

## Steel Vehicles of the Future

Steel in the automotive industry. Steel has been one of main materials used to manufacture automobiles for well over a hundred years. Nowadays, as ‘personal mobility’ is undergoing profound changes, steel offers multiple solutions for the cars of tomorrow.



What will happen to cars, one of the most commonly used modes of transport, in the near future? What does the future hold for the steel that has been used in the automotive industry for more than a century? In a recent study, commissioned by WorldAutoSteel, the automotive division of the World Steel Association, analysts identified several areas of development for this segment of the global industry.

The main driving force of change will be activists campaigning against global climate change with new requirements for car manufacturers aimed at reducing CO2 emissions. The response to the challenges posed by climate change will be, on one hand, fast-paced progress in the automotive market and, on the other hand, customers turning to new mobility models (e.g., car sharing and mobile services). In simple terms, the public demand for cars in the future might look like this: more passengers need to be transported by fewer cars with minimal CO2 emissions. Researchers believe that steel will continue to play a big role in this transformed model as it did before.

### Steel electric vehicles

The demand for automotive steel is expected to keep pace with the growth of the global car market. According to Reuters, global automotive giants intend to invest the massive sum of more than US\$300 billion in electric vehicles over the next decade. A bit less than half of this amount will be invested in China, where the government provides stimulus measures to encourage the manufacture of electric vehicles and batteries for them.

Of course, car manufacturers could have opted for increasing the use of lightweight, yet costly aluminium in order to reduce the weight of electric vehicles. Innovations in the manufacture of batteries enable car manufacturers to not do this. It is worth remembering that metal structural parts, like the body and chassis, account for up to 50% of a car’s weight and the transmission for another 25%.



Moreover, the modern high-strength steel that is used in the manufacture of internal combustion engine vehicles can just as easily be utilised for electric vehicles: its use has allowed the automotive industry to reduce the weight of existing models significantly.

High-strength steel has already made it possible to reduce the average weight of a vehicle sold in the US over the last decade. And this is despite the fact that the share of trucks in overall sales has grown dramatically over the same period, from 40% to 70%.

A similar effect has already been seen in the electric vehicle segment. Small, two-seat electric vehicle models are gradually becoming a thing of the past. Analysing the pace of development of battery technology and changes in car weight, experts expect the market to offer electric vehicles in all sizes in the near future.

Therefore, the amount of steel used in future cars will be more correlated with their size rather than the energy source of the engine. At the same time, as the production of electric vehicles increases, how steel is applied in their production may change. This mainly concerns the battery cases for such vehicles. It is steel that can provide inexpensive and reliable protection for electric vehicle batteries.

### **Advanced high-strength steels for vehicles**

Advanced High Strength Steels (AHSS) are another area the global automotive industry is counting on. AHSS are complex materials specially engineered to satisfy the most stringent requirements of consumers and car manufacturers for modern vehicles. This

[steel for automotive applications](#)

is uniquely light and strong enough to be an ideal choice for the manufacture of a safe, environmentally-friendly and affordable vehicle of the future. In recent years, AHSS have been the fastest growing automotive materials, according to WorldAutoSteel estimates.

Let's look at safety issues separately. The response of road users during a car crash, which can happen in just 67 milliseconds, often does not play a decisive role. One has to pin all hopes on the design of the car and behaviour of materials during an accident. Nowadays, the global steel industry is working to create new generations of AHSS with improved properties ensuring safety for car drivers and passengers in the event of a road accident.



Interestingly, in line with the wishes of their customers, steel companies offer car manufacturers not just an AHSS sheet, but a comprehensive vision for its future use.

For example, as part of the UltraLight Steel Auto Body (ULSAB) programme, participants developed a design for an ultra-light steel auto body structure. To implement the ULSAB initiative, 35 steel producers from 18 countries banded together to create a consortium and invested US\$22 million to come up with a new concept for an ultra-light steel auto body for car manufacturers. At the same time, the ULSAB project provided a solution for the automotive industry's primary demand, reducing the weight of a steel vehicle without increasing costs or impairing performance.

It is important to understand that steel producers' projects are not pipe dreams. Innovative steel technologies are used not only by Elon Musk with his cybertruck, but also by traditional automakers. The Toyota Highlander 2020 is noteworthy in this regard. Thanks to the use of light,

[high-strength steel](#)

, it weighs about 100kg less than its similarly equipped predecessor, even though it is longer. Or the Volvo XC40 SUV, which was named the 2018 European Car of the Year. Experts recognise the unique level of safety of this car achieved by the utilisation of hot-formed boron steel. In all, AHSS have already become an important and irreplaceable materials for cars that have been promoted by world's leading manufacturers in recent years.

### **Change in the vehicle consumption model**

The average Ukrainian car owner tends to believe that giving up a personally-owned car in favour of an unmanned, public electric vehicle is akin to science fiction. This makes it all the more impressive that leading steel producers are already trying to become suppliers of materials for such vehicles, which will provide the new mobility of the future, such as MaaS (Mobility-as-a-Service, the term used to describe the idea that a consumer voluntarily refuses from a personally-owned car in favour of a carrier's services).

In particular, in November 2020, WorldAutoSteel announced a new vehicle engineering programme, Steel E-Motive. More than 20 of the largest steel companies in the world banded together under the umbrella of WorldAutoSteel to demonstrate why steel should become a material of choice for MaaS using unmanned electric vehicles.

“We are approaching a critical milestone in automotive history when what we know as normal is about to change significantly and the steel industry plans to be right in the middle of this revolutionary change. With a vast portfolio of Advanced High-Strength Steels and steel technologies from which to draw, we envision that Steel E-Motive will deliver new, exciting ideas for steel vehicle architectures that will shape the future of sustainable mobility,” WorldAutoSteel said in its statement about the opportunities for cooperation between steel producers and automakers.

In conclusion, the safety and durability of cars will be even more important for autonomous vehicles or cars used in car-sharing (rental) systems than for traditional private cars. That is why steel, being an affordable and durable material, will remain just as irreplaceable as it was at the birth of the automotive industry more than a century ago.

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