



Grinding line

Product, Process Innovations Propel Rane Brake Lining, Trichy

APA Bureau

Next to Japan, Japanese quality concepts are practiced more in India. This has been the impetus for the global majors operating elsewhere in the world to source more components from India. The Chennai headquartered Rane Brake Lining Limited (RBL), part of Rs 3,260 crore (net sales) Rane Group, manufactures brake linings, disk pads, composite

brake blocks, clutch facing and clutch buttons. The company is expanding its global reach as it sees tremendous opportunities. The share of exports in its turnover is about eight percent offering significant headroom for growth.

RBL, which reported a net sales of Rs 448 crore in FY 2016, has manufacturing facilities in Chennai, Hyderabad, Puducherry and Trichy.

The company is a Tier-2 supplier to several OEMs including Maruti Suzuki, Ford India, GM India, Honda Cars, Hyundai Motor India, Mahindra, Nissan Motors India, Tata Motors, Toyota Kirloskar, Ashok Leyland, Eicher and Force Motors. It is also supplying to the Railways. Besides, it caters to the aftermarket through seven wholesale distributors and over 10,000 dealers in the country. It exports to a few OEMs in Germany

and to the aftermarket in several other countries in Europe, Middle East and South Asia.

Focus Trichy

Recently *AutoParts Asia* visited the Trichy plant of Rane Brake Lining (RBL Trichy) to take a close look at its product and process innovations. The plant's net sales in FY 2016 was Rs 118.6 crore against Rs 107.2 crore in the previous year.

RBL Trichy, commissioned in 2008, to makes disc pads for passenger cars and brake linings for commercial vehicles, is expanding its product portfolio and making global inroads. S Bhargav, Head, Operations, RBL Trichy, told *AutoParts Asia* that the plant will up the ante in exports since the share of exports in its turnover is insignificant.

The global sourcing arm of Volvo in India, in its first phase of supplier evaluation through SEM audit (Supplier Evaluation Model), has approved the RBL Trichy plant to supply heavy commercial brake



Brake pads



Curing line



Adhesive coating

lining. As a second phase, PPAP audit has also been completed by Volvo India for two part numbers and received the approval. Now RBL is one of the global sources for Volvo to supply heavy commercial brake Lining. RBL is also in the process of adding global customers to its customer base. One of the largest European OEMs has initiated the plant audit. In the domestic front the company will focus on making brake parts for the SUV segment.

The important activities of RBL Trichy to sustain market leadership are categorised into six elements: Technical collaboration, new technology, new product development, marketing, manufacturing excellence and IT-enabled manufacturing. While emphasis has been laid on all of them, the focus has been on new product development. To support these initiatives the company has enhanced the product reliability testing and validation.

The company has institutionalised the new product development process, and as an initial step, has created 'Formulation Library and Technology Table,' which consists of different kinds of recipes to make brake pads or linings, with different performance characteristics and price points. This table indirectly keeps customers with RBL as there was no room for them to look at alternatives. This was introduced in 2013 as part of challenging Deming Grand Prize.

Dual-core

Under the new technologies, RBL Trichy has developed a 'dual-core,' which is a unique concept

in commercial vehicle brake lining. Inspired by the brake disc pads, the dual-core brake lining consists of a high strength composite material as under-layer (the portion of lining placed on the brake drum) and regular friction material as the main friction (braking area) layer.

The conventional brake lining is a single composition of friction material. The combination of the two different materials has three-fold effects: Higher cross-braking, inter-lamina shear strength, and higher rivet-holding capacity.

The higher cross-braking strength prevents the brake lining from cracking and surface disintegration from higher braking force; the higher rivet holding property prevents rivet loosening. These give 50 percent more life to the brake lining than the conventional linings. They also minimise breakage in the assembly of

linings, especially in the aftermarket, where no riveting is generally done as for OEMs, based on a systematic process. RBL has applied for the patent of this new brake lining, Bhargava said.

The challenge in dual-core is in developing the under-layer having compatible resin strength to polymerise with the friction layer at the top. The friction layer is till the wear limit, which is ideally about 60 to 65 percent of the thickness of the brake lining. The product design includes development of under layer matrix having high-strength, to hold rivets while also compatible with the friction material.

Thanks to its flexible manufacturing facility, RBL Trichy has not created a separate line to make dual-core brake lining, though it is a new product. Without major process and layout changes, the company was able to



Test lab



S Bhargav (sixth from left) with his core team

produce seamlessly the new breed of brake lining.

Dual-core was developed about 18 months ago and now it is sold in the aftermarket. Samples were submitted to a few OEMs and validation is in progress with some of them. "The general feedback from the mechanics and aftermarket is encouraging and the sales momentum is picking up," he said.

RBL Trichy has also introduced shim bonding in brake pads as a value addition to its customers. Now it is used only for products supplied to Mando. For flawless production, it has deployed several poke yokes in the assembly line. The company is now working with other customers to supply brake pads with wear clip.

Innovative Process

Yet another new technology that RBL Trichy has developed is to reduce product variations. As the brake lining or pads are made through a batch mixing process (about 2,500 products in one go, loaded in the oven for baking), variations need to be as minimal as possible to get uniform and flawless products. The company has developed an oven, in-house that can control airflow in the chamber from the top with several heat sensors strategically positioned to maintain the right temperature for all the products loaded for baking. This enhances and optimises airflow in the oven and helps all the products to get polymerised and cured uniformly.

Since the fan capacity is doubled to maintain uniform air flow for homogeneity, the running cost is marginally higher. The company

addresses this by eliminating waste and conserving energy. This internal efficiency enhancement initiative reduces rejections significantly, he said.

All these initiatives have reduced rejection level to 3ppm in the current financial year. This is the first time that the ppm level is in single digit. For the past three years it had been hovering around 50ppm.

NVH Solutions

RBL had introduced a new technological solution a few years ago that can contain NVH through spherical concave profile of the back plate. While the outer side of the back plate (where it is fastened to the calliper) is flat, the other side has spherical concave profile to hold the friction material. This simple change, as it may look, helps in effective braking and faster retraction. It also helps in green-braking, effectively. Green-braking is the performance of brakes when applied for the first time in a vehicle.

Techno Marketing

In order to create more visibility among the customers, RBL Trichy has created a Techno Marketing division, a combination of R&D and Business Development. The personnel of this new division promote sales of these new products by educating and convincing the customers about

the superior design of the products, and their technical excellence and commercial advantages.

The company has set up 'Proto,' a dedicated development department, within the plant. This miniature prototype development centre helps compress the lead time to 24 hours from the 72 hours earlier.

All these initiatives have helped the plant in getting accolades from many of its customers. Maruti Suzuki's Tier-2 system audit has given RBL Trichy the Green rating, which is given to vendors who score more than 90 percent ratings on different parameters. Only very few Tier-2 vendors score over 90 percent ratings.





CV brake lining manufacturing line

From Brakes India, one of the major customers of RBL Trichy, the company has received 'A Grade' certification (scoring over 90 percent) consecutively for the last two years. In the Nisshinbo Process Audit, RBL Trichy scored 95 percent in 2015; this is one of the highest scores among the Nisshinbo associated plants outside Japan.

Employee involvement at RBL Trichy is total as every employee accepts all new initiatives positively. Against the target of 14 suggestions a year per employee, the company gets about 21 on an average. RBL has been adjudged as one of the top-rated 'Best Workplaces' in India by the Great Place to Work Institute. It received this recognition consecutively for two years. In 2013 RBL was rated as the industry best as it scored 77 points. Among the plants of RBL, the Trichy facility earned the highest score of 88 points. This plant has also received ACMA Bronze award for HR Excellence in 2016.

Shopfloor

The entire design of the manufacturing process and layout of the Trichy plant of RBL are based on the technology of its partner company Nisshinbo of Japan. It has been maintaining an average machine uptime of 99.8 percent, the highest in the industry.

About the manufacturing process Bhargav said that the company has a unique process of logging in the entire cycle – right from the receipt of the raw material to the despatch of the finished products to the customers. It uses Radio Frequency Identification Device (RFID) and in-

house-developed software systems and PLC controllers to manage every stage of operation.

The manufacturing process consists of mixing, pre-forming, curing, heat treatment, back-plate preparation, adhesive coating, baking, grinding, scorching, final inspection and packaging.

Deployment of

RFID helps the company validate the grade of the ingredients and match the relevant process parameters before the commencement of every operation in the manufacturing line. For every formulation, the entire process, including the total number of raw materials, weight/ quantity and the process parameters such as temperature, time and pressure, is predetermined by the process computer.

All the critical parameters are monitored on-line and the whole operation is performed in a controlled atmosphere to ensure quality. The company has deployed several poka-yokes to ensure flawless operation. The machine will automatically stop flashing a warning in the unlikely event of any non-conformity of operations.

Auto Batching System

The mixing process is carried out in a controlled environment and the equipment has been customised and developed indigenously. Annunciation system ensures continuous interaction between machine and team member and interfacing auto batching trolley, and mixer ascertains right ingredients are loaded in the mixing machine tuned to the right process. At the end of the batching operation a report on mixture of ingredients is generated to ensure that the input and the output weights tally. The whole operation is designed by RBL, which is appreciated by its partner Nisshinbo.

Plate Preparation

Preparing the back plate of the disc pad is very important as it ensures proper adhesive coating, fixing the friction material and maintains the mechanical properties. Auto loading and unloading mechanism guarantees the process runs with minimal manpower. One of the highlights of the system is the online phosphating, which ensures higher productivity and flawless process while eliminating human intervention. The machine is built with several interdependent mechanisms to enable the system run as per specification, and eventually churn out distortion-free back plates.

Curing Process

All the operations of the curing process have been supported with user-friendly visual aids and online monitoring facilities for better control and easier trouble shooting. It has two stage grinding operations to achieve better surface finish and parallelism. In order to reduce the tool set-up time the company has a unique 'easy tool set-up' mechanism developed in-house. The maximum time taken between the last piece produced of one model and the first piece produced of another model is about 120 minutes. It is currently working towards achieving less than 60 minutes through LTF (Lean Task Force Team).

The plant has a special high-capacity dust suction system since friction materials generate lot of dust during the manufacturing process. This makes the plant dust-free, though it deals with more than 200 raw materials in different forms. Yet another specialty of the process is the unique scorching operation, which ensures better green-braking performance. Going forward the plant plans to induct a powder coating unit to do away with painting, despite being an expensive proposition. **APA**



Range of products manufactured by RBL Trichy