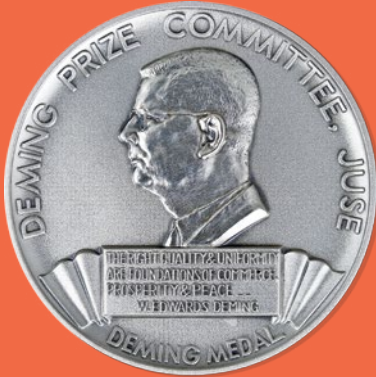


# PROPEL

ISSUE 16 | JANUARY 2019

2018年度  
**デミング賞・日経品質管理文献賞 授賞式**  
The 2018 Award Ceremony for The Deming Prize



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**RANE NSK  
WINS THE  
PRESTIGIOUS  
DEMING  
PRIZE 2018**

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# THE WORLD OF RANE



Rane Holdings Limited (RHL)

Rane Brake Lining Limited (RBL)

Rane Engine Valve Limited (REVL)

Rane (Madras) Limited (RML)

- *Steering & Linkages Division (SLD)*

- *Diecasting Division (DCD)*

- *Rane Auto Parts (RAP)*

- *Rane Precision Die Casting Inc. (RPDC)*

Rane NSK Steering Systems Private Limited (RNSS)

Rane TRW Steering Systems Private Limited (RTSS)

- *Occupant Safety Division (OSD)*

- *Steering Gear Division (SGD)*

Rane Holdings America Inc. (RHAI)

Rane t4u Private Limited

Rane Holdings Europe GmbH



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# INSIDE THIS EDITION



In this edition of Rane Propel, we've a terrific collection of articles, including a cover story on Rane NSK winning the Deming Prize 2018.

We begin this edition with a note by our Chairman, Mr. L. Ganesh, who emphasizes on the importance of staying ahead in an evolving market and why we must have a strategic business plan that takes into account the technological disruptions taking place in the market and evaluate our vision, goals and strategies with a clean slate.

Winning the Deming is always a prestigious moment and needless to add, a very special moment for the team that was part of the Deming journey from start to finish. For the Cover Story this edition, we interviewed several people from RNSS and requested them to recall for us the entire journey. The company first had the intention of pursuing the Deming Prize in 2010 and since then the team from Rane NSK has worked tirelessly to transform the business and eventually win the Deming. We capture memorable moments from this experience for Rane Propel.

Earlier this quarter, we celebrated *Maithri 2018*, a get together for senior management leaders from across Rane group. At the event, we also recognized the winners of ACE Awards 2017-18, and in this edition we present to you pictures from the event.

For the *Future of Mobility* section, we spoke to Mr. RM Thirupathi, Sr. VP of RTSS-SGD, to understand what the future of steering technology will look like and how the technology will evolve as the shift happens to electric and eventually autonomous mobility.

For *Business Roundup*, we spoke to Mr. B. Ayyappan, President of RTSS-OSD, to share the growth journey of this business over the last few years. In FY18, the company registered a turnover of Rs 502 crores, representing almost 7x growth in 6 years, and this article captures for us the key factors that enabled this level of progress.

For *Outside In*, we interviewed Mr. Sunil Kakkar who heads supply chain at Maruti Suzuki, and he spoke to us about Maruti's Supply Chain System, emerging trends and innovations in supply chain and logistics.

In *News@Rane*, we share key announcements and news from various Rane Group companies, awards won and some events we participated in.

We hope you enjoy reading this edition of Rane Propel.



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## AWARDS & RECOGNITION

### RPDC WINS QUALITY AWARD

Rane Precision Die Casting Inc. has been awarded the "Perfect Quality for 2018" by Nexteer Automotive for accomplishing Zero PPM Defect Rate and Zero Complaints for 14 months.



### RECOGNITION FROM SML ISUZU

Rane TRW Steering Systems Pvt. Ltd. has received the "New Product Development Award" by SML ISUZU, that was announced at the supplier meet held on 30-Nov-2018 in Chandigarh.

### RECOGNITION FROM TATA MOTORS

Rane TRW Steering Systems Pvt. Ltd. has received the "Efficiency Award" from Tata Motors, that was announced at the supplier meet held on 15-Oct-2018 in Colombo.





# STAYING AHEAD IN AN EVOLVING MARKET

I would like to begin this note by congratulating Rane NSK for winning the Deming Prize this year. It is certainly a matter of pride for all of us at the Rane group. We're proud also because it is the fifth company within the Group to win the Deming Prize. Additionally, Rane NSK's achievement has motivated other companies in the NSK Group to aspire for the same and that makes it all the more special.

A few years back, Rane NSK had gone through difficult times, primarily because of a market shift for manual column business. The company had to engineer a turnaround and a swift strategic change that required sizable investments and also importing of equipment. The TQM Journey helped make sure this shift was smooth and also laid the foundation for research and development for new products and overall capability enhancement for the future. Deming is certainly a great milestone and the overall TQM journey of the entire group has come a full circle with all our major manufacturing businesses having secured Deming Prize.

Another important development at RNSS is the setting up of a new plant in Ahmedabad to cater to our customers in the Western region of India. As the Bawal plant is running on full capacity, this was a much needed move. While we will start with only a single assembly line for now, over the



next five to seven years this facility is expected to play an important role for RNSS.

I must also add that we won prestigious customer awards from Swaraj Mazda (SML) and Tata Motors recently. It is heartening to get recognized by our customers, as it validates our processes and ability to meeting customer needs.

### **Overall Market View**

Till the last quarter, the industry was going at a fair clip, with all segments doing well. However, in the last quarter, the growth rate has softened except in the two-wheeler segment, due to a macro-level liquidity crunch. This is expected to correct itself in the coming quarters, as this slowing down, according to some, is a temporary phase. However, we have to watch quarter four closely to get some perspective about 2019-20.

We have gone ahead as per plans in expanding our capacities. This includes capacity and capability in hydraulic power steering, seatbelts and airbags. Rane Engine Valve and Rane Brake Lining have made customer-focused investments on a more moderate scale.

Rane Precision Diecasting, US, has also had a positive news in the last two months with an improvement in the order book. In the initial two years, post-acquisition, the focus had been on enhancing quality and improve operational processes, while continuing to be closer to our customers in North America. As the order book gets stronger, there is more reason for us to double down on our quality efforts and we have identified people from the group in India to spend some time at RPDC to effect operational improvements over the next six to nine months.

### **Rane Pioneer of Change Award**

Rane Pioneer of Change award was instituted as part of Shri L L Narayan (LLN) memorial initiatives during LLN's centenary function held on 6th October 2017 to recognize the work done by social impact organizations. After a thorough review process, we have recognized V-Excel for enabling self-sustained life for individuals with special needs. They have conceived 'Tiffin Times' to build capacity to empower and mainstream 100 individuals with

*I am happy to note that we won prestigious customer awards from Swaraj Mazda (SML) and Tata Motors recently. It is heartening to get recognized by our customers, as it validates our processes and ability to meeting customer needs.*

special needs. Through this project V-Excel will train young adults with special needs on 'hospitality on wheels' in the fast-food service sector.

**On the future of mobility**, while there is lot of buzz in the market, we believe the area is still evolving and nebulous. At Rane, we're carefully watching emerging technology trends both as a defensive strategy to ensure our businesses are adapting and also spotting new opportunities. The company is also drawing up its roadmap for the telematics segment.

**On a closing note**, I believe for the year ahead, we must have a strategic business plan that takes into account the technological disruptions taking place in the market and evaluate our vision, goals and strategies with a clean slate. We must revisit what we have been doing, taking forward all that will help us align to the new vision. As always, I would say we need to take a cautious approach supported by the right contingency plans, with a keen eye on our costs to tackle a volatile market.

I wish our employees and stakeholders a very happy and prosperous new year.

# RANE NSK WINS THE DEMING PRIZE

CONTINUOUS IMPROVEMENT AND TQM ARE A PART OF THE RANE GROUP DNA AND RANE NSK IS NO DIFFERENT. THE COMPANY, A JOINT VENTURE BETWEEN RANE AND NSK, JAPAN, HAS BEEN FOLLOWING TQM PRINCIPLES FOR A LONG TIME, ASPIRING FOR THE DEMING PRIZE LIKE THE REST. WINNING THE DEMING PRIZE THIS YEAR WAS A MILESTONE VALIDATING THESE EFFORTS.

## *The Early Days – Preparing for the Deming*

Rane NSK, which manufactures manual steering column and electric power steering systems, began its TQM efforts in 2010 and it all started with the first step – Deming Diagnosis – a process to identify what needed to be done to win the prestigious award.

However, it had to put its plans on hold due to business compulsions. The focus had to shift to business transformation, which was aided by TQM practices already in place.

In 2012-13, the company was ready to pursue its Deming dream again and engaged with a Japanese Sensei who started visiting Rane NSK to give inputs on TQM concepts and advice on process improvements and encourage lateral thinking and thereby improving problem solving skills.

In 2016, Rane Business Excellence Audit (R-BEAT) was done and this was a test to assess Rane NSK's preparedness. "We didn't do so well, and that was an eye-opener. We thought we were doing the right things but were unable to demonstrate our processes and practices effectively," recalls Rajesh Raghavan, President, Rane NSK. Additionally Rane NSK received guidance and support from the members of the Business Excellence Council of the Group who were experts in TQM practices.



"When RNSS decided to challenge Deming Prize, it was felt important that Rane group's collective experience and wisdom on winning four Deming Prizes and three Deming Grand Prizes must be leveraged so as to ensure giving confidence to RNSS team to challenge Deming Prize successfully. A plan was worked out to take guidance from Business Excellence Council comprising Business Heads and senior leaders," says N Haribabu, Advisor-Rane Holdings Ltd.

## **Robust Business Growth**

Even as the TQM Journey was being planned at the company, Rane NSK had grown very well between 2006 and 2016. While annual revenue was Rs 36 crore in 2006, it registered a turnover of Rs 1000 crores in 2017. In the last five years, the company's revenues have more than doubled, with significant growth in sales and profitability. One of the plants that had been making losses for the past three years had turned around since FY15 as a result of these continual improvement efforts.

In addition to internal processes, the





**Hideki Koike, Managing Director of Rane NSK said this after winning the award:**

*"NSK management encouraged Rane NSK to pursue its Deming goal so as to use this as a good initiative to develop TQM within the company. We are proud that we are the first NSK company to have won it. A few NSK group companies have shown interest to visit us to learn from our experience, and one of them is considering challenging the Deming Prize."*



explains, "Communication was one area in which we faced tremendous challenges. Engineers, for instance, can become extremely technical and it was difficult for us to communicate with an audit team that probably did not have many engineers. Keeping communication simple, clear and structured was one of the key improvements the team effected."

Meanwhile, the criteria for Deming had also undergone a change, explains Rajendra Kumar, who has been part of other successful Deming efforts within the Rane group and is currently heading the quality initiative at Rane NSK. "There is greater stress on strategic planning and top management commitment. Second is the means by which the PDCA is achieved. Third change is in the scoring pattern," he explains. Once Rane NSK got clarity on these aspects, the efforts were transformed to align with the new requirements.

### Impact

"It was a learning experience to go through this journey and we as a team cherished it. The manufacturing teams' capability to challenge the status quo using the right tool, strengthening of DRM practices, and promoting TEI activities will help us stride through any challenging situation in future," says Dinesh Deo, VP Operations.

One of the greatest impacts of aiming for and getting the Deming Prize was the way it rejuvenated the team, giving them a purpose beyond merely chasing targets. This helped in spurring innovation and new product development, leading to expansion and growth. Since TQM also needs TEI – Total Employee Involvement, in addition to the operators, engineers were also encouraged to come up with improvements, and 25 QIT projects were implemented in two years.

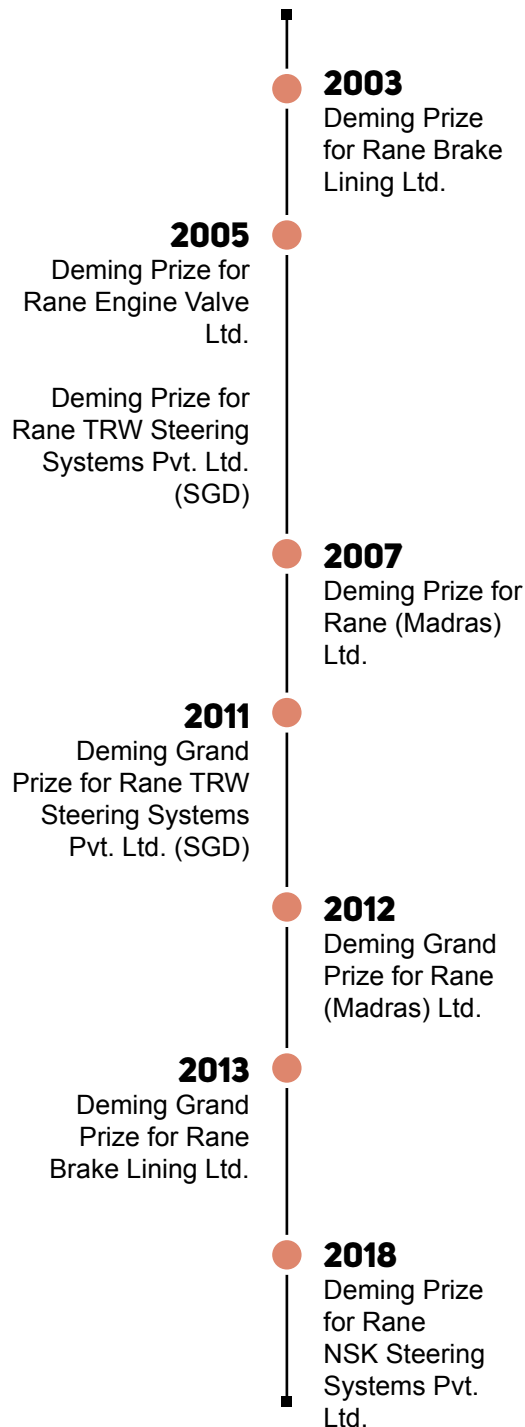
"One of the biggest take away from

engineers were also encouraged to engage with their counterparts in other NSK plants across the world, which had tremendous impact on skill improvement and enabled the company to win multiple awards, including from customers.

### Renewing Deming Goals

In 2017, the company decided to try again for Deming Diagnosis. "It was a very challenging process and we underwent multiple preparatory audits. These pre audits helped us significantly in facing up to the questions posed by the external auditors," Rajesh adds. K Saravanan, Head-R&D, RNSS,

# RANE GROUP'S DEMING JOURNEY



TQM is having a very rigorous system of review of the results and this helps to ensure that the appropriate systems along with check and balances are instilled. It has also created a bonding across the functions to achieve the common goals of the organization,” adds Sethuraman, CFO of RNSS.

One of the key benefits has been greater awareness about continuous improvement across the organization, leading to impactful changes over a period of time. This has helped improve on various KPIs. From an RFQ-based approach, the company works on value-addition based approach. It has been able to standardize operations across the plants. Cross plant-learning has gone up, as has focus on improving safety and quality across processes.

## Next Step Forward

Winning the award has given Rane NSK an opportunity to understand its strengths and identify its weaknesses, which it will work on. The presence of other experienced TQM experts in the group is a big advantage which has helped Rane NSK.

Risk management has improved, and in fact, the company was able to demonstrate this capability on the day

of the audit: Due to unforeseen external contingencies on the previous day of the final audit, there was a possibility of social disturbances which had to be factored in. To minimize risk, the team had to quickly put together a plan to shift the venue of the audit to the hotel where the examiners were staying. This proactive approach was much appreciated by the examiners and they said, “TQM is about anomaly management. You have demonstrated it well today.”

## L Ganesh, Chairman, Rane Group

*It is a proud moment for Rane NSK to be awarded the 2018 Deming Prize for the sustained efforts in utilizing TQM in our business. Rane NSK has been thoroughly focused on developing TQM systems that encompass everything, from products and services to administration and human resources. We have made great effort to comprehensively improve and develop, and this award recognizes our distinct efforts in TQM. We will continue to strengthen and engage our TQM systems as a powerful asset to meet the needs of our customers in India and around the world.*



# MAITHRI 2018



On October 4, Maithri 2018, a get together for senior management leaders from across the Rane group, was held.

The event was also used as a forum to present the ACE (Achieving and Celebrating Excellence) Awards for 2017-18 and the following companies were recognised:

**Excellence in Plant Operations:**  
**Runner-up:** Rane TRW Occupant Safety Division – SP Koil

**Excellence in Plant Operations:**  
**Winner:** Rane (Madras) - Pondy

**Excellence in Innovation:** Rane (Madras)

**Excellence in HR Practices:**  
Rane (Madras)

**Excellence in Business Performance:** Rane NSK Steering Systems











## THE KEY TO A LEAN AND EFFICIENT SUPPLY CHAIN

*For this article, we interviewed Mr. Sunil Kakkar, Executive Director - Supply Chain, Maruti Suzuki India Ltd (MSIL). He spoke about the importance of working closely with tier 1 and tier 2 suppliers to improve quality and ensure capacity building for future growth. Kakkar also touches upon the importance of using IT to drive efficiency across the supply chain.*



**Maruti Suzuki is constantly expanding capacity to meet the growing demand in the Indian automotive market. From a supply chain perspective, what are some key initiatives to meet this growth goal?**

Comprehensive Excellence Programme is a key initiative focussed on upgradation of all Tier 1 Suppliers of Maruti Suzuki (MSIL) to drive future growth. All our suppliers are part of this initiative and are experiencing tremendous growth by bringing out newer products in the shortest possible time.

As part of this initiative, MSIL is working with Tier 1 suppliers on capacity building for future growth as well in improving their design and development capabilities to reduce development timelines of new models and bring newer models faster.

MSIL is also working directly with Tier 2 suppliers for improving quality in production. Training and capacity building of Tier 2 suppliers is also coordinated through Maruti Centre of Excellence. Increasing the strength of good quality Tier 2 suppliers is an integral part of the growth strategy.

**Lean supply chain and logistics management as well as just-in-time (JIT) have enabled Maruti**

**to achieve growth & profitability. Please share with us some key milestones achieved as well as the developments you took over as the head of SCM?**

The automotive industry is familiar with the benefits of JIT supplies, which helps quality and cost directly. Proximity of production location to the OEM is the key for lean operations. Currently more than 85 per cent of the suppliers of MSIL are located within 100 km distance. In the past few years, SCM initiatives in the areas of packaging improvement and truck safety have also been implemented.

While Suzuki Motor Gujarat expansion was in progress, MSIL along with its suppliers have worked aggressively for enhancing the value addition. The pace of value addition activity in Gujarat has increased in recent years, helping in leaner and efficient supply chain. Further, building up of production capacities in Gujarat has enhanced overall capability and in maintaining the quality levels. A good example is Rane group itself. Rane group already has its facilities in Gujarat and is also setting up additional facilities for supporting the local value addition activity at Gujarat.

**What are some of the processes through which you maintain compliance to Maruti's**

**processes along the supply chain? Can you tell us about the 'Maruti Production System', the training provided to vendors?**

MSIL constantly focusses on maintaining the compliance levels across MSIL internally and at our suppliers through 4M change management and supplier assessments. Maruti has supported its suppliers in various areas of production through Maruti Production System (MPS) Program in the past and also subsequent initiatives in the areas of Tool Life Monitoring and Tier 2 upgradation through the Maruti Centre of Excellence.

Further, vendors are going to setup DOJO centres at the production facilities for ensuring Safety, Quality and Productivity.

By sharing its learnings from time to time, MSIL also ensures that everyone benefits from the mistakes of others and improves without having to face the problem themselves.

**What role does information technology play in SCM? E-procurement, centralized purchase of common requirements etc. are viewed as critical ways of driving bargains. Can you share the Maruti story in driving costs**



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### ***down and improving the supply chain efficiency through E-Nagare?***

With increase in the scale of operations, MSIL is relying on the use of IT for automating processes and making them more efficient. The E-Nagare system and the rolling forecast for six months have helped MSIL improve its inward supply chain.

With increase in scale of operations and complexities, IT is helping Supply Chain teams remain lean by enabling supply monitoring and stock monitoring, among others.

MSIL sourcing selection process is now completely online, giving us the capability to handle large numbers and complexities. This has brought benefits of transparency, speed, accuracy with minimum human intervention. This also helps in bringing down the development timelines through ease of monitoring.

IT is also helping in implementation of sequential supplies with major suppliers, which has led to saving line side space, leaner operations and plant productivity.

The consolidation of raw material requirement for suppliers has improved cost efficiency and quality. Currently MSIL does consolidation of its raw material requirements for commodities like Steel, Aluminum, Copper, Lead, etc.

In order to achieve good quality and long term capacities, MSIL is engaging with its Tier 2 & Tier 3 (Raw Material) suppliers.

### ***Can you share some of your innovations in the distribution side?***

MSIL is working towards reducing carbon emissions generated by freight transport involved in taking materials to its facilities and delivering vehicles

to dealers. MSIL has setup RPDC (Regional Parts Distribution Centre) and regional stockyards in various parts of India to serve its customers. MSIL suppliers are directly supplying the spare part consignments to these locations. This has helped reduce the lead time in meeting the customer requirement and also reduced the load on spare warehouses in Gurgaon. This has created a multiple Hub and Spoke distribution network for different regions.

### ***Supplier Relationship building is very critical to keep a healthy supply chain. Please share some of Maruti's efforts in this direction.***

Today material cost from suppliers stands at around 70%. Suppliers are a key contributor to MSIL's success in maintaining the leadership market position. Vendor Conference, Supplier Club events, Tier 2 upgradation activities are some of the key initiatives of MSIL in its endeavor to maintain high level of engagement with its suppliers.

MSIL is working with its suppliers for implementing efficient production systems, developing healthy Tier 2 base, joint study of practices in areas like IR, Safety, etc. for identifying areas of improvement.

Need based training of Tier 1 suppliers is carried out through Maruti Suzuki Training Academy (MSTA). Apart from shop specific trainings (e.g. body, paint, press, weld), trainings on preventive maintenance, 5S and plant safety are also conducted.

MSIL is also working with its suppliers to percolate best practices to its Tier 2 suppliers.

### ***According to you, how does Supply Chain need to evolve to meet the emerging trends and innovations in the auto industry (electric vehicles, light***

### ***weighting, etc.)***

MSIL is already working on using latest technologies for improving the product efficiencies and reducing the vehicle weight for overall fuel efficiency improvement. New generation lightweight vehicle platform has been developed, which provides advanced passenger safety and increased fuel efficiency leading to lower emissions.

This improvement could not happen easily. MSIL along with its suppliers is taking aggressive weight targets at the design stage itself and suppliers are also working towards developing newer, stronger and lighter raw materials to meet this requirement. The production process in the complete supply chain is also undergoing a change towards better controls, lowering of variables and higher accuracies.

MSIL is already working on a portfolio of xEV technologies to accelerate electrification of powertrains in India and is committed to launching an electric vehicle in India in 2020. The company is gearing up through R&D and strategic partnerships to steer its way forward in EV domain.

### ***If you'd like to share one piece of advice with quality and supply chain professionals in India's manufacturing industry, what would those be?***

Today customers are demanding Zero Defect, which is no longer an aspiration, but a business need. The Zero Defect approach will drive and re-define growth trajectory of India's Manufacturing Industry.

Quality and Supply Chain professionals must change their mindsets and start working towards achieving Zero Defect. It is possible to achieve this milestone by continuous focus and improvements using the PDCA approach.

# Marching towards SUCCESS

*People, Passion and Speed assisted by technology and world class service have been the key factors that have been responsible for the tremendous growth of RTSS-OSD in the last four years.*

Rane TRW Steering Systems-Occupant Safety Division has grown remarkably well over the last six years. In FY12, they clocked an annual turnover of Rs 69 crores and In FY18, they registered a turnover of Rs 502 crores representing almost 7x growth in 6 years. In the last six years, the company has been growing at a CAGR of 40 per cent, which is higher than the industry average. B Ayyappan, President at RTSS-OSD attributes this growth to tremendous hard work put in by his team.

There are several factors that have gone into making this remarkable turnaround possible. In 2012, the company added a global angle to its vision of becoming a preferred supplier of Occupant Restraint Systems, with a commitment to safety. It set for itself a goal of pursuing excellence such that it becomes attractive for global partners as well. With this in mind, it has focused on developing the three key areas of

people, technology and marketing strengths to have a holistic growth.

## **People First**

The division follows a management style of transparency and approachability at all levels, giving its team the freedom to test and experiment. Retention of core team, providing opportunities and growth to junior members, adding at top only when it is essential have all been real motivating factors for this kind of productivity and growth. By this way, it has established a highly supportive second line of management, and recruited and trained freshers and engineers with two to three years of experience with skills needed to meet its goals. It encourages the engineers to interact directly with its partners. This has helped develop the confidence of its team, as well as created in them a sense of ownership. "The team is really motivated and are so dedicated to the cause of providing the right solutions and



sustaining this growth," says a visibly proud Ayyappan. The team has 10 in the senior management; around 70 per cent of its staff have three to five years of experience, and the remaining 30 per cent have 10 to 12 years of experience.

Continuous training has helped the team stay abreast with emerging technology. The employees travel to the plants in China, Korea and Europe, or experts travel to the Indian





“In 2012, RTSS-OSD began its export journey supplying seatbelts to Renault in Brazil and Columbia. By demonstrating its technology capabilities that ensured quality at competitive costs, RTSS-OSD bagged an order from Ford and Hyundai Kia soon after.”

plants to help in knowledge transfer. Periodic telephonic interactions with counterparts at plants abroad have also helped in becoming aware of challenges faced and improving processes and enhancing quality.

RTSS-OSD recently released a logo representing its growth using People, Passion and Speed as the motto. The company has the largest number of women employees in its plant and believes that they have contributed tremendously to manufacturing critical parts with zero ppm, given their high

dedication and concentration levels.

### **Upgrading Technology**

“Earlier, India would be behind international trends at least by a few years,” Ayyappan explains. But now, in most segments, India is on par. RTSS has also ensured that it incorporates the latest technologies and equipment so that it can meet its aspiration of being globally competitive.

However, as importing machines can require huge outlays, it has developed local suppliers to match global standards. The plants are now world-class, and the division has successfully demonstrated its capabilities, winning a few export orders.

In 2013, RTSS had started manufacturing airbags in its existing plant in Chennai. But seeing its growing demand as well as to cater to the changing technological requirements, it established a brownfield plant in its existing facility in 2015. Propelled by further growth, it will be opening a state-of-the-art plant in Trichy with facility for laser cutting and sewing of airbags and seatbelts.

This is expected to be the largest plant in the group and will be live by 2019.

### **Tapping into Global Markets**

In 2012, RTSS-OSD began its export journey supplying seatbelts to Renault in Brazil and Columbia. By demonstrating its technology capabilities that ensured quality at competitive costs, RTSS-OSD bagged an order from Ford and Hyundai Kia soon after. “Being a JV partner of a European company, winning an order from a Korean company was no mean task,” expresses Ayyappan. It required lot of hard work, and he commends his team for rising up to the occasion every time. Winning this order further boosted its ability to win more clients in the country and the division added three more prestigious clients. Its localization capability has been an added advantage in strengthening the company’s relationship with its customers.

While there is much to celebrate, the division has no intentions to rest on its laurels and will continue to add capabilities that will keep its customers happy and further boost revenue growth.

# STEERING TOWARDS AUTONOMY

*It is certainly an exciting time for steering technology solution providers, as they have to keep pace with rapidly changing times. For the 'Future of Mobility' section this edition, we interacted with Mr. RM Thirupathi, Sr. VP, Rane TRW Steering Systems, to understand emerging trends in steering technology, keeping in mind both technological innovations and regulatory requirements.*

There is much that is happening in the automotive industry, technological innovations and regulatory requirements influencing the developments. Steering technology too is evolving to keep pace as well as to facilitate the transformation smoothly and effectively.

The key areas where one can see the shift happening include:

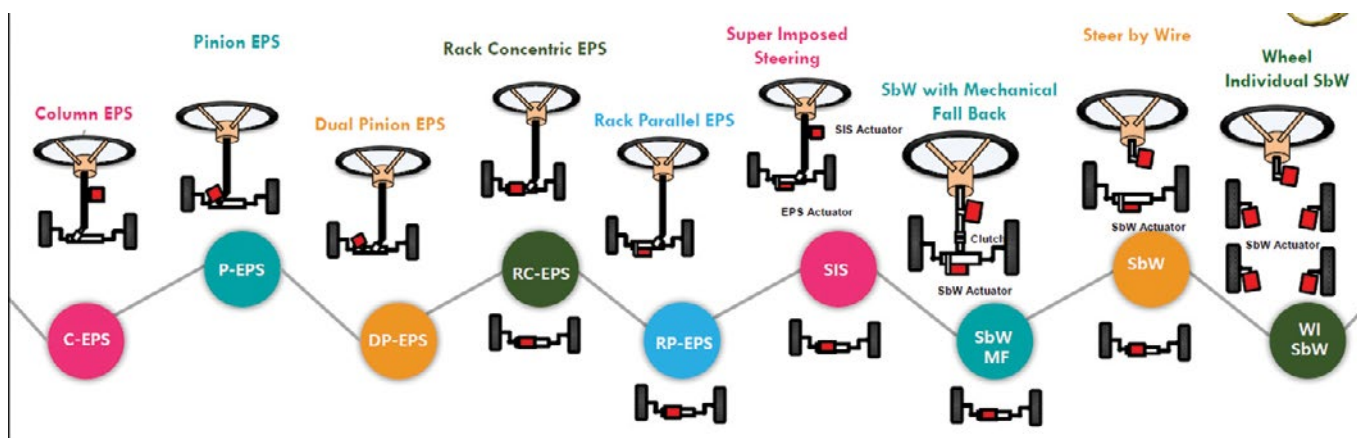
- Smart Logistics with greater data orientation
- Digitalisation of manufacturing processes
- Integrated safety to prevent or mitigate the severity of traffic accidents
- Vehicle Motion Control
- Electric Mobility – which is expected to become inevitable by 2030 when electric cars will become mandatory

## **Key Trends and Influencers**

Safety is not only gaining importance as the number of vehicles have increased,



with a corresponding increase in accidents, but also because technology facilitates safety features such as turn assist steering, evasive maneuvering, collision avoidance and emergency braking. ISO26262 ASIL also requires tightening of functional safety in development cycle of systems. This, however, is not easy to achieve and there will be more collaboration between suppliers of different components to integrate features and improve safety.



**Steering Technology Evolution in Passenger Vehicle**

Regulation regarding improving pollution control is also pushing manufacturers to turn towards emission-free vehicles, both in passenger and commercial vehicles. "Steering is also being aligned to some of these trends and electrification of the drive line and other systems like steering will lead to improvement in vehicle efficiency," points out RM Thirupathi, Sr VP, Rane TRW Steering Systems. Automated driving is yet another exciting trend that is still evolving. Driverless automated vehicles promote safer and greener mobility and interestingly, third party players have shown greater nimbleness in entering the space. Autonomous driving will be implemented in stages, from assisted systems to semi automation to high level of automation to fully autonomous vehicle. This will need enabling technologies such as electrical steering, cameras, radar, laser and communication systems etc. Steering technologies too will undergo a corresponding change.

### Steering for Change

Electronics is going to play a big part in incorporating intelligence into the steering using technologies in integrated safety, electric mobility and automation. For automation to be

*"Safety is not only gaining importance as the number of vehicles have increased, with a corresponding increase in accidents, but also because technology facilitates safety features such as turn assist steering, evasive maneuvering, collision avoidance and emergency braking."*

possible, steering needs sensors to 'see', controller to 'think' or process the data and an actuator to 'act' or respond based on data analysis. "SEE – THINK – ACT is the leading principle of our partner ZF for its technological innovations," says RM Thirupathi. In fact, in a sense, world has been moving towards this intelligence since the 1980s when electric power steering (EPS) was first introduced in mini cars due to lower axle load and rack force. Now EPS is used in different vehicle segments up to SUVs in a variety of configurations based on cost, packaging and performance. "They have enabled making the vehicles lighter and fuel efficient, and

everybody is now moving away from column EPS to rack EPS," explains Thirupathi.

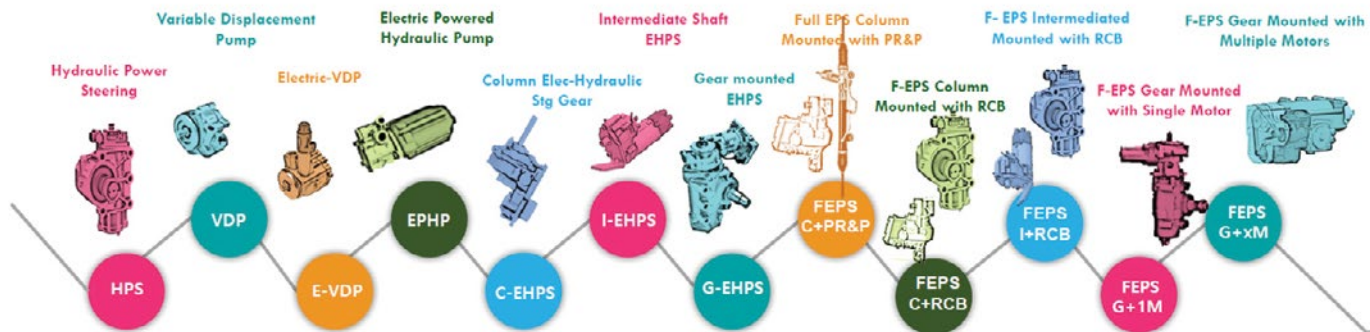
### From EPS to SbW

As autonomous driving evolves from driver guided to fully automated system, the steering system too will evolve from EPS to steer-by-wire (SbW), which would become the de facto configuration in automobiles in a matter of time in many. One of the interim stages is the Super-Imposed Steering (SIS), a hybrid system that maintains the mechanical linkage but installs an electric motor in the steering column. The electric motor is used to increase or decrease the road wheel angle imposed by the driver as a function of vehicle velocity, stability and the driver's steering wheel angle.

SbW may eventually do away with all the mechanical and physical linkages between steering wheel and front road wheels, replacing them with electronic sensors, control units and actuators. SbW being a critical element of fully autonomous and self-driving cars of the future, European estimation is that the market for SbW systems will grow at an annual rate of close to 30 percent from the year 2020.

Steering being a 'mission critical'





**Steering Technology Evolution in Commercial Vehicle**

“As autonomous driving evolves from driver guided to fully automated system, the steering system too will evolve from EPS to steer-by-wire (SbW), which would become the de facto configuration in automobiles.”

function, OEMs have by and large restricted the use of SbW on prototypes and concept vehicles only as on date. OEMs and Technology suppliers will work on developing these systems, as they are expected to contribute to comfort, weight reduction and significant safety.

Eventually, Full Electric Power Steering is the future that will enable fully automated driving.

### Commercial Vehicles

Full EPS is ideal for commercial vehicles as well and its migration up to ICV is expected to be fast due to Euro norms and Electric Vehicle revolution.

The insurmountable challenges for scaling up of EPS for higher axle

loads include durability demands of heavy commercial vehicles as well as power limitations with 12 V systems. While diesel engine trucks in North America have 12-volt systems, it is 24 volts in Europe, India and China. 48-volt electrical systems for trucks and buses are likely now on the way due to higher vehicle electrification. Rack type and RCB type EPS are being evolved by various competent and skilled technology suppliers to OEMs.

Electro Hydraulic Power Steering (EHPS) is the stepping stone to realize the full EPS. The advantages of a Full EPS can be obtained in terms of electric torque overlay features over a hydraulic power steering.

### Future Challenges

Some of the challenges that will emerge as we move towards fully automated driving include ensuring safety. Compliance to safety standards such as IEC61508 and ISO26262 ASIL levels will be important. Security is another area that needs attention as cyber jacking of EPS is real in the era of internet of things. EPS is more vulnerable because its functionality mostly relies on software. In fact, not only the EPS but the entire connected ecosystem must be protected – be it

the communication, flashing, booting, debugging, or diagnosis.

Then there are technical challenges such as real world usage and testing, big data management and analysis of use case studies. Some of the other challenges include self-learning or tuning the compensation gain of EPS with respect to mechanical linkage parameters such as friction, backlash and inertia variation, different and rough road conditions, variety of vehicle applications and different usage and driving patterns. Providing the steering technology at the right price, especially in sensitive markets, packaging in conformance to IP69K, meeting legislative stipulations are some of the other areas that will need greater clarity as well as solutions.

But no doubt, as the technology matures, so will its use, which will in turn create an ecosystem ready to meet the challenges and offer corresponding and appropriate solutions. Though many doubts and challenges exist today, the world has already started seeing changes in vehicle ownership and usage patterns, driven by some of these technological developments. In the times to come, there will be greater clarity.



## EVENTS



### **RANE GROUP AT AUTOSERVE 2018**

Rane Group participated in CII Autoserve 2018, one of India's Largest Exhibitions on Automotive Care, Maintenance, Service Parts, Garage Equipment & Accessories held from 23rd to 25th Nov 2018 at Chennai Trade Centre. Rane Group companies were part of the dedicated pavilion "ACMA Safer Drives", which is an initiative to make Indian roads safer and sensitize stakeholders towards their responsibility on roads. Through this event, the group companies emphasised on the importance of genuine quality spare parts to ensure safety of vehicles.



### **RANE GROUP AT FISITA WORLD CONGRESS 2018**

Rane Group was a Gold Sponsor for the 37th FISITA World Congress 2018 event held from 2nd to 5th Oct 2018 at the Chennai Trade Centre.

The group companies showcased their innovative technologies and Mr. RM Thirupati – Sr Vice President, Product Engineering, Rane TRW Steering Systems Pvt Ltd – Steering Gear Division delivered a keynote speech on Emerging Trends in Steering Systems.

The-four-day event attracted over 1,200 delegates from India and abroad.

### **RANE NSK ADDED A NEW FACILITY IN AHMEDABAD**

Rane NSK Steering Systems Pvt. Ltd. Opened a new facility for Electric Power Steering (EPS) on November 22, 2018 at Ahmedabad, Gujarat.

The facility is strategically located at Changodhar, 20 kms from Ahmedabad, Gujarat. This facility will address the expected market demand and serve passenger vehicle customers in the western region.

The company will invest around Rs. 35 crores this fiscal for a capacity of around 2,50,000 units per annum and this will be ramped up to 6,00,000 units in next two years, with an additional investment of around Rs 20 to 25 crores.



## RANE PIONEER OF CHANGE AWARD PRESENTED TO V-EXCEL



Rane Foundation presented Rane Pioneer of Change Award to V-Excel Educational Trust (V-Excel) for building a social impact venture that is focused on helping individuals with special needs pick up key skills for employability and therefore live a self-sustainable life.

The Rane Pioneer of Change award was instituted as part of Shri L L Narayan (LLN) memorial initiatives during LLN's centenary function held on 6th October 2017. The inaugural edition witnessed participation from 78 NGOs and individual social change makers across Tamil Nadu. The award comprises of a medallion and a cash prize of Rs. 10 Lakh.

Started in 2001, V-Excel provides lifespan services for persons with special needs. V-Excel runs a wide range of programs such as special schools, specialized therapies, remedial intervention, vocational training, teacher training, etc. With Chennai as the hub, it has 10 centres in 2 states and has positively touched the lives of over 65,000 children since inception.

V-Excel has conceptualized 'Tiffin Times' as a concept to build capacity to empower and bring to the mainstream 100 individuals with special needs. Through this project, V-Excel will train young adults with special needs to deliver 'hospitality on wheels' in the fast-food service sector.

The award was presented in a function held at Rane Corporate Centre on 3rd November 2018.



**"Talent wins games, but  
teamwork and intelligence wins  
championships"**

**— Michael Jordan**

**We picked this quote, since it was apt for an edition that features a cover story on Rane NSK winning the Deming Prize. The leaders at Rane NSK often emphasised how it was seamless teamwork that got them there.**





**Rane Corporate Centre**

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