DANIEL KURR

Lightweight construction calls for fast laser machines

People crave mobility. They also need to breathe. Contradictory necessities that lead to the inevitable conclusion that mobility must become sustainable. In India, automotive supplier JBM Group shows how this can be achieved – using high-tech materials and machines.

It began in the 1990s: A computer and technology boom the world had never seen before got underway. It was then that the Chairman Mr S. K. Arya, founder of the Jay Bharat Maruti (JBM) Group, had a vision. Inspired by the chipmaker's "Intel inside" slogan, he dreamed of "JBM inside" – a JBM component in every car made in India.

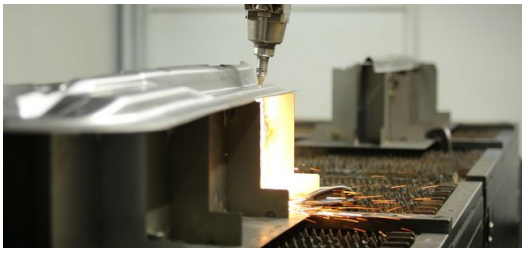
His vision has come true: Founded in 1983 as a manufacturer of cylinders, JBM Group is now a corporation that produces more than 500,000 automotive parts every single day. The company has a presence in ten countries with more than 25 locations throughout the world. JBM Group now has more than 25,000 employees and yearly sales of more than $2.2 billion. On its way to a global conglomerate, however, the company has made a strong commitment to the pursuit of sustainability.

Sustainability is the common thread

It is not a coincidence that JBM attaches so much importance to sustainability: India is affected by massive air pollution. The impact on public health is dramatic, the impact on the country's economy likewise. India is home to more than half of the world's 20 most polluted cities. Every year, the country loses, according to scientists, around two percent of its Gross Domestic Product solely due to air pollution. Demand for private vehicles is considered one of the main reasons of the increase of air pollution and congestion. Fact is, this demand remains undiminished. In the fiscal year 2019/20, manufacturers sold more than 21.5 million vehicles in India.

This is why JBM does not only produce automotive components and systems, but also works on solutions for a more sustainable mobility. The company manufactures buses, electric vehicles and their power units as well as charging infrastructure. In addition, the Indian automotive supplier is involved in renewable energy systems, "waste to worth" and artificial intelligence. The idea of sustainability is a common thread running through all areas of the Group. Consequentially,

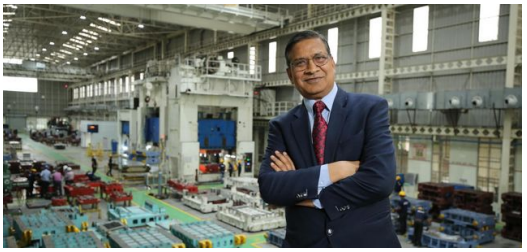
the bus division, for example, offers electric buses as well as diesel buses with particularly low emissions. Solar power plants, battery energy storage systems and electricity infrastructure are on the agenda at JBM in the renewable energies division. With this line-up, JBM is able to meet strict sustainability requirements.



Laser is the only tool able to trim parts made of high strength steels once they have cooled.

B. B. Gupta (left), President Strategy & Business Planning of JBM Auto Components, and General Manager Ajit Choudhary inspect parts cut with the TruLaser Cell 7040.

High strength steel parts are processed precisely, as Ajit Choudhary (right), General Manager of JBM Auto Components, demonstrates to President Strategy & Business Planning B. B. Gupta.



B. B. Gupta, President Strategy & Business Planning of JBM Auto Components, runs his factories at a world-class level.

Originally bought for prototyping, JBM is using the TruLaser Cell 7040 now to process parts made of high strength steel.

JBM has been using the TruLaser 1030 laser machines for sheet metal cutting for several years.

Lightweight doesn’t always need high strength steels: JBM uses this TruLaser 1030 to produce profiles for buses.

Banshi Dhar, Machine Operator at JBM, controls the TruLaser machines.

Quality guaranteed: Engineers at JBM are inspecting the parts made with the TruBend 1100 press brake.

JBM Group is not only among the biggest automotive suppliers in India, but also committed to sustainability in non-automotive business divisions.

Lightweight construction fights air pollution

How can technology reduce air pollution caused by vehicles? One tried and tested approach that has achieved a lot for the automotive industry is lightweight construction. Less weight equals fewer emissions. And this is true regardless of the drive system: cars with combustion engines require less fuel and emit fewer pollutants. Electric vehicles require less electricity, can extend their range and are therefore more attractive to users. For this reason, automotive manufacturers and their suppliers around the world are working on ways to make their vehicles lighter.

JBM is working with various car manufacturers. “We produce components for all international vehicle manufacturers that have a presence in India,” says B. B. Gupta, President Strategy & Business Planning of JBM Auto Components. These include companies such as Daimler, Ford and Suzuki-Maruti. And these automakers are demanding lightweight solutions from their suppliers. “The demand for lightweight automotive components is growing rapidly,” Gupta further explains.

Tubes and profiles are one way to make vehicles lighter. They can be used instead of solid structures for load-bearing parts in the body. To do this, engineers need to know where and how forces act in the body. For this, they use modern simulation software that can show exactly where forces are at work. Only in these areas material is needed to absorb them. Tubes and profiles allow the material to be used primarily where it is needed. Elsewhere, the material can be reduced – providing lighter components.

Saving material was also the target in the latest project JBM has implemented in collaboration with TRUMPF: TruLaser 3030 laser machines and a TruLaser 1030 as well as TruBend 3100 and TruBend 1100 press brakes are producing lightweight profiles for buses at JBM.

High strength steel leaves no choice

Another approach to aim for lighter vehicles is the use of high-strength steels. They allow thinner sheets to be used for automobiles, thus reducing their weight without compromising passenger safety in the event of an accident. On the downside, these materials are almost impossible to machine using conventional methods. “We use high-strength steels with a tensile strength of up to 1000 megapascals,” explains Gupta. Just to give you an idea, imagine a tiny strip of high-strength steel measuring barely ten square millimeters: This is enough to suspend a small car weighing one ton from it. Obviously, the very same characteristics of steel that protect the passengers in a car so well are those that cause major headaches to production engineers: If a steel component is hard to deform in a car crash, it is similarly hard to form it in a press or to trim and to pierce it. High-strength steels are therefore formed red-hot using press hardening. Once they have cooled, there is only one tool that can then be used: the laser. It is used to trim or drill through the robust workpieces.

The TruLaser Cell 7040 is available at JBM for processing such press-hardened parts. It has been in use since 2018, although initially it was intended for prototype construction. Today, it also processes a variety of high-strength steels on a daily basis – no other machine in the automotive supplier's production is as well equipped for these tasks. “JBM chose this machine at the time primarily because of its precision. But reliability was also important,” reports Mohammed Hidayath, Sales Director at TRUMPF India.

Laser machines have proven their value

It is no coincidence that JBM relies on TRUMPF for processing the high-strength steels: The Indian automotive supplier could already look back on good experiences with the laser pioneer. For example, the TruLaser 1030 and 3030 laser machines have been in use for sheet metal cutting for years. "JBM is convinced by the laser machines because they deliver high quality and run smoothly for many years," reports Hidayath. Gupta, President Strategy & Business Planning of JBM Auto Components, adds: "Our plants in India are equipped with TRUMPF laser machines, and of course we also use them for our factory in Germany."

The business relationship goes back a long way: as early as the late 1990s, Gupta visited TRUMPF headquarters in Ditzingen. The automotive supplier then bought its first machines nine years ago. TRUMPF offers more than machines, according to Gupta: "TRUMPF employees can quickly work out and implement solutions to difficult problems." The service is also very good and responds quickly – Gupta regards TRUMPF as superior to other machine manufacturers in this regard.

This good working relationship is far from over. JBM continues to grow rapidly. "We are considering buying more TRUMPF machines in future," Gupta announces. There may very well be a need for that. JBM recently won a series of tenders with its buses, for example, and is already planning to expand production.

Signs are also good for lightweight construction in general – studies see continuing strong growth here, especially in the automotive sector. This means that Intel can once again be a role model for the Indian supplier: Just as the Americans grew big with "Intel inside" during the computer boom, sustainability offers many opportunities for "JBM inside".

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