All around the world, there is a demand for quieter cars.

A QUIETER FUTURE

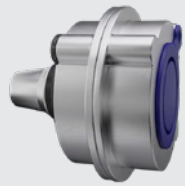
THERE'S A GOOD CHANCE THAT THE CAR IN YOUR GARAGE RELIES ON A PRODUCT PROVIDED BY TRELLEBORG TO ACHIEVE QUIETER OPERATION OF BRAKES. THOUGH ALREADY A GLOBAL MARKET LEADER IN TECHNICAL LAMINATES, TRELLEBORG IS STRIVING FOR NEW SOLUTIONS REGIONALLY.

TEXT DANIEL DASEY **PHOTO** GETTY IMAGES

Concepts of damping

Trelleborg combines polymer and metal to help solve noise and vibration challenges.

Shims/Insulators
Unique rubber-to-metal composite materials solve noise and vibration issues.



Tuned Absorbers
A cost-efficient solution for low frequency brake noise – moan, groan and squeal.

Right:
Americans have a special bond with their vehicles, reflected in a remarkable aftermarket dominance in the sale of replacement brake components.

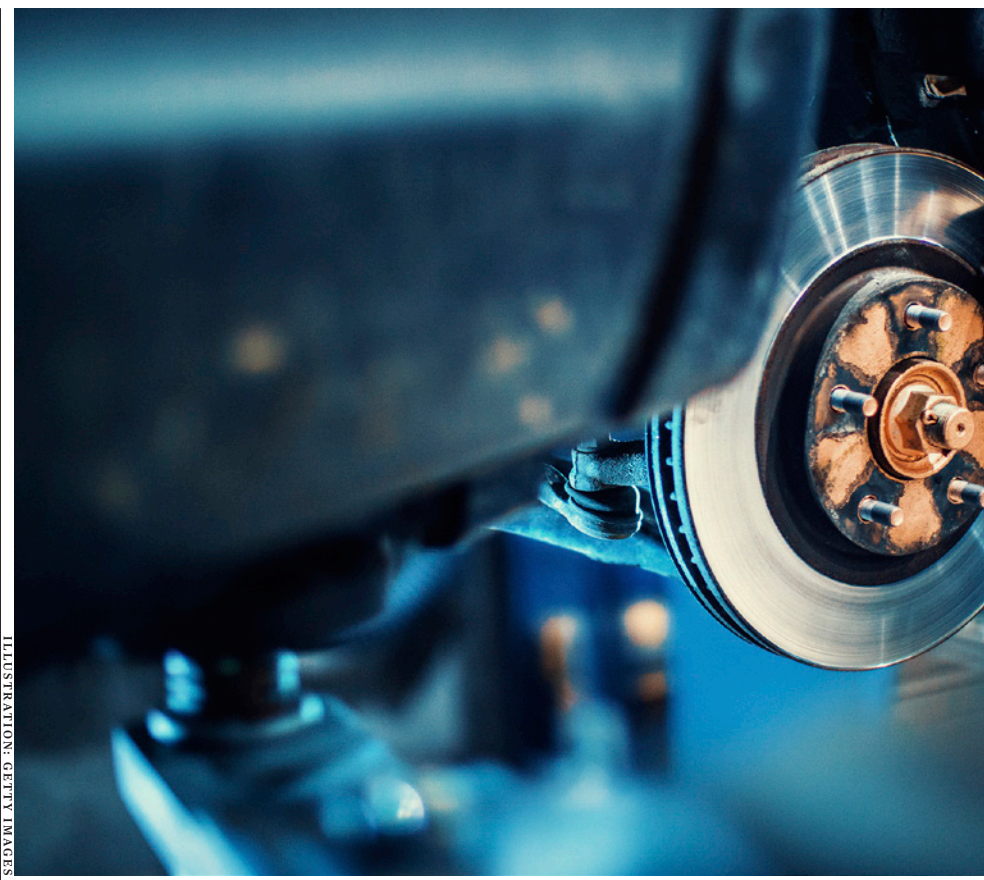


ILLUSTRATION: GETTY IMAGES

Modern passenger cars are heavy objects. When a driver makes the decision to brake, close to two tons of steel, glass and rubber need to be brought to a halt in a matter of meters. The fact that today's vehicles can perform this task with minimal shaking, noise, and disruption to passengers, relies on good brake design – and very often Trelleborg's Technical Laminates.

One major application for the technical laminates are noise damping shims that sit between the brake pad and caliper in disc brakes. Attached to the friction pad backing in the brake mechanism, such shims can help to significantly reduce vibration during braking, delivering the smooth ride that modern drivers expect.

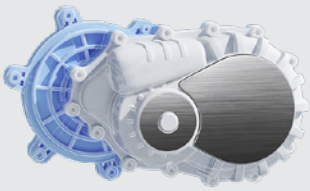
While some market drivers and trends are global, those related to the technical laminates vary worldwide.

People in the United States have a unique relationship with their vehicles, thanks to long driving distances and a historically strong automotive manufacturing base. The market for replacement brake components is also unique, with a far higher proportion sold via aftermarket retailers, as opposed to Original Equipment Manufacturers (OEMs), than in the other regions.

"Traditionally, people saved money by going to aftermarket retailers, picking up parts and doing repairs themselves," says John Bennett, Regional Manager for North and South America for damping solutions. "Today, brakes are far more complex, and it's more difficult for individuals to do repairs, but the local market still has the same reliance on aftermarket retailers, as this is where repair and maintenance very often source parts."

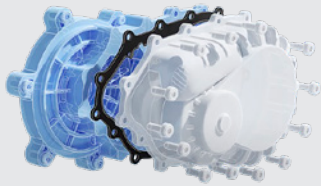
The Trelleborg team in the US is typically a third- or fourth-tier supplier to the automotive industry, working with everyone from friction material to brake component manufacturers, aftermarket retailers to OEMs. Test equipment includes ten

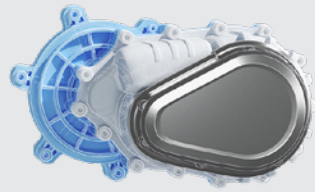
John Bennett,
Regional Manager for North and South America for damping solutions.



Structural damping
The high loss coefficient of metal to polymer materials reduce structural vibration.

Vibration isolation
Metal-to-polymer materials effectively isolate a structure from vibration sources.





Noise encapsulation
Shapes formed of metal-to-polymer materials encapsulate the surface of a structure preventing noise transmission.

"Traditionally, people saved money by going to aftermarket retailers, picking up parts and doing repairs themselves."

John Bennett, Trelleborg

dynamometers (dynos) that allow the noise solutions requested by customers to be evaluated and assessed under close-to-real-life operating conditions.

Over 30 years in the United States, Trelleborg's noise damping brake shims have grown to become market leader.

Bennett says three key pillars have driven this growth: team, product and service. "We have a really good team, not just in our region but across the globe," he says. "We also have a highly engineered product that meets or exceeds the demands of the marketplace. What ties it all together is our service. From our dyno testing to delivering samples same-day and more, we go above and beyond for our customers."

A key challenge in the Americas going forward will be the way electric vehicles (EVs) are reshaping the use and lifespan of brakes. With regenerative braking in EVs reducing brake component wear, there may come a time when one set of brake pads lasts the vehicle's entire life. In the meantime, Bennett says, the quieter operation of EV motors is creating additional demands on OEMs to optimize noise reduction within such vehicles.

The team is also looking for opportunities for its vibration damping technologies in other sectors. "A few that come to mind are the aerospace market and the motors used in household appliances and industrial applications," he says.

Unlike the US market, most brake replacement parts sold in Europe go through OEM channels. Alessandro Baggi, OE/OES Shim Director Europe, says only about 20 percent of Trelleborg's vibration damping shims in the region end up in aftermarket channels.

"I see the European automotive market as a little bit like an incubator, where new ideas and trends are created," says Baggi. "China and the US both have bigger volumes than Europe, and they move much faster. But we're creating many of the ideas that end up in production."

TRELLEBORG NOISE DAMPING PRODUCTS

Trelleborg manufactures a wide range of noise damping shims and insulators for use when endurance against thermal, chemical and mechanical stress is required.

Solutions for brakes include shims, slippers, piston clips and sliding clips.

Advanced laminate solutions reduce noise and vibration in a range of automotive applications, including inverter covers, valve covers, chain covers and oil pans, as well as in nonautomotive sectors.

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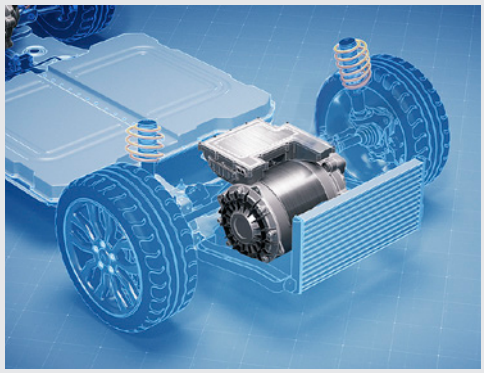
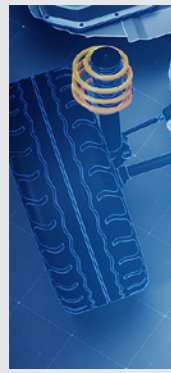
No more noise

Specially engineered damping materials minimize vibration and noise.



Applied Damping Material
ADM provides superior damping of structure-borne noise and can be cut and formed to fit most surfaces.



Trelleborg products are market leaders in Europe, and Baggi says a number of factors are driving the success there.

"In terms of shims, our success comes down to winning as many projects as possible," he says. "We need to be present to win this work. Meanwhile, in terms of technical laminates, our success relies on finding new applications where they can be of use." Baggi says the biggest trend affecting the European vibration damping business is the electrification of vehicles.

"We have been asked to increase the damping of the material for shims and other components at low temperature because in EVs the braking system is cooler," he says. "The next phase is to create new rubbers with the same lower temperature damping characteristics and to produce stronger shims, because more stress is now being applied to the brake pad."

Baggi believes one potential opportunity moving forward may be supplying materials to help lessen vibration within drum brakes.

"Drum brakes are an old-fashioned way of braking," he says. "However, the new Euro 7 emission standard means that vehicles can't pollute by spreading dust. The drum brake is a good solution to this because the brake is closed. They are already being used by manufacturers, and we are looking for ways to try to damp the noise that they make."

Alessandro Baggi,
OE/OES Shim
Director Europe

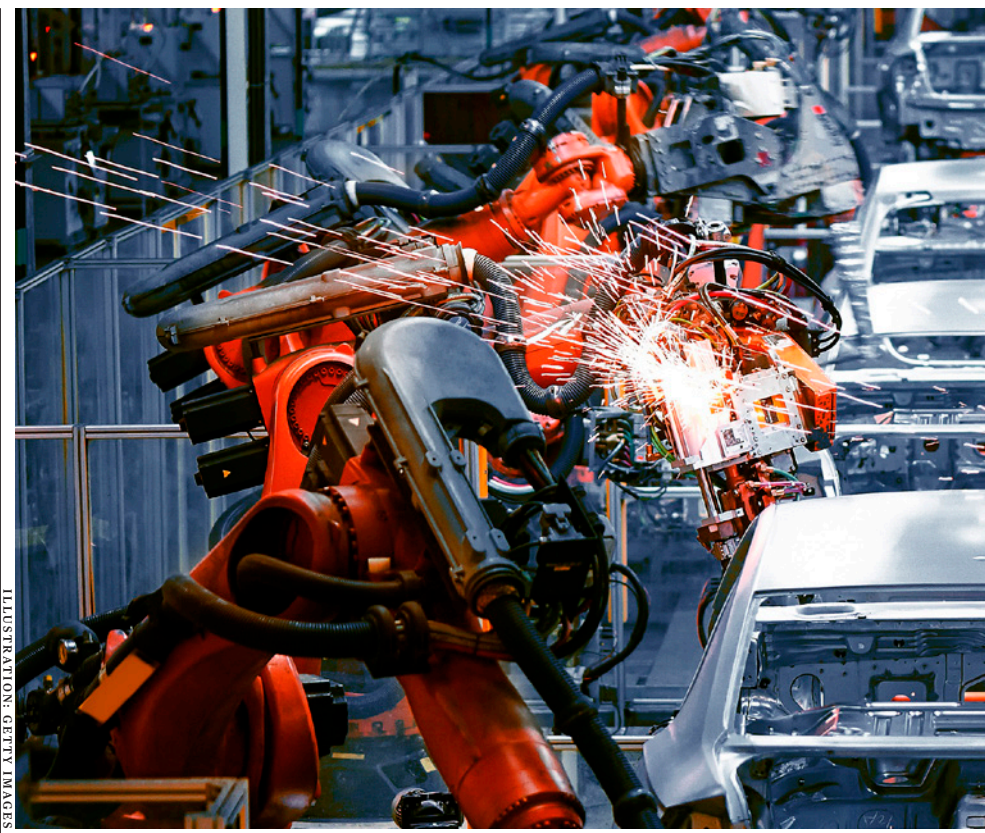
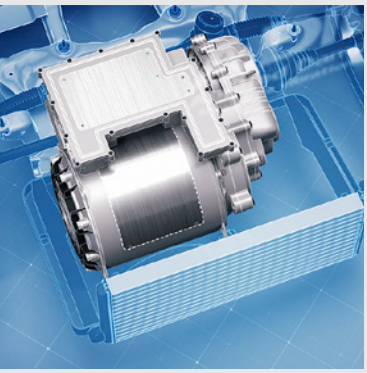


ILLUSTRATION: GETTY IMAGES

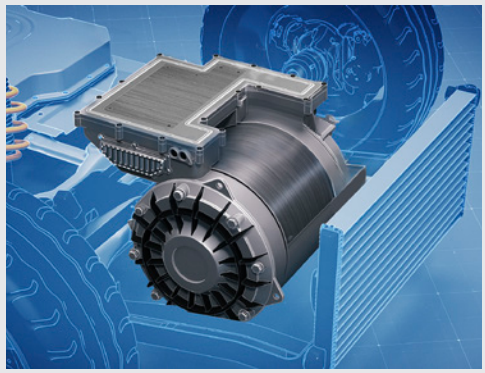
ILLUSTRATION: TRELLEBORG

Left:
The biggest trend affecting the European vibration damping business is the electrification of vehicles.

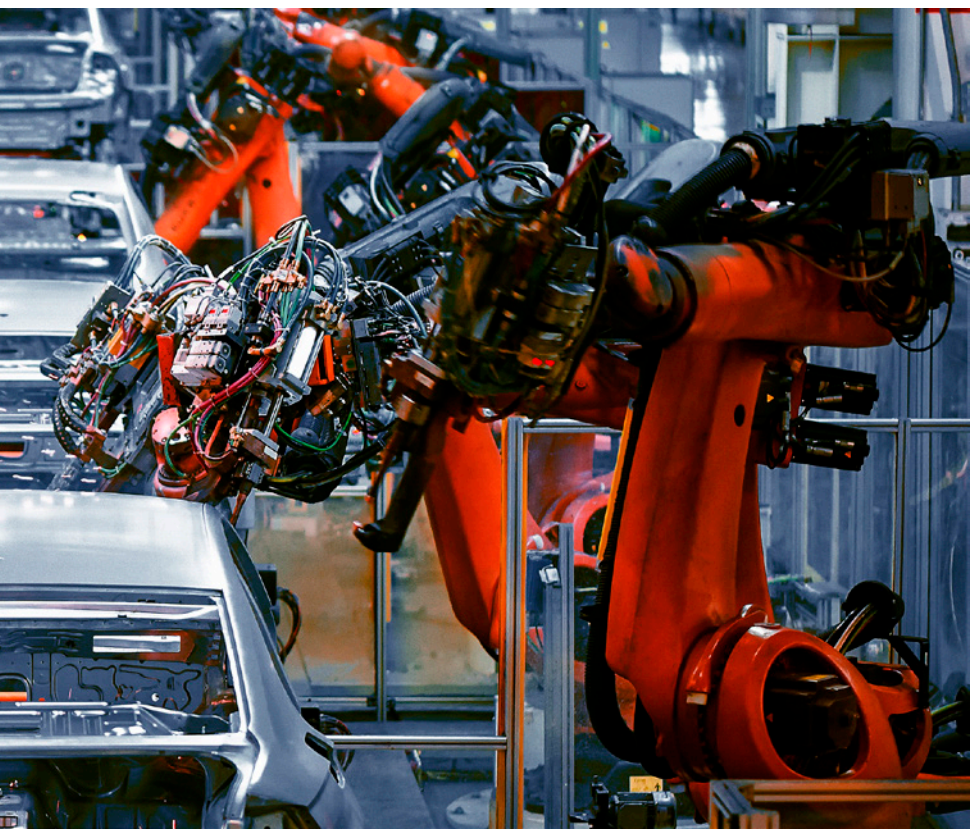
Above:
In China, 27 million cars were sold in 2022. Local brands compete with international companies.

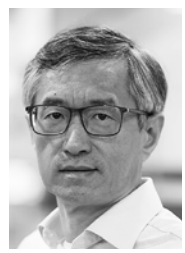


Applied Damping Foam
ADF reduces structural-borne noise by combining damping and isolation.



Visco-LAM and Duru-LAM
Both are sandwich materials comprising two metal sheets laminated with a viscoelastic polymer layer. They are used to replace resonant components.





Weidong Yao, General Manager for damping solutions in China.

“We have eight dynos in Shanghai that let us work with customers on noise testing to find solutions.”

Weidong Yao, Trelleborg

Weidong Yao, General Manager for damping solutions in China, says the Chinese automotive market is large, fragmented and very competitive. As well as local Chinese auto makers, many international brands are based in the country. The Chinese domestic automobile market is the largest in the world, with nearly 27 million cars sold in 2022.

Yao says that while competition is fierce, the diversity of the market has worked in the favor of Trelleborg in recent years.

“Our business sales trend has been very strong. That’s due to the work we have done developing the business here and also due to the strength of local Chinese brands. They keep on growing and getting a greater share of the Chinese market.”

He explains Trelleborg has steadily grown to become a market leader in shims and vibration damping solutions for brakes and other vehicle components in China.

Yao says the key drivers for the business in China are the strong local market, the strength of the product and the hard work of the sales team.

“This work is supported by strong R&D,” he says. “We have eight dynos in Shanghai that let us work with customers on noise testing to find solutions.”

Yao says Chinese auto buyers, more than in many other markets, are embracing electric vehicles. While this may slowly reduce requirements for shims, he sees great potential for selling technical laminates that reduce noise and vibration in other parts of EVs.

“One problem with EVs is the noise generated by the inverter in the electric driving system and also the electric motor,” he says. “These often have custom aluminum covers that work like speakers, increasing the noise level. By putting a piece of applied damping material on top of the cover and bonding it, we can significantly reduce that noise.” ■