Lean Manufacturing, Automation Key To Growth For RML

A global supplier of steering & linkage systems and diecast components, Rane (Madras) Ltd (RML) is also one of the largest players of these products in the country. We recently visited the company's Varanavasi plant, near Chennai, which manufactures steering & linkage products for the domestic and export markets. At the RML shopfloor, A Makesh, Vice President, Materials and Plant – 4 gave us a detailed walkthrough, and spoke about the company's focus on safety and quality in production.

INTRODUCTION

Spread over an area of 18 acre, RML's Varanavasi plant was established in 2006 after the company witnessed steady growth in its export business. Two years later, in 2008, the plant also began manufacturing products like greaser-less joints for light commercial vehicles (LCVs) for the domestic market. Additionally, between 2012 and 2014, seven suspension and steering linkage product (SSLP) lines and three steering gear product (SGP) lines were also transferred to the facility.

The Varanavasi plant, built on an 84,000 sq ft area that houses two shops, a scrap yard and a cafeteria, currently manufactures suspension ball joints and outer ball joints for export markets, and produces tie-rods, drag links, centre links, sealed metallic linkages, upper control arms, lower ball joints and steering gear products for domestic customers.

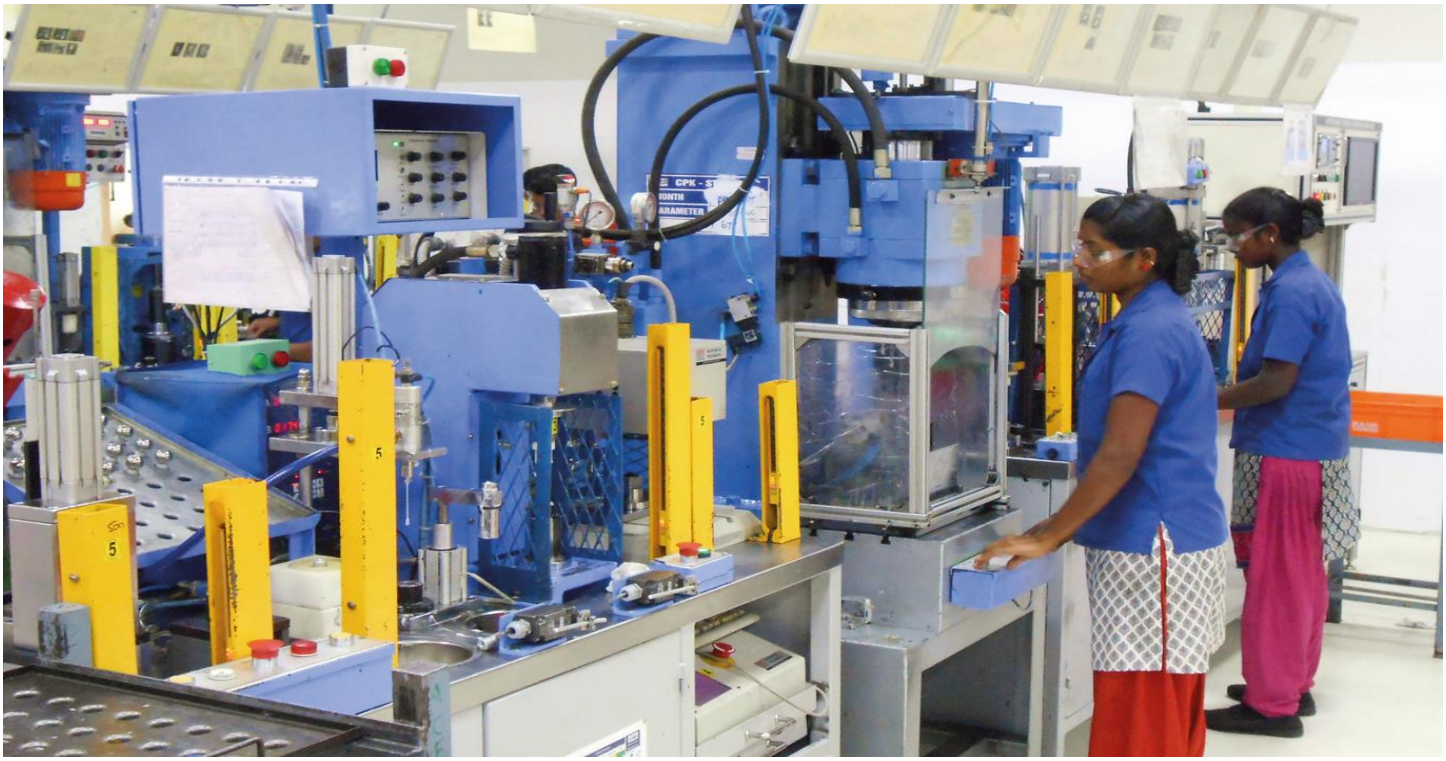
LEAN MANUFACTURING

RML follows a lean production system and predictive maintenance is carried out under its special manufacturing process, just like all other Rane Group companies. The initiatives taken under lean production system include equipment management, quality improvement, reduction of set-up time, inventory management and enhancing the involvement of operators. Activities such as integrating total productive maintenance (TPM) initiatives with lean production system to increase availability of machines are undertaken, Makesh said.

In terms of inventory management, the company employs the KANBAN system to control the logistical chain in-house, as well as for suppliers. Operator involvement has been enhanced at the plant by making ergonomic and project execution assessments, as well as by directly receiving feedback from operators. Other features of the production system that result in lean manufacturing are linear assembly lines, customised presses for product requirements, on-line performance checking, bar coding and packing facility. The Poka yoke mechanism is also used extensively to help operators avoid mistakes. With its production systems and quality checks at various levels, RML endeavours to reduce its manufacturing rejections to below 100 ppm, Makesh said.

SHOPFLOOR

One of the first machines on the RML shopfloor is the robotics cell, which combines three machines. The robotics cell carries out the assembly of sockets and ball pins to make suspension ball joints that are the main components manufactured by the facility. RML uses robots for this assembly in order to maintain productivity numbers, as well as reduce operator fatigue, Makesh noted. The operator is only required to load and unload the components into this cell. The robot cell not only assembles components fed into the machines, but also inspects the components before and after assembly. This ensures a very high level of quality of the suspension ball joints assembled in this cell.



Additionally, as a safety measure, the robotic cell is fitted with eight emergency sensors that stop operations once a person enters the cage. It begins to operate once again only after the person exits the cell, shuts the door and restarts the machine.

The assemblies manufactured at the facility typically have two common components, the socket and the ball pin, along with a variety of plastic parts. The plastic parts include top cup, bottom clip, circlip, boot ring, end plate, boot and protective cap. The sockets and ball pins go through a number of processes from being received as forgings, right up to the final assembly.

Sockets for outer ball joint assemblies go from forgings to being bored, then boot machined, after which they are provided with an e-coat and then finally drilled and tapped. The sockets for suspension ball joints are received as forgings and go through the boring, boot grooving and e-coating process. The ball pins forgings of outer ball joints go through similar machining processes. They include turning, thread rolling, Geomat coating, and Ball Turning and Burnishing Machining (BTBM). Similarly, ball pins of suspension ball joints go through the turning, induction hardening, Geomat coating, and BTBM processes.

After the machining process, the assembly of all these components provides the final part that can be assembled on to the vehicles. RML has a separate air conditioned, dust-free premise within the facility that perform the assembly of components that are supplied to export markets. At this premise, inspected components are marked and packaged. Every component is also coded with a date and unique traceable number, in order to be tracked back in case of any future issues. After final assembly, the components are sent through a pre-dispatch inspection using machine vision technology, which looks through every aspect of the assembled component. This inspection is also a form of automation that RML employs.

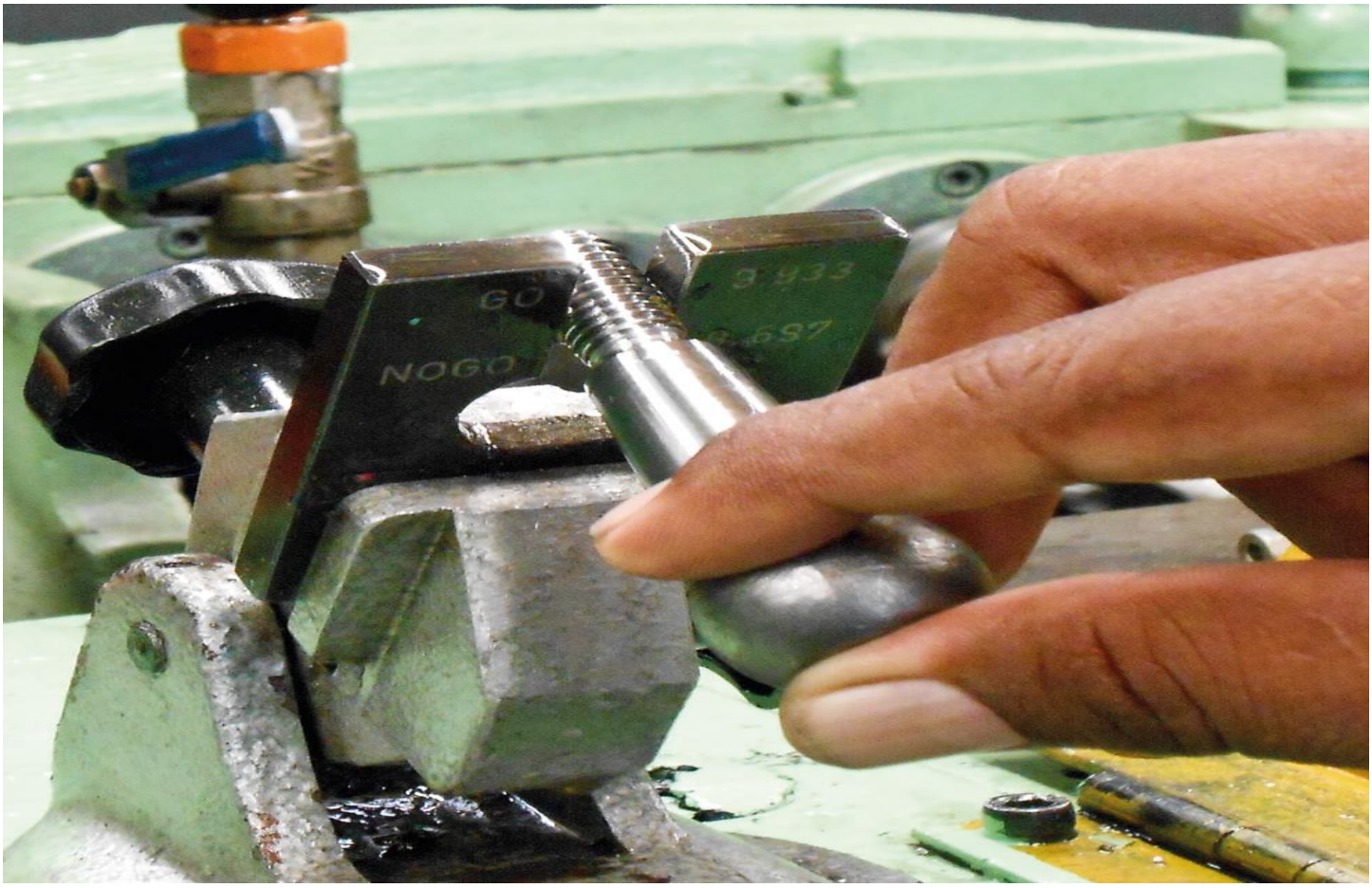
There are number of safety improvements that have been implemented on the machines at the facility, primarily based on recommendations by operators. Some of them include simple additions like grilles on ball pin thread rolling machines. Every single component manufactured at the facility is inspected right after each process, which also ensures the high quality levels. To add to better ergonomics, components are fed through trays that are light and easily pick-able, and inspection tools are also placed in easy-reach after each process.

RESEARCH AND DEVELOPMENT

RML has its own R&D setup, which looks into the development of products across all of the company's plants. The R&D department consists of about 50 engineers spread across the company's facilities in Velachery, Pondicherry and Mysore. While inspections at the manufacturing plant remain at product level requirements, deeper testing is carried out at the main plant in Velachery, Makesh noted. Components are inspected on three main levels at the plant – part conformance checking, product performance testing and metallurgical testing.

ROUND-UP

Over the years, the company has focussed on automation of certain processes to reduce manual work. Automated Guided Vehicles (AGV), robot loading and unloading of components, automated painting and oil dipping, and automatic pallet shrink wrapping are some of the initiatives taken to increase efficiency through automation.



For future expansion, the company has enough space within the facility, Makesh noted. The facility has an annual production capacity of 6.6 mn ball joints for SSLP and 200,000 gears for SGP. The facility has over 650 employees, with almost 600 being operators. Machinery in the plant include turning centres, customised special-purpose super finishing machines, induction hardening machines, thread forming centres, hot and cold working presses and cylindrical grinders, besides other equipment. The plant has been accredited with TS 16949, ISO 14001 and OHSAS 18001, like all other RML manufacturing facilities. Makesh said all RML suppliers are also accredited with TS 16949 or ISO 9001:2008 standards.

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