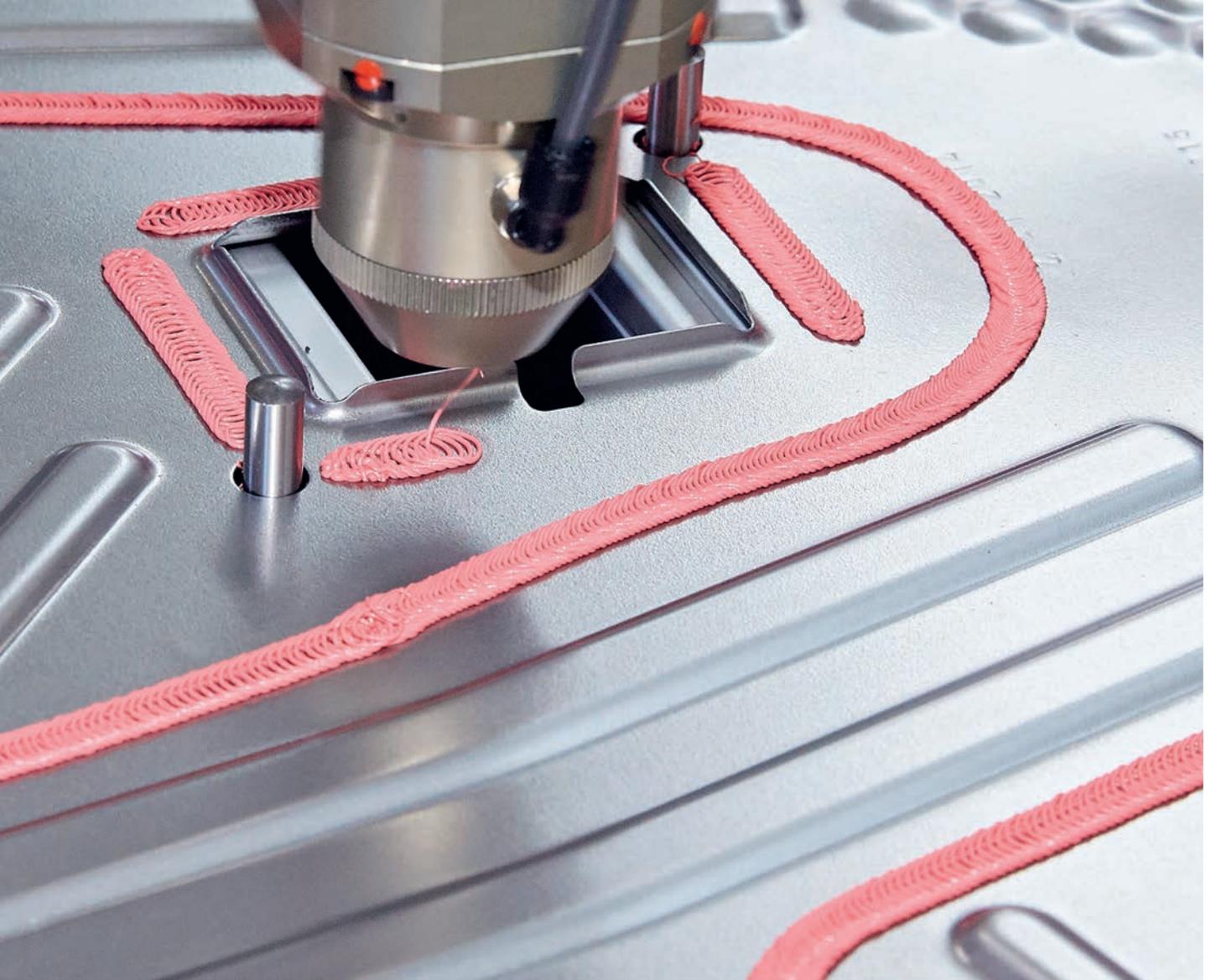


THE LIGHTWEIGHT, ELECTRIC FUTURE OF CARS

The automotive industry is in transition, where processes need to be flexible, materials light in weight and the end product increasingly propelled by electricity.

TEXT BJÖRN RAUNIO PHOTO ATLAS COPCO



THE ONGOING EFFORT to fight climate change is having an important impact on the automotive industry today. Breakthroughs in battery technologies in combination with various governmental initiatives are driving a change from fossil fuels to electric cars.

In a study from 2017, McKinsey predicts that by 2030 about 22 % of the vehicles being produced will be pure-battery electric vehicles and 18 % some kind of hybrid vehicles. The remaining 60 % will still have internal combustion engines, but the shift is nevertheless huge.

Regardless of which power train is being used, another important objective for the industry is reducing the weight of vehicles. For traditional cars, this is a key factor for reducing CO₂ emissions. The heavier the car, the more fuel it will consume. Since range is an issue for electrical vehicles, and the weight of batteries is considerable, there is also a big incentive to find ways to make these cars as light as possible. Both of these factors push increased use of lightweight materials such



Nicklas Tibblin, Vice President Marketing, Industrial Technique.

10%

Today electric cars and hybrids represent less than 5 % of the global market. The forecast for 2020 is over 10 %.

as aluminum, carbon fiber composites and high-grade steel.

Nicklas Tibblin, Vice President Marketing, says these developments create new business opportunities for Atlas Copco.

“Today, electric and hybrid cars only make up a few percent of the global car production,” he says. “There is a lot of work to be done, and technologies have not yet stabilized. We understand that our customers in the automotive industry are facing major challenges with developing their processes and techniques. They have a new need for flexibility in the factory, which is something we have understood and are supporting with our product portfolio.”

The immature state of the technology means that new concepts and models are being developed all the time. Every car manufacturer is working with a range of different power trains and materials. No one knows for sure which concepts will win in the end. Therefore investment cycles are shorter. Companies invest in smaller, more





Atlas Copco Industrial Technique is a pioneer in riveting.

flexible plants with the ability to quickly change or adjust lines of production.

“To achieve flexibility you need to have equipment optimized for change,” Tibblin says. “You want to eliminate as much hardware as possible. Here, Atlas Copco’s range of battery-powered tools allows customers to get rid of controllers. This makes a transition much faster and easier. Also, the connected, smart tools we have been providing for more than 15 years can help the operator quickly adapt to a new process, since the tool will help you do things in the right order.”

THE INCREASED USE of new materials also means that car manufacturers must come up with new assembly processes.

“Some years ago there was a strong belief in carbon fiber composites and aluminum taking over more and more, but the trends have turned back a little,” explains Andreas Kiefer, Vice President, Business Development. “Now we are actually seeing a bit of a comeback for steel car bodies, with aluminum being used where it really counts, in specific parts or in enclosures. But the steel is now very high-grade and sheets are thin.”

Manufacturers also use flexible designs, where more steel is used in some markets and more aluminum in others. Combining different materials presents new challenges when it comes to joining. Joining steel to aluminum and fixing composites to aluminum in a secure way can call for new equipment and solutions.

“Change is always challenging, but translates into new opportunities for us at Atlas Copco,” Kiefer says. “It is key for us to be fast and adjust our R&D to shifting trends. Most of all in Asia the paradigm change toward electrification of the drive train is going very fast. Our advantage is



Andreas Kiefer, Vice President Business Development, Industrial Technique.





New materials means that car manufacturers must come up with new assembly processes.

that Atlas Copco is a one-stop shop within technologies for joining and fastening. We cover all of them and have an incredible experience and knowledge in this area. Understanding the customers' full process, we can support them even within research and development."

One example of this is how Atlas Copco has created a team of fastener development engineers whose role it is to work with customers to understand their current and future needs and develop solutions to meet them.

One focus is on developing new rivets and riveting methods for joining high-strength steel and ultra-high-strength steel to high-strength aluminum. A flagship technology is the fully tubular rivets developed for riveting three or four layers of high-strength 6000 series aluminum alloys. The tubular rivet range is currently being expanded to cover a wider range of joining solutions, such as smaller-diameter rivets for joining narrower flange widths to reduce the amount of sheet metal employed and increase interior cabin space. Another example is leading expertise in adhesive bonding technology, which can be used in addition to traditional welding to help lower the overall weight of automobiles.

"Our aim is to offer a range of joining solutions to enable high-strength materials to be used in the most effective places," says Paul Briskham, Fastener Technology Group Manager. "Customers have informed us that one of the biggest growth areas in mass-volume car assembly is the introduction of cast aluminum suspension shock towers. Our next new rivet that will be released in 2018 has been developed in response to this."

The rise of electric power trains also creates new joining needs connected to battery manufacture and assembly.

"Batteries become an integrated part of the vehicle structure, and lithium ion cell assembly is safety-critical," says Roy Chen, Global Electric Vehicle Segment Leader. "In every step of the assembly process you have to use smart and secure joining technologies. We can supply all technologies and develop unique solutions that the manufacturer needs."

Atlas Copco has come up with innovative ways of handling all types of joining within the battery pack.

"One of our most important strengths is our capability to work directly with our customers in this way," Tibblin says. "We are familiar with their assembly processes, we know the best practices and can supply them with a lot of knowledge in their production." ■

A one-stop shop

- Atlas Copco offers smart and battery-powered assembly tools and equipment optimized for flexibility
- One-stop shop within specialized technologies for joining and fastening different materials in a secure way
- Support in process development and R&D
- Joining solutions for battery manufacture and assembly.



Roy Chen, Global Electric Vehicle Segment Leader, Industrial Technique.



Paul Briskham, Fastener Technology Group Manager, Industrial Technique.