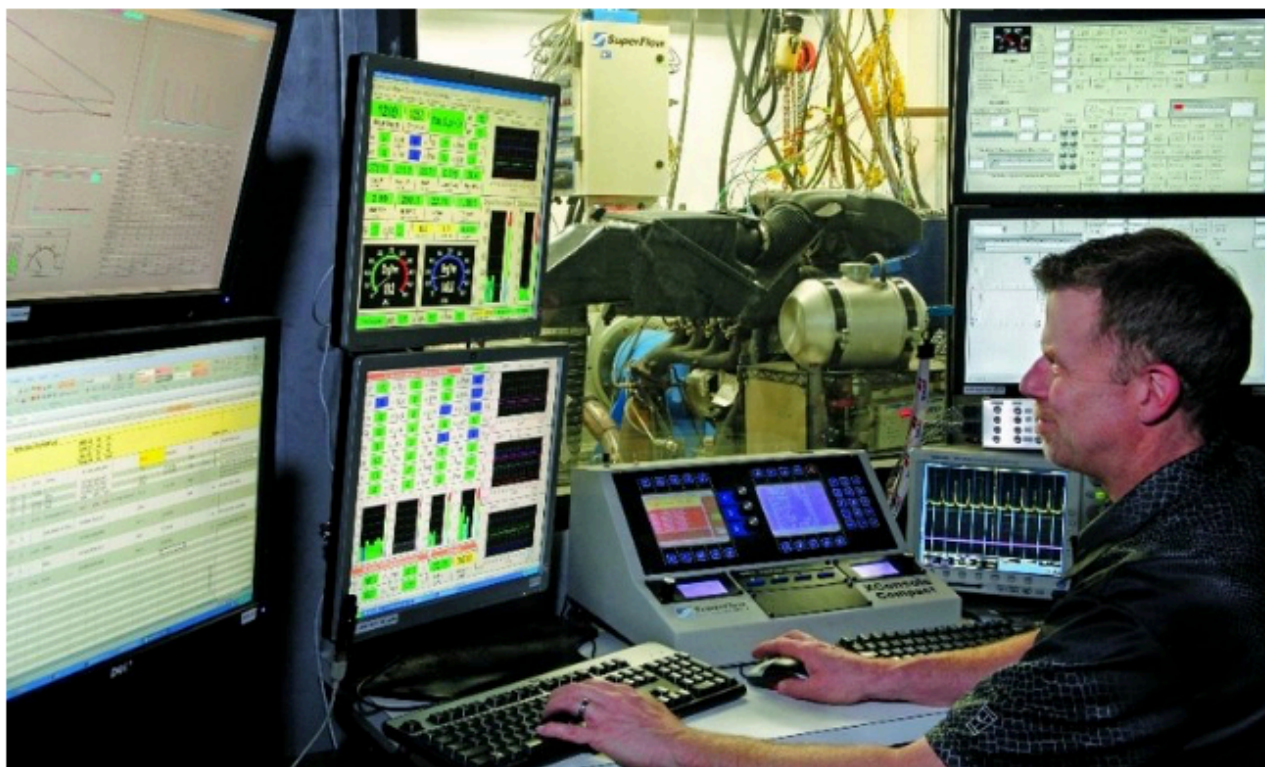
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Tula Technology's Engine Lab Manager Chris Chandler monitors an engine on the dynamometer.

The redesigned Toyota Supra sports car that went on sale last fall has won rave reviews for its stellar handling. The GMC Sierra pickup with a V-8 engine rates among the most fuel-efficient pickups on the road. The 2020 mid-engine Chevrolet Corvette is built with an industry-first super-lightweight curved carbon-fiber bumper beam.



To get its innovation to market, Tula partnered with Delphi, which moved the technology to the Silverado.

The biggest reason for the trend? Industry disruption and transformation.

There has been tumultuous change as the automobile is morphing from a manually operated, fossil-fuel combustion-powered vehicle to one that runs on electricity and can drive itself. That change is partly behind the team approach to technology development.

At the same time, the industry is perfecting exotic new materials, harnessing artificial intelligence, processing vast amounts of data and electrifying traditional mechanical systems. And parts makers often don't have the in-house expertise to master the new fields.

An idea from the valley

Tula Technology, a Silicon Valley startup founded in 2008, created the next generation of cylinder-deactivation systems using technologies borne out of advanced signal processing, algorithms and controls. But to get those new concepts into the auto industry, Tula partnered with both an established supplier, Delphi Technologies, and an automaker, General Motors.

Traditional cylinder cutoff systems simply switch off a set number of cylinders when a vehicle reaches cruising speeds. Tula's system measures the driver's demand for power and fires only the number of cylinders needed. A V-8 could run on, for example, two cylinders in some situations. The resulting fuel savings in the GMC Sierra can be as much as 15 percent, Tula claims.



Bailey: Tula needed resources and help

But Tula could not deliver a drop-in system for auto industry-scale production, Bailey told *Automotive News*.

"We knew we needed the resources, help and experience of a company like General Motors," Bailey said.

"We're a small company, about 64 people. When we approached GM, we were about half that.

"We were pretty good at controls and algorithms, and we had a pretty good blend of automotive and Silicon

Valley expertise that helped us see

some new possibilities. But to really implement those in high volume in the auto industry, it was going to take resources that we didn't have access to."

Those are typically resources that automakers and large suppliers have, and they are key to turning innovative ideas from a young company into partnerships that can bring new technologies to market, Fream said.

"It's a whole other situation to take some of the new technology and software development happening in nontraditional, perhaps startup organizations, and scale it into something that can be manufactured for hundreds of thousands of vehicles," Fream said.

"Some of these newer startups and software companies don't have the experience to do that. So partnering with a larger supplier enables them to get that product to market successfully. You are seeing more of those kinds of partnerships. Suppliers are looking for that kind of innovation as they address the needs of the OEM."



Ohlins Racing came under the wing of Tenneco's DRiV Division to spread its performance technologies.

Ohlins Racing AB is a Swedish company whose name is well known among motorcycle racers and competitive mountain bike riders and in the motorsports racing industry. For the past 20 years, it has been working with Tier 1 supplier Tenneco Inc. on high-performance shocks, springs and other suspension parts. On the Supra, Ohlins is

largely responsible for the car's suspension system. A little more than a year ago, Tenneco bought Ohlins and it has become part of the company's DRiV division.

Henrik Johansson, general manager of the advanced suspension technologies group at DRiV and CEO of Ohlins Racing AB prior to the Tenneco acquisition, says his company needed Tenneco help to make its high-performance suspension hardware affordable.

"What Tenneco brings to the table for us is the buying power, the global footprint in manufacturing and the mass production approach that we for sure didn't have," Johansson told *Automotive News* from Sweden. He also said working with Tenneco helped Ohlins learn how to design more robust products with higher quality, and how to save costs.

In the Supra, Ohlins engineers developed the actuator for the continuously variable shocks, while Tenneco designed and manufactures the triple-tube shocks that use them.

Johansson says Tenneco was "the perfect match" to take the Ohlins brand to the next level while still keeping it a premium

"We don't want to be the mass-production brand. We should be the niche company that sits on the R models and the S models and develops new technology," he said.

The company's current projects are developing the suspension system hardware for Volvo's Polestar brand of high-performance vehicles.

A lighter tail for Corvette

From its new and simplified electrical architecture to its fast-shifting eight-speed automatic transmission, the flashy new midengine Chevrolet Corvette is bristling with new technology. But there's one piece of high-tech innovation on the car that has no moving parts and can't be seen. It is a weight-saving game-changer that engineers from Chevrolet and Shape Corp. of Grand Haven, Mich. treated with the same gravity as the car's 495-hp midmounted engine.

It's the curved carbon-fiber rear bumper bar mounted to the frame rails.

Shape's engineers, working alongside their Chevrolet counterparts, perfected the technology that created the curved pultruded beam for high-volume production — an industry first. The bar sits behind the rear fascia and helps protect the frame rails, trunk and other parts of the car in a rear-end collision.

Most carbon-fiber components are extruded, or pushed through the die that makes the part. The Corvette's pultruded bumper bar is pulled through the die, a manufacturing process designed for carbon fiber and resin.

Toby Jacobson, plastic and composites engineering manager at Shape, said the company was in the process of developing the technology to produce the curved carbon-fiber bumper bar. But when Corvette engineers decided it would be a perfect fit for the car, the project took off.

Jacobson said GM brought expertise in design for manufacturing, computer-aided design and carbon fiber, while Shape's knowledge in materials and energy management blended well with GM's.

"They were committed," he said. "We got a lot of support from their materials team to get it approved. GM was very accessible. The testing took a lot of time, but they opened up their lab and did a lot of the materials testing and got it done very quickly. There was genuine enthusiasm from their point of view."

On the previous-generation Corvette, the rear bumper was made of aluminum and weighed about 8.5 pounds. The carbon-fiber bumper bar, which Shape manufactures and delivers to GM, weighs about 2.8 pounds. Jacobson said the previous aluminum version was not optimized for weight. On a high-performance sports car, every ounce matters because weight affects acceleration, handling and braking.

During the reveal of the midengine Corvette last summer in an old blimp hangar in Tustin, Calif., the Corvette's chief engineer, Tadge Juechter, took the rare step of calling out the unseen back-end component.

For project partners at the marketing event, the shout-out was a thrill.

"It's not the sexiest part of the vehicle," Jacobson admitted. "Consumers are not looking at that when they are buying the car."

But speaking of what was achieved through the partnership, he added, "It was pretty rewarding to all of us who worked on the car to hear the bumper being recognized."