

Quality drives at RTSSL drives you safe



Story & Photography: T Murralli

'Safety first and foremost' is the mantra that defines the makers of the hydraulic pump and the rack & pinion, the two vital components of the steering architecture that ensure you reach your destination in safety and comfort.

One company that stands out in the production of hydraulic pumps and rack & pinion is Rane TRW Steering Systems Limited (RTSSL), Chennai, whose commitment to the highest standards of quality led them to become one of the leading suppliers to utility and commercial vehicle OMEs.

We undertook a short journey to the RTSSL plant to observe the transfiguration of rack & pinion and hydraulic pumps at the company's flagship facility in Guduvancherry, about 35 km south of Chennai. This facility has two manufacturing value streams – to make hydraulic pumps and rack & pinion gears.

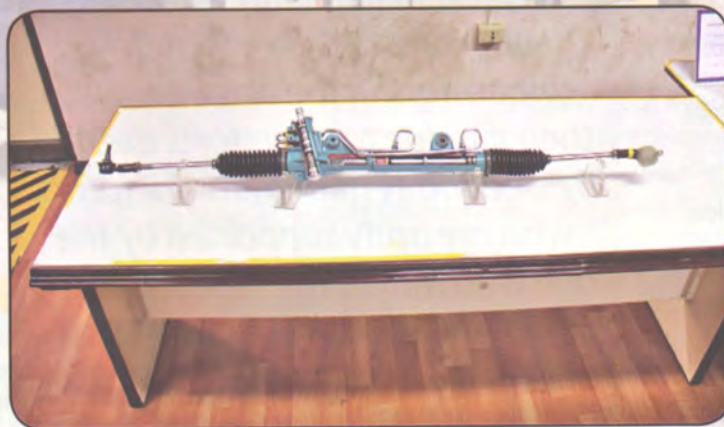
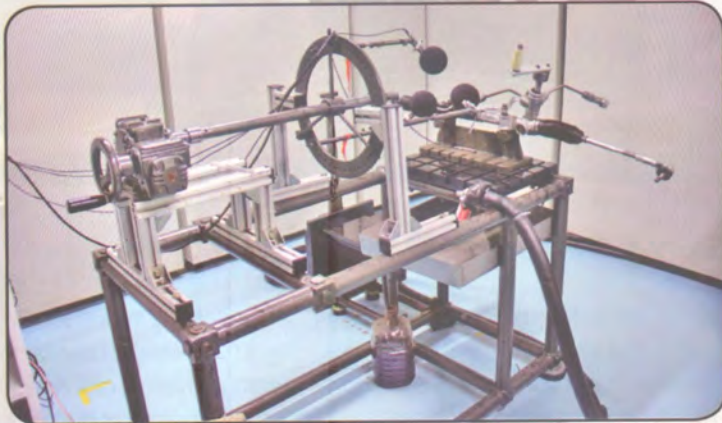
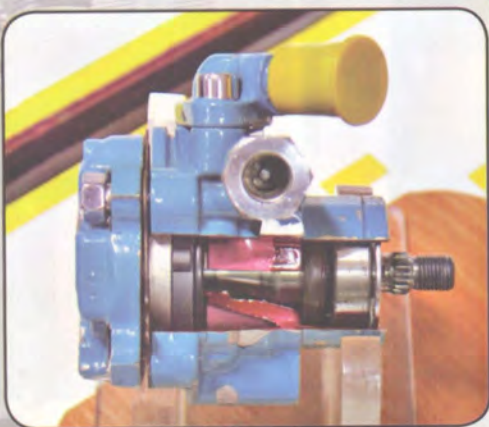
The pump division has 81 suppliers including ten from abroad, primarily sourced from Korea and Japan. The rack & pinion division has 82 suppliers including 27 mainly from Europe with most of whom TRW, its partner, has an ongoing partnership.

While driving, when you twirl the steering wheel, does your vehicle take the turn smooth and efficiently without any discomfort? If the answer is yes, then it is due to the efforts exerted by steering system manufacturers, who are aptly supported by the one who makes the rack & pinions as well as hydraulic pumps.

Training



Product Development



Production and Despatch



Hydraulic Pump

The key elements of the hydraulic pump include the housing, shaft and internal parts like the cam, rotor and blades. All these parts are machined to accuracy levels of less than five microns. It has two dedicated lines for housing - ferrous (for CVs) and aluminum (for passenger cars). Interestingly, cams of various sizes are machined in a single machine. Similarly, rotors of different sizes are machined in one piece of equipment, which has helped the company optimise its manufacturing efficiency.

The assembly section has four different streams, one each for CVs and passenger cars and the rest for utility vehicles, owing to the sheer volumes

on hand. These are flexible lines with each one making up to six different models. Interestingly, the changeover time between models is minimised to less than 10 minutes due to its special fixtures, multiple sensors and supporting poke yokes.

Irrespective of the extent of customisation across the myriad variants calling for innumerable specialised parts, work proceeds smoothly due to the kits system backed by systematic planning. Each pallet has the required parts to make the number of units scheduled by the OEMs and - the 'first in, first out,' concept helps maintain consumption and replenishment sequentially.



Power rack & pinion

As the name indicates, the housing and rack are machined in this shop and later sent to the production line. The bought out parts like the rack tube, bellows, and inner and outer ball joint assembly reach the line from the stores after a thorough quality check.

The assembly line is fully automated with physical operations confined to loading and unloading of parts. The line has more than 1,000 poke yokes to ensure that non-conforming products do not move to the subsequent station for further value addition. Servo motors are deployed for these kinds of precision operations while the load cells help in continuous monitoring

P V Gopalakrishnan, vice president-Operations (fifth from right) with his team.

of the flow line. Totally, there are ten assembly lines in U-formation to make 30 variants of the rack & pinion.

Leak test

In the next stage, seals and components are thoroughly checked for leaks. High/low pressure testing as also vacuum tests augments these processes. The error proof technique deployed here is in the machine itself that generates the serial number. It will not release a number and the related bar code if a particular part does not meet the minimum requirements of the performance test.

Design and development

Several types of software including

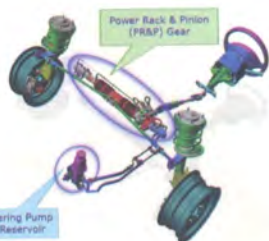
ProEngineer help the company in the design and development of new products. Finite Element Analysis (FEA) assesses the kinetics of fluid while CFD (Computational Fluid Dynamics) supports in evaluating the dynamics of the hydraulic fluid by simulating the flow of medium in the pump. Controlling noise is a huge challenge for present-day manufacturers since modern vehicles are much more quieter than what it used to be earlier.

The company also undertakes different types of stress /fatigue analyses with detailed mathematical simulation of functional characteristics. These initiatives have helped contain the number of prototypes significantly. At present only one or two prototypes are made in which several parameters are assessed enabling corrective actions to be taken when required. Minimum iterations in developing a new product and the respective prototypes help RTSSL to contain new product development time by up to 30 percent.

Currently, 75 models are in production at RTSSL with 39 for rack & pinion with pumps accounting for the rest. It caters to Ford, Tata Motors, Renault (Duster and Dacia), Mahindra, Force Motors, Ashok Leyland, Ashok Leyland-Nissan and Daimler. The plant makes 50,000 pumps a month and 70,000 rack & pinion sets. The present capacity utilisation is down to about 50 percent. Due to the slowdown it works only for two shifts now.

Products supplied by RTSSL . . .

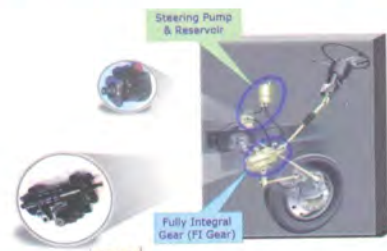
In Passenger Car (P-C) steering system



RTSSL - SGD

Products supplied by RTSSL

In Commercial Vehicle (C-V) steering system



RTSSL - SGD

RTSSL, Steering Gear Division - Milestones

- 1980 Established Plant 1 at Triplicane to manufacture Power Steering Gear for Heavy Commercial vehicle in Collaboration with TRW, USA
- 1981 Established Plant 2 at Chennai to manufacture Power Steering Pump in collaboration with JMC, Japan
- 1982 Established Plant 3 at Chennai to manufacture Power Rack & Pinion Gears for Passenger Cars
- 1983 JV formed with TRW, USA and Company renamed to "Rane TRW Steering Systems Limited"
- 1984 TQM initiatives launched under the guidance of JUSE Consultants
- 1985 Deming Prize awarded by JUSE, Japan
- 1986 Established Plant 4 at Uthiranchi to Assemble Gears for Heavy Commercial vehicle segment
- 1987 Japan Quality Medal awarded by JUSE, Japan

RTSSL - SGD

In conversation: G Parthipan, President, RTSSL

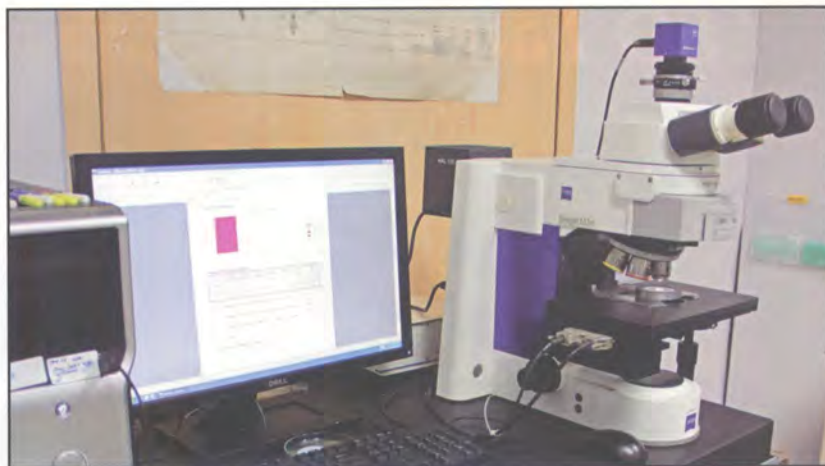


What is your current PPM level for the pump and rack & pinion? How do you plan to contain it further?

On an average, we maintain less than 70 PPM in the power rack & pinion while it is around 80 PPM for pumps. Customers express issues on noise as the cabin is becoming much quieter now. This is in spite of individual products, in our case the rack & pinion and the pump, meeting customer specifications. We discount these issues classifying them as 'No Trouble Found (NTF)' cases. However, we have begun accounting NTF too since the last two years as it helps to improve quality further.

Tell us about the initiatives taken at the shop floor and the benefits accrued?

Improving robustness of manufacturing processes is a priority since adherence to parameters will improve quality. Customer complaints have been given the highest priority. Sensitivity within the organisation has significantly increased. Even the smallest concern is taken seriously by even the operators and discussed at shop floor meetings to resolve it. Secondly, it helps in implementing the



best practices across the company and its products.

How are you managing the current slowdown while optimising a robust manufacturing process?

We go the whole hog on every day output, and reduce the number of working days as it helps in optimising the fixed costs. Besides, we reduced the shifts to two. These steps will help us

become a leaner organisation.

What is your mantra to optimise slowdown and the peak demand conditions – by resorting to automation or banking on people?

Difficult to say which one is the right recipe. Our philosophy has been to adapt low-cost automation since it has to gel well with men and machines. However, from the quality perspective, we do not mind going high on automation.

Can you tell us about the new programmes that you are working on?

Being a dominant player in the CV space holding more than 50 percent market share, we continue working with almost all our customers for their new programmes in LCV, ICV and MHCVs. Ditto with passenger cars for the hydraulic power steering segment. For instance, we are working with Renault on a high volume programme and with Isuzu. We are working with our partner TRW to enter Russia.

Can you tell us about your sales performance and share of exports?

Currently, 23 percent of the total sales come from exports. Our turnover last year was Rs 558 crores, and this year it may drop by five to seven percent. **ACI**

