



ADDING LIGHTNESS

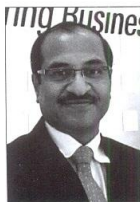
EXTRAORDINARY MATERIALS AND AUTOMATION IS CHANGING THE FACE OF AUTOMOTIVE ENGINEERING

BY JAYASHREE MENDES

1. Robots aid in reducing operating costs, improving product quality and consistency, as well as increasing output rates, manufacturing flexibility and reducing material waste.



Our press shop is capable of designing and manufacturing complex progressive tools.
- Santosh Poojari

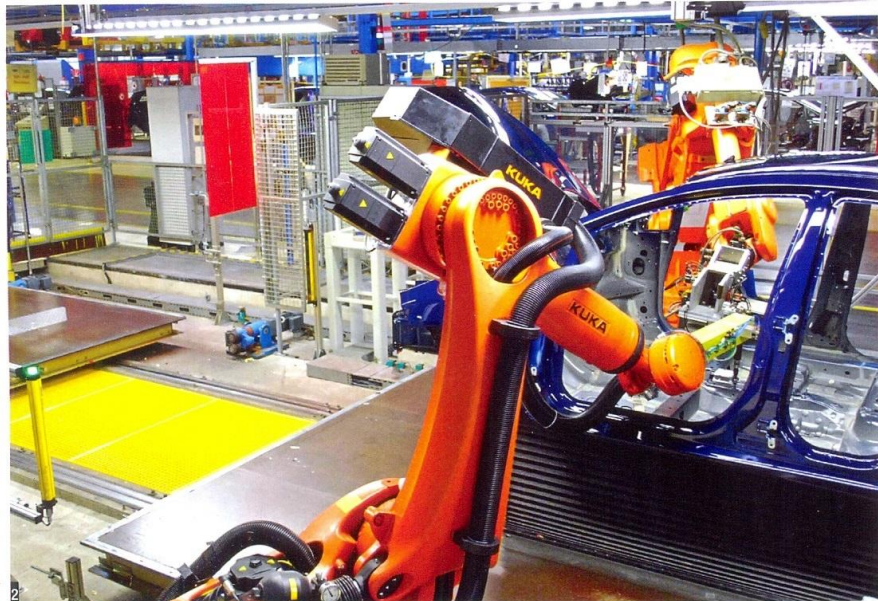


We believe in developing solutions and have ensured to get the right transmission technology for the Indian market.
- K Srinivasan



We emphasise on first-time-right approach. FMEA is conducted at different levels to ensure that aspects of product failure are taken care of during design.
- Vikas Puri

2. At the framing station the roof and body sides are joined using a brazing technique which not only saves time, but also makes for a clean and elegant joint.



ONE USUALLY DOES NOT CONSIDER ONLY fuel efficiency when buying a car. Those in the know would also consider engine efficiency, safety, advanced electric propulsion, power electronics, among other things. Automobile is probably the only sector that is subject to continuous and regular upgradations and keeping up with them can be a tough thing.

In terms of engineering trends in the automotive sector, there is a focus on improving transmissions (adding speeds), accessory load reduction through intelligent energy management of other components, battery chemistries, and increasing lightness by use of alternative materials such as aluminium, composites, plastics, etc.

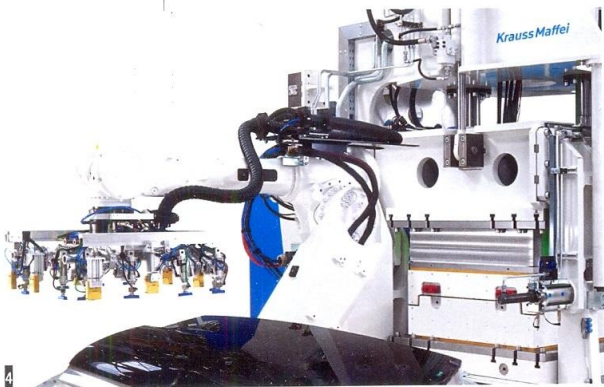
Krishnakumar Srinivasan, president, APAC, vehicle group, Eaton, says, "From a technology standpoint, we believe in developing solutions for the region and have ensured that we get the right transmission technology required for the Indian market. The Indian market is unique due to high shift densities and harsh operating conditions hence, the products need to be designed to give optimum performance in these conditions. Stringent incoming quality checks and end of the line testing equipment ensures delivery of defect free products."

With each passing year, there are new impositions on the automobile industry in terms of reducing emissions, acquiring lightness in vehicles, making them safer, etc. Minda Stoneridge Instruments Limited (MSIL), a subsidiary of Minda Corporation, has kept abreast of new technologies especially the growing

EVERY YEAR, THERE ARE NEW IMPOSITIONS IN TERMS OF REDUCING EMISSIONS, ACQUIRING LIGHTNESS, ETC

electronics that spurred the sensors requirement. MSIL quickly adapted itself to this market need and entered into a joint venture with Stoneridge in 2011. This enabled them to bring in a variety of sensors in the category of speed, position, temp level, and pressure. The company today supplies over three million different sensors annually to leading OEMs. Over the last few years, MSIL expanded its product offerings in the range of mechanical and electronic instrument clusters, dashboard assemblies, digital clocks, infotainment systems and electronic controllers. With a wide range of products, MSIL has an installed capacity of over five million units per annum.

Similarly, LuK India, a brand from Schaeffler India, has state-of-the-art manufacturing facilities in various areas of operations namely press shop, heat treatment and machining. The press shop is well equipped



3. MSIL's mechanical includes tool designing and moulding capabilities. Machines ranging from 50T to 200T are equipped with auto material feed, robotic pickups.

4. Composites can be designed to be far stronger than aluminum or steel. They can be engineered to be strong in a specific direction.

with a range of presses right from 63T to 1500T with which a big variety of stampings are manufactured. "The press shop is well supported by an advanced tool room set up capable of designing and manufacturing complex progressive tools," says Santosh Poojari, plant head, LuK India.

QUALITY & DELIVERY

There is a hazard here for the end user if the manufacturer has not put in quality parts and compromised on the end product. Quality is gauged on customer expectation by meeting all the customer targets. "Our process area is designed to meet customer quality by implementing suitable methods, such as Six Sigma, 5S, value stream analysis and additional activities aimed at continuous improvement. Initiatives such as Idea Management and local improvement projects are undertaken on a regular basis to ensure that customer quality and delivery are met. The delivery is ensured

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with defining our Zero defect approach along with lean principles in our process," says Poojari.

Vikas Puri, head, strategic business unit (sensors), Minda Stoneridge Instruments Ltd, says, "At MSIL, quality starts way before the product is produced. We emphasise on first-time-right approach. Failure Mode and Effects Analysis (FMEA) is conducted by a cross functional team at different levels in terms of systems, products and processes to ensure that various aspects of product failure are taken care of while designing. Supplier PPAPs are done as their parts play a major role in our product quality. We follow a safe launch approach and keep a close track on the PPM levels. Cost of poor quality is tracked to ensure that engineering solution is given by CFT."

It is not for nothing that automotive engineering comprises acquiring various certifications such as ISO-14001, TS 16949 and OHSAS 18001. As companies continue to invest early in future technologies, many large companies want to stay ahead of the competition and get that early mover advantage with the introduction of regulation driven products.



5. Eaton's Ranjangaon facility manufactures and supplies medium and heavy-duty truck transmission for the Indian and export markets.

6. Just-in-time requires a near accurate supply chain ready for the picking.

MANUFACTURING PROCESSES

Since most of the products at MSIL are electro-mechanical, the company has invested in vertical integration of key processes. For its electronics, it has modern SMT lines for lead and lead free requirements that deliver 22,000 components per hour. All lines are equipped with automatic inspection process, 3D paste printing, ICT and automatic routing for depanelling. Selective soldering processes use robotic arms. Puri says, "Our mechanical includes tool designing and moulding capabilities. Machines ranging from 50T to approximately 200T are equipped with auto material feed, robotic pickups. At our assemblies, we adopt Lean, Poka Yoke and SMED. Automated end of line testers and vision based inspection stations are followed for all critical to quality stations."

Luk India brings its German expertise and their process approach is towards zero defect policy by defining processes first time right. Poojari says, "Our

GLOBAL MANUFACTURING COMPANIES HAVE ONE SET OF STANDARDS THEY TAKE TO OTHER COUNTRIES.

manufacturing processes are designed and developed on "Fit for Quality and "MOVE" principles. We develop Poka Yoke and ensure that our process is free from errors all the time and in all the workstations. Our processes are developed for prevention from lessons learnt and effective use of prevention tools. We need intelligent defect prevention: getting it right is the key by making error free processes with effective use of prevention tools in manufacturing process."

Global manufacturing companies have an advantage that local do not. They have a one set of standards that they can adopt and follow and brought on by their parent company. Eaton's manufacturing facilities are held accountable for meeting process and productivity goals. "We invest in new technologies and processes to upgrade our manufacturing plants and to make them cleaner, safer and more energy efficient. Our unified standards and assessment methods based upon Environment, Health & Safety (EHS) policy allow employees to jointly shoulder the responsibility of achieving our EHS objectives. We place a high priority on matters related to the environment, employee and community health, and safety. Safety is fundamental to everything we do," says Srinivasan.



We have invested significantly in latest technologies to help achieve world class levels in both quality and productivity in our plants in India. We have been utilizing various technological tools for enhancing the accuracy and efficiency of our operations, be it material management, engineering or manufacturing change management. These improvements have helped our plants achieve model plant level performance and get recognitions for their production efficiency. The Ranjangaon plant, for instance, received Eaton's Best New Plant Award in 2011.

ADVANCED R&D

Most companies also have cultivated an in-house integrated test lab that provide strong capability to conduct hardware tests to validate current and future designs for both global and regional products. Labs are established with a vision to have an independent regional testing capability and thus expedite product development and time to the market. Most of them are fully operational for conducting various functional tests to achieve maximum durability and high perfor-

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mance; not to forget compliance to highest safety and regulatory requirements.

The R&D department in LuK consists of design, internal testing and vehicle level simulation and testing teams. They are responsible for design and development of clutches for passenger car, truck and tractor clutches and also the clutch release system. The team is capable of design and testing of clutch and clutch release system to ensure clutch pedal effort and vehicle vibrations are within acceptable limits to customer. Young Engineers in R&D department are trained in-house as well at our headquarters. The R&D team also works closely with the Prototype Engineers.

Going forward, companies are anticipating the day when a driver will turn over the car's controls to an automatic, programmed guidance system and travel in comfort and absolute safety. ■

7. Most often, auto component companies are required to supply to several factories on a daily basis.

8. A reduction in workforce have left the industry with fewer employees to monitor welding operations and the overall shortage of skilled welders has compounded the challenge.