



PROPEL

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The background of the cover is a photograph. In the foreground, a long row of tall, thin flagpoles extends from the bottom left towards the right. Each pole holds a flag of a different country. The flags are colorful and appear to be waving. In the upper right portion of the image, a commercial airplane is flying across the sky, leaving two distinct white contrails behind it. The sky is a clear, bright blue.

A Peek into Rane Group's
International Business



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)

- Light Metal Casting India (LMCI)

- Rane Auto Parts (RAP)

- Rane Light Metal Castings Inc (LMCA)

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. (RHA)

Rane Holdings Europe GmbH (RHEG)

Rane t4u Private Limited



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publishes The Smart CEO
magazine

INSIDE THIS EDITION

The world is breathing again, a little cautiously but a little more boldly too. This is reflecting in business growth, especially exports business for the Rane Group companies. In the Cover Story, we highlight some of our initiatives to strengthen our international presence through strategies covering design, manufacturing and marketing.

Another area that has captured the imagination of customers, especially with increasing petrol prices, is electric vehicles, especially in the two-wheeler market. In the section Outside In, we speak to Tarun Mehta, Co-Founder of Ather Energy, about the growing market demand for electric vehicles, the innovations Ather is bringing to the product and the role supply chain plays in keeping up with the ever-changing demands of the market.

Another area of growing interest is IoT, which is being leveraged by the Rane group company, Rane t4U. We interview Sanjeev Agrawal, President, Rane T4u, in the Business Roundup section, to capture his vision for the future of the company.

Don't miss out our other sections, Know the Product where we describe how the Steering Systems work; Rane for Good that highlights Rane's CSR activities; and Employee Spotlight, with the spotlight on the engineering teams of the Rane group companies.

Enjoy reading!

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A Snapshot of Rane's Two-Wheeler Business

The two-wheeler segment contributes around 4% to Rane Group's revenues. Rane components are used in scooters--both petrol and electric, motorcycles and three-wheelers.

Light Metal Casting Products



Battery Box & Cover

Friction Materials

Disc Pad



Rane (Madras)

- Light Metal Casting Products

Rane Brake Lining

- Disc Pads

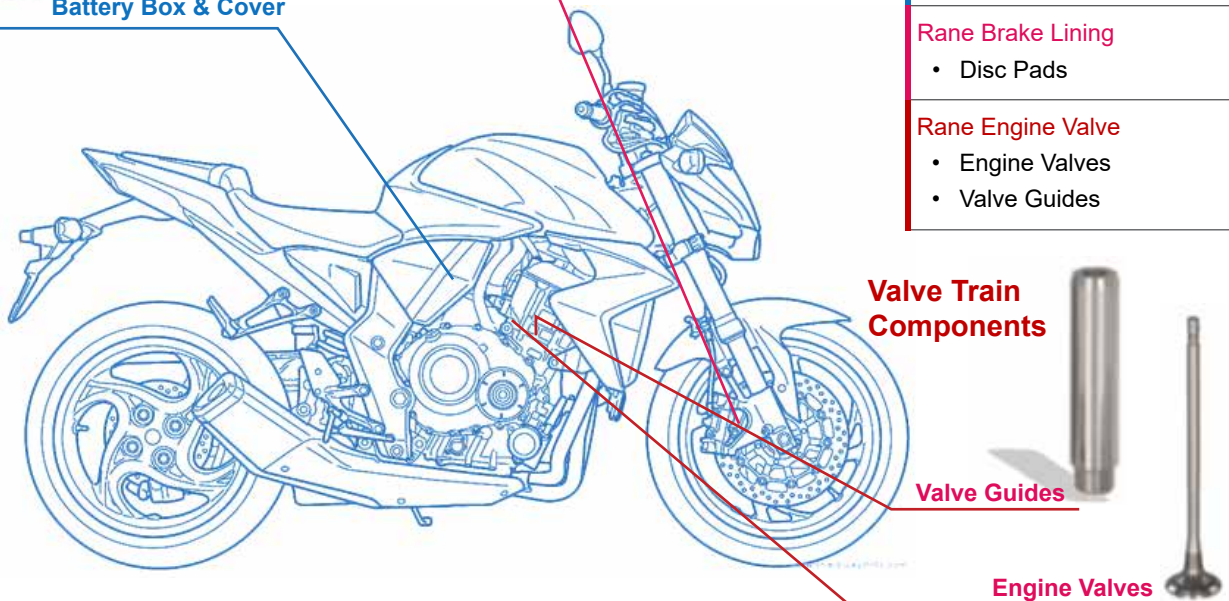
Rane Engine Valve

- Engine Valves
- Valve Guides

Valve Train Components

Valve Guides

Engine Valves



CUSTOMERS SERVED

The Rane Group serves many leading Indian and International brands in this segment. These include:

INDIA



TVS



ROYAL ENFIELD



PIAGGIO



ATHER



INTERNATIONAL





Rane Group's International Business – On Firm Footing

Rane Group, since its inception in 1929, has been expanding its areas of operations in the auto components segment steadily. The company has signed up several joint ventures with industry leaders to leverage their technical know-how and improve the quality of its products.

This helped the group establish its reputation in the Indian market. By adopting Total Quality Management, it has further ensured a holistic approach to quality with Total Employee Involvement. Its learning and development programs are also aimed at empowering its employees to meet global standards and contribute to the evolution of the Rane group of companies.

This approach enabled the company to foray into the international markets confidently and establish itself as a name to reckon with in exports. Rane Group entered the US market in the 1980s and Europe in the 1990s. Over the years, it has been able to increase its market presence and today exports to 30+ countries. Initially, Rane serviced its clients from India, but as customers prefer near-shore suppliers, especially for safety-critical products, the company established offices in the US and Germany and also operates a manufacturing unit in the US.

The international business contributes 22% to the group's revenue and is expected to increase to 25% in the

near future. During the pandemic, though the business from India was impacted, international markets continued to fuel the growth of the company.

Rane's Three-Pronged Approach to Increase Its Global Business

To be competitive in the international markets, Rane Group has followed a three-pronged approach:

- 1) Enhance competencies to scale more globally
- 2) Grow exports with the support of JV partners
- 3) Establish an international manufacturing footprint

I. Enhance Competencies to Scale More Globally



The Steering and Linkage Division of Rane Madras Ltd (RML) won several export businesses through a structured approach and doubled exports in four years. **Gowri Kailasam**, President, RML-SLD, shares how the company was able to grow despite challenges such as the pandemic, global market fluctuations and stringent cost/quality expectations from export customers.

Bespoke Business Development

One of the keys to success is the focused approach the business development team adopts specific to the customer/project to ensure effective monitoring right from RFQ to winning the business. The relationship matrix covering all key decision-makers across levels is made as part of the Battle Plan to ensure constant interaction throughout the process. A visit plan is made to meet and align the decision-makers across geographies to improve the chances of winning the business. The BD team further engages with all the internal functions to meet the stringent QCD targets given by the customers.

Design Capability

Another area that evokes customer confidence in RML SLD is its

design capability. The R&D team works closely with the customers to understand their needs and create specific solutions that meet their product/cost demands by factoring in cost, durability, reliability, and robustness. In-built quality, cost competitiveness, and value through technology are the three guiding factors for all RML designs. Specific products are developed for customers to meet their requirements, and SLD's full range of in-house product testing/design capability provides a one-stop solution for global customers.

Innovation in Manufacturing

As cost is a major challenge in winning the export business, RML SLD has been working on various innovative manufacturing methods to reduce investments and improve quality and productivity. SLD, with its in-house manufacturing engineering capability, has designed & developed fully automated assembly lines in line with global competitors, thus significantly reducing capital expenditure. Latest technologies such as Artificial Intelligence are used to develop algorithms for automating critical manufacturing operations, Industry 4.0 implementation and digitisation of the shop floor.

Quality

Quality being extremely important for sustaining/growing export businesses, SLD follows a structured process to ensure Product Quality right from design to mass production stage.

Manufacturing facilities are set up with adequate controls to monitor key product parameters along with error proofing, and a firewall to ensure defect-free output. Quality and Program Management teams work together through the process of product development till mass production approval. All new export programs are monitored through a 'Safe Launch' Program for six months from the start of production. Periodical reviews of the Safe Launch status are held at the Business Head level to ensure the smooth launch of the program.

Customer Service

Customer Service Engineers (CSE) are appointed at respective customer locations to ensure smooth business transactions and effective management of schedules, material inward, quality and other issues.

Impact of Pandemic

The pandemic did not affect all countries simultaneously. Therefore, RML SLD's export program was not majorly affected. SLD's R&D and Manufacturing Engineering teams worked with local suppliers to ensure timely implementation, thus avoiding program delays due to the pandemic. Strict Safety Protocols/SOPs maintained by RML SLD helped it to run uninterrupted production and achieve the projected export target.

Due to pandemic/other socio-political conditions in China, global OEMs are de-risking their sourcing strategy by looking for capable suppliers like RML SLD, which is aiding more business opportunities in the export market.



II. Grow Exports with the Support of JV Partners



B Ayyappan

RTSS-OSD derives 60% of its revenues from exports to various geographies such as South Korea, Germany, Russia, etc. In the exports business, spotting the opportunity is a very important aspect, according to **B Ayyappan**, President – RTSS-OSD. He shares how the support from the JV partner enabled the division to spread its wings and expand its reach.

Identifying Opportunity

For RTSS-OSD, the first-mile success was in identifying the absence of a ZF OSS (Occupant Safety Systems) plant in Korea though it had good sales, engineering, and test facilities. Having supplied to global OEMs such as Ford and Renault in India, the company was confident of delivering quality products to a global customer at the required quality levels. They convinced the ZF OSS management to bring in the latest available seat belt technology, Pretensioner and Retractor (SPR4 and FS1), to India and got the approval to quote for Export business to potential customers.

Strategic Approach

As cost is an important factor in

exports, each of the cost elements was reengineered and an optimal cost structure arrived at. Even risk factors such as the Forex were considered. The RTSS-OSD project management consulted with their counterparts at ZF OSS extensively to weed out the gaps. The company won its first order in 2014 and was able to win ZF's trust through an agile response to their dynamic and ever-changing engineering requirements without compromising on quality and delivery requirements. This won the company repeat business and enabled expansion into IRS (Inflatable Restraint Systems) products.

Transparency to Win Trust

One of the reasons RTSS-OSD was able to leverage its JV to win export business was the trust it had earned by showcasing professionalism and transparency in dealing with ZF. The team was aligned to the expectations of a global organization and developed an attitude of learning and growing with them. This helped the team apply global best practices at all levels and across functions, viz. marketing, engineering, operations, materials and finance. The team's flexibility to adapt to global timelines from Korea to Europe to the USA increased its standing with ZF, which found potential in the JV and was willing to increase business association.

Local Capabilities

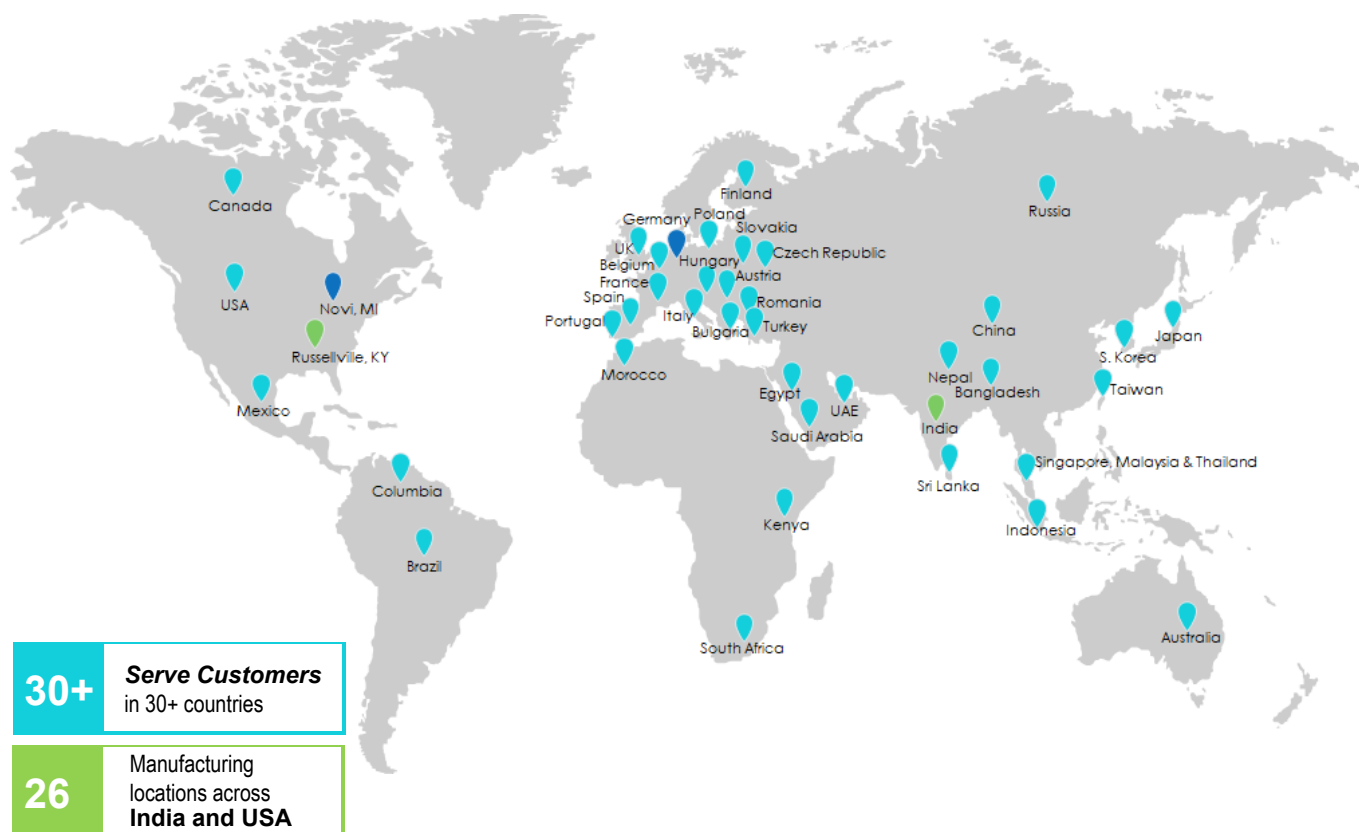
RTSS-OSD is on an aggressive localisation path for almost all parts of a seat belt except PT and Webbing; and in the airbag, except inflator. The division will work on further localization and aggressively increase engineering resources to enable most of the development work to be done in India.

RTSS-OSD is actively exploring setting up an engineering centre to cater to global needs. Improving test capabilities such as mini sleds, NVH, environmental and durability test setups to reduce time and cost are also on the anvil. All these initiatives will make the division more competitive in terms of engineering, cost, quality and delivery performance. Setting up a global proto shop for meeting the needs of various businesses of ZF across the globe and exporting seat belts to various global locations are also being worked on.

This JV is now seen as an extension of other ZF plants but with a regional business decision-making ability, which is paving the way for further growth in the coming years. 'Think Global, Act Local' is an apt adage for this JV.

The JV with ZF has grown in purpose and resulted in:

- Addition of newer technologies like side airbags, curtain airbags, dual-stage airbags, KnAB and new technology seatbelts like SPR4, SPR8, FS1, new buckle technologies
- The addition of newer verticals like cushion business started from captive use which transformed into exports to ZF global locations
- Localization of cushion fabrics
- Development of local sources for global supplies
- Development of local machine-building sources
- Indigenous development of technology such as iFS1
- Local engineering development for low-cost launch
- Recognising our Proto Shop for global proto requirements
- Giving a global engineering development project to India for a seatbelt application
- Expanding further for newer technologies



III. International Manufacturing Footprint

Rane has been supplying Light Metal Casting products to Indian and global customers since 2005, with 70% of the revenues coming from international customers. The global demand for aluminium castings increased due to the light-weighting of cars. Since the US customers indicated a preference for local supplies, Rane Group decided the time was ripe to start manufacturing there. In 2016, to meet the needs of its US customers, the company acquired a manufacturing unit in Russellville, Kentucky, US, to supply low porosity high-quality aluminium die-castings in this market.

When the acquisition was made, Rane was conscious that the acquired entity Rane Light Metal Castings Inc. (RLMCA) required operational turnaround and financial support to improve the performance. However,

the desired results could not be achieved in the planned timeframe of 3-4 years. Rane Light Metal Castings America could secure only limited new business, which resulted in the widening of losses and restricting the capacity to invest in operational improvements. The Covid-19 pandemic has significantly impacted the future of this business.

In the past 12 months, the operational performance of Rane Light Metal Castings Inc. has improved with the introduction of TQM best practices such as Policy Management, DRMs, PDCA way of working, preventive maintenance and tool management. It was evident from the significant reduction in expedited freight cost, repair and maintenance cost, consumable and tooling cost and cost of poor quality.

The group is enthused by all the above operational improvements, good new orders procured and the emerging demand for aluminium components in the Auto industry, particularly due to electrification. The strategic manufacturing footprint in the USA will further the aspiration of enhancing international revenues in the coming years.

The above-mentioned three-pronged approach has enabled the company to win the trust of its customers and develop a healthy pipeline even in times of the pandemic, boosting revenues from international business.

Ather Electric Vehicles: Talk of the Town



The two-wheeler segment is charged with excitement by an increasing interest in electric vehicles. Tarun Mehta, Co-founder & CEO at Ather Energy, a company to which Rane supplies light metal castings, shares his views on the industry from a supplier perspective.

Just to set the context for this story, you started Ather Energy while you were still doing your undergrad at IIT-M. Please share your 3 most memorable moments from your entrepreneurship journey so far.

In the early years, we used to keep an early prototype in a glass office in the IIT Madras tech park and it used to attract a lot of attention. That led to a lot of user conversations with the prototype serving as a fantastic conversation starter.

Another great memory is the first launch of Ather450 in 2018. It was our first product launch and I was quite nervous as an entrepreneur but the market response was phenomenal.

Rane being a supplier to Ather, we understand the critical need for demand forecasting and planning. Take us through how you do this at Ather?

Being a technology startup, we are continuously evolving and striving to embed data and technology in everything we do. As compared to the goliaths of the industry, it may seem obvious, but for a company of our size, we can

proudly claim to have completely migrated to an ERP-run (SAP-based) forecasting, planning and manufacturing system. With an aggressive city expansion strategy, we are in a continuous production ramp-up mode, which requires us to collaborate with our suppliers more minutely for the short term as well as strategically for the long term. Our material requirement plans for both short and long terms are shared automatically with all our suppliers through our ERP system, with continuous corrections on a periodic basis to enable the entire supply chain to be dynamic and resilient. Today we have reached a stage of system-driven decision making for the entire forecasting, planning and manufacturing cycle. We are also actively monitoring the supply chain of our sub-tier suppliers for critical components and raw materials to maneuver through sudden shocks in their supply.

It is amazing how you've built a wonderful supply chain from scratch. Take us through this journey.

Rome wasn't built in a day. It took a lot of time to reach where we are today, navigating through lots of suppliers, team structures, strategies, resources, etc. to finally find the balanced supply chain which makes a positive business case for the organisation. Building an effective supply chain has required a lot of work on multiple other fronts like product & technology, business development strategy, manufacturing strategy, etc. so that an optimum supply chain strategy can be developed. Building the right teams with the right resources and required competencies and retaining them has been one of the key pieces of the puzzle. But most importantly, building and maintaining long-term relationships with our suppliers, driving value and enabling them to grow with us as pioneers of the electric vehicle revolution in India has been the defining vision in building our supply chain.

Thanks to unique features like navigation dashboards, we're sure you have had to innovate in terms of tech supply chain. How did you go about doing that?

Innovation is perhaps the most innate characteristic of Ather as an organisation and it transcends to every team and every member of Ather, because we "Think like a Species". Product innovation has a huge dependence on the ability of its supply chain to deliver the same at a price and scale which makes economic sense. In this regard, Ather has always tried to partner with suppliers who have a similar innovation DNA, which enables both organisations to share, learn and adapt in order to

deliver product features that are market-leading. Building a highly competent talent pool of product architects, engineers, sourcing experts, manufacturing veterans, etc. over a significant span of time has paid dividends in building a smart, cost-effective supply chain especially for the market-leading product features. Lastly, the key driver for such innovation has been the adoption of agile practices across product development, supply chain and manufacturing, enabling Ather to go to market quickly and be economically feasible.

Tell us a little bit about Ather's various target customer groups? How are you thinking about that?

At the pace at which the EV industry and Ather is growing, we are seeing a very rapid change in the type of customers who are considering us. From a demographics perspective, our core TG falls in the 25 to 45 years age group, mostly on the premium end of the spectrum and hence SEC A and B1. Most of our customers have already owned a 4-wheeler or a 2-wheeler or both.

From a behavioural and psychographics perspective, in the initial years we obviously saw Early Adopter customers--these were people who were tech/EV/Auto enthusiasts who were thrilled by the beautiful product and the ecosystem that we were creating. They were quite ahead of the curve and were willing to make bold choices even if these were unconventional ones. If they believed in something, they went for it without worrying too much about what the world would say. These customers formed the first wave of advocates for Ather.

Now that we expand to major tier 1 and 2 cities, our experience centres are attracting more customers than many petrol brands and we are already witnessing the Early Majority customers considering our product. These are active considerers of ICE scooters. While we were getting more of the 125cc and above customers till of late, thanks to the recent increase of 50% in Government's FAME subsidy on Ather scooters, we are getting even the 110cc scooter considerers. But even today, Ather customers are more discerning than the average scooter customer. Beyond just the category advantages like lower maintenance and cost of ownership, our customers value the seamless and thought-through experience that we've created.

Keeping this target in mind, how did you choose the features you wanted to add?

We designed the Ather 450X to be a clear upgrade over the ICE scooters. This is because we understood quite early that if the EV industry has to be a viable alternative to the highly evolved ICE scooter category, it needs to offer very strong and convincing products and not cheap/low-

performance EV products that you've seen in the past.

So we wanted to have a scooter that does everything that a conventional scooter does better than the conventional scooters, and meets a whole new set of customer needs using technology. Hence, you see that on all parameters that you typically evaluate a conventional scooter--like performance, comfort, convenience, design, the Ather 450 series beats any scooter hands down. And over and above that, it offers new technology features like Inbuilt 4G and Bluetooth connectivity, on-board Google navigation, call and music control on-the-fly, over-the-air feature updates, Reverse Park Assist and more.

You talk about how Ather is designed for "our Indian" roads. Tell us a little bit about that. How do you plan to save the Indian rider's back?

We've designed the Ather 450X to be a Zero Compromise vehicle when it comes to ride and handling on Indian roads. It offers a host of first-in-industry features like Monoshock Rear Suspension for enhanced convenience, Lowest Centre of Gravity for bike-like handling, Quickest Acceleration in India to zip through the choked roads in our cities and double disc brakes to ensure safety despite high speed. It offers a gradeability of 20 degrees--which is higher than any scooter in the country and hence you can go up any slope/flyover in your city. The battery and the touchscreen dashboard are all-weather proof and water-resistant so you don't need to worry about rains or extreme sunlight and take it to any place in the country.

With Ather Grid, you want our cities EV ready. Tell us your approach to scaling up Ather Grid.

A key barrier to the adoption of electric vehicles is range anxiety. To address this issue, Ather has designed and manufactured Ather Grid, an extensive public fast-charging network that offers fast, reliable and safe charging solutions. Currently, the Ather Grid network spans 200+ locations in 25 cities and we plan to expand the network with a total of 500 locations by March 2022.

We will continue to set up sharing infrastructure before entering any new city as we believe that accessible charging infrastructure is critical before launching our products in any market. We are adding at least 45 charging units every month.

Ather Energy recently opened the proprietary charging connector to other OEMs to adopt for their two-wheelers to drive faster adoption of EVs and improve supporting infrastructure. This will allow EV owners to access more charging points and will also act as a catalyst for building charging infrastructure.



Eyeing **Leadership** Position In **Commercial Logistics** Segment

Sanjeev Agrawal, who took over as President of Rane t4U in January 2021, shares with Rane Propel his vision and objectives for the company and how his experience will help drive growth for the company.

Kindly tell us about yourself and your vision for Rane t4U.

I have been in the technology solutions space for the past 29 years and have worked in various US MNCs such as Honeywell (20 years) and Tribble Inc. (4 years) in various roles as part of their growth journey. I started my career with Steel & Tyre manufacturing industry as Process Automation & Control Instrumentation engineer. In my stint with Honeywell, I was the Engineering Head for India, operations leader and business leader. My passion has been to provide the leadership with technology solutions that best meet customer needs in a cost-effective manner. I got a chance to work on challenging assignments and led some of the turnarounds.

Rane t4u has been offering IoT solutions for mobile assets enabling a connected vehicle ecosystem. With the phenomenal growth in the e-commerce segment, particularly during the Covid-19 pandemic, digitalisation and automation for supply chain management became a mandatory requirement. This will continue to drive faster and deeper adoption of technology in the logistics and mobility space. Our vision is to make Rane t4u a market leader in telematics-based IoT solutions, particularly in the commercial logistics segment as it is the core segment for Rane as a group.

Rane t4u believes in providing end-to-end solutions for an entire ecosystem to integrate operations between all interrelated players in an industry. Please tell us some of your key focus areas and your strategy for market promotion.

We plan to connect all stakeholders such as the fleet owners, large and medium 3PL, shippers (users of logistics), Fast Tag, insurance players, and financiers as part of the ecosystem which is enabled by technology. We are focusing on horizontal expansion with fleet owners and vertical integration with shippers as part of the journey to a mature ecosystem.

What are some of the core areas you have a presence in and how do you plan to expand reach?

We have been into goods logistics (long haul, mid-mile, first and last-mile including e-commerce), people mobility (self-drive cars, taxis, employee transportation), natural resources (sand & other minerals mining and tracking). We plan to expand into construction logistics solutions including various machine monitoring and workers tracking, warehouse / fixed assets management, IoT and IIoT.

What is your product/solution roadmap? Please share some of the key elements of your solutions and how you see the market evolving?

We have expanded our products and solutions portfolio, newly added a range of rugged hardware and sensors and are focusing on safety solutions such as ADAS (Advanced Driver Assistance System) and DMS (Driver Monitoring Solutions) for drivers and passengers. We plan to expand into the electric vehicle ecosystem including charging stations monitoring and user platform. We plan to release solutions for IIoT.

Since the Covid-19 pandemic, what have been some of the challenges faced by Rane t4u and your strategies to overcome them?

Covid-19 impacted the business initially as some of the segments like people mobility and logistics were hit badly.

Many customers had delayed investments in technology and remote collaboration with teams became a challenge. However, the team adopted remote working and ensured uninterrupted customer service. We are focusing on expanding our penetration into the Commercial Logistics segment, which serves the e-commerce segment, and EV vehicles, which would continue to grow.

Covid-19 also saw the quick adoption of technology for greater efficiency and productivity while enabling remote working. Was this trend reflected in Rane t4u's customers' operations too? How did it impact your business?

Yes, we see a greater interest in digitalisation in the mobility segment, particularly e-commerce. Visibility and productivity have been in focus to serve the end customer better. We are expecting good growth from this change in the medium term.

How do you see the future unfolding as the role of technology in business continuity and disaster management is becoming more evident?

We all have learned this, and technology has proved how helpful it is to mitigate business risk and helped in business continuity. Technology usage and automation would continue to grow, and we see a clear trend as there is a huge demand for semiconductors and software resources post-Covid-19.

How do you see your own marketing strategy reflecting these changes for faster growth?

We are aligning with the core market focus and hence have reshaped some of the products' positioning from Rane t4u for fleet owners/shippers and e-commerce. We plan to connect to the core market support system including various industry events and digital marketing.

Where do you see the company in 2025 in terms of revenue and achievements?

We are all set for exponential growth. Rane t4u has been in this industry for 12 plus years and will continue to leverage our domain expertise and customer experience. We plan to see 400% growth and will be expanding both in the domestic and international markets.

Making a Mark in Innovation and R&D

E ASHOK,
Product Engineering,
RTSS SGD



Memorable Experiences

One of my most memorable experiences is winning Ford B517 (Figo) Pump business in 2008 after two failed attempts. We worked closely with the Ford engineering team and successfully designed and developed two unique pumps for Diesel and Petrol variants (new housing with improved hydraulic passage for better NVH performance developed through PDC route). The pump performance was better than that from an overseas player. With this, we were able to establish ourselves in Ford for pump business.

Greatest Learning

Expecting the unexpected, breaking the barriers and crossing the departmental boundaries to achieve the end result are my key learnings from the RAMP workshops and I am practicing them. Cross learning with Rane R&D teams through New Technology Group (NTG) meetings gives me lots of insights into our group capabilities and strengths. As part of Deming and JQM audits, I learnt the TQM principles and TQM is our way of life, demonstrated through RBEAT audits.

Under the Rane KEY scheme, I have done my PG in Automobile Engineering and now I am going to start my Doctorate program shortly.

Key Contribution

I started my career with pump manufacturing in 1998 and moved to product engineering pump, where I worked in almost all functional areas such as NPD, CPI, MCR, VAVE and product testing. I looked after Reservoir design and development and am one of the inventors of Pump and Reservoir products for which seven patents have been filed. Now I have been given the opportunity to design and develop New Technology products in FIG & Pump. I have also participated in external competitions and won awards for New Technology Products such as ACI Award in 2020 for Electric mobility solution for Motor-Driven Pump for EVs.

Keeping Pace

Engaging with customers, understanding their unstated needs and closely coordinating with them to fulfill their needs proactively is the key to success. RAMP and HPLD groomed me to achieve it and it is a continuous learning process. Getting periodic feedback from peers, colleagues and superiors helped me in self-improvement.

Rane in One Word: Gurukula



V. JEYAMURUGAN,
DGM - R&D, RML-SLD

Memorable Moments

There are many: the design, development and testing of the steering gear we assembled on the car and rolled out successfully at the customer assembly line. I got to sit inside the Toe setting pit at the customer assembly line and examine the toe set values at TATA Motors. A cherished memory is watching the First Indica, Nexon, Tigor and Altroz roll out of the assembly line without any issues.

Memorable Experiences

Retro fitment activity with HPS product in the smaller tractor (22HP tractor) was challenging to meet the packaging and performance expectations of the customer. On demonstrating the performance, we were able to win the business and this paved the way for more tractor applications.

Greatest Learning

I joined Rane in 1994 in the manufacturing department as a master craft trainee and my learning started with CNC programming and manufacturing process set up in turning, shaping, hobbing, rolling etc. My new role in the design department from 2002 helped me to understand design tools and improve my communication skills, build customer relationships and design new products to enhance business.

Key Contributions

Design and development of 12 new families of products (CV & Tractor) which helped in capturing high potential businesses.

Keeping Pace

Proactively interacting with customers and understand their implicit and explicit needs to upgrade products and

Greatest Learning

There is no limit to learning. To meet Global Customer Standards, I get to learn about new technologies, upgrade testing facilities and documentation processes and so on.

Key Contributions

DFMEA is the backbone for any successful new product launch. I developed a DFMEA for our products, which is on par with global standards and was appreciated by many domestic and global customers.

Keeping Pace

The development of silent cars (electric versions) pushed us to enable silent operations in our products and innovate for vibration absorption and fit-for-life requirement. We have to upgrade our product technology to have an edge over the competition. This never-ending journey makes me refresh my capabilities.

Rane in One Word: Honourable



R. KANNAN,
Manager - Product
Engineering, RTSS-SGD

technology with new design. The training by Prof. Washio on the NPD process and QFD in MIQ Nasik in 2007 helped me to understand them in detail. HPLD training helped me in developing leadership skills, communication skills and decision making.

Rane in One Word: A great place

A. GURUSAMY,

Senior Manager - Product Engineering, REVL



Memorable Experiences

My most memorable experience was while working on the hollow valve and hollow camshaft projects. Both the products were entirely new to REVL and every aspect of the project, right from scratch, procuring benchmarking samples till the development of the prototype, was really challenging.

Greatest Learning

Through the High Potential Leadership Development Programme I had the opportunity to attend a leadership programme from one of the best business schools in the country. The entire session helped me have a fresh outlook towards my professional life while helping me develop the necessary skills for moving ahead in my career. TQM and the business excellence process of the company have a lot to offer with regard to a systematic approach towards excellence.

Key Contribution

My key contributions would include being part of a PDE

engagement, development of temperature measurement guides and working on areas of advanced engineering such as new technology development.

Keeping Pace

Having joined as a CAE engineer, I progressively grew, taking up additional roles and responsibilities. From being a design verification engineer I moved on to lead the design verification and validation facilities of the R&D function. My background in automobile engineering helped me to manage the testing facilities of the company with much ease and today I head the engine testing facility and design verification, while administratively overseeing the metallurgical lab of the R&D function.

Rane in One Word: RANE - Results And New-learnings Everyday

K. BHARATH KUMAR, Senior Manager - R&D, RNSS



Memorable Experiences

In the book, "Start with Why", by Simon Sinek, the author describes that the middle section of the brain, the limbic brain, is responsible for all of our feelings but it has no capacity for language. This disconnection makes expressing feelings difficult. This aptly reflects my difficulty in communicating my feelings for Rane. Rane has provided me the freedom to explore in every assignment that I took up from the start of my career in April 2007, be developing the first tilt & telescopic column Mahindra Navistar (currently Mahindra Trucks and Bus Division) or developing new technologies for Global OEs.

Greatest Learning

Being part of R&D from day one, the technical learnings are higher. But as an individual, I feel that I have improved as a better person in terms of empathizing and being

friendly based on the leadership programs that I went through in Rane.

Key Contributions

Since 2016, I have played a vital role in establishing a relationship with academia and institutionalising the process of leveraging their knowledge and resources for new technology and core engineering development. As a result, we get postgraduate interns from top universities such as IIT/VIT/SRM, etc. to work on core engineering projects such as material science and manufacturing technology. Now, this activity has been established across departments such as Manufacturing Engineering.

Keeping Pace

Learning is the only way to sustain the changes professionally and personally. So I keep myself updated by attending technical symposiums, webinars, conferences, etc. Rane has provided me the space to complete my PG, which has enhanced my domain knowledge. Also based on academic relationships, I was able to interact with great minds such as JN Reddy (in Finite Element Analysis), which has further enhanced the domain knowledge.

Rane in One Word: Remarkable

Rane Vidyalyaya

Phase 2 Building Inaugurated



to Rane Foundation, but for whose vision such a school building matching International Standards would have never come up in a rural area like Mannachannallur.

The school is located in Theerampalayam, a village in Mannachannalur Taluk of Tiruchirappalli District. Phase 1 of the construction covered 3413 sq. metres and Phase 2 of the construction covered 3748 sq. metres. The overall constructed area forms 40% of the land area of 7211 sq. metres.

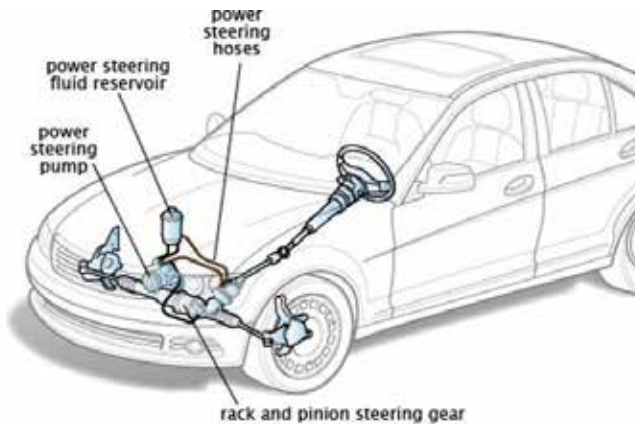
While the first phase had the focus on all admin areas, library, composite lab and 14 classrooms, the second phase has brought alive all the laboratories required to suffice till the Senior Secondary stage. A total of 11 labs are in place with specific ones for Physics, Chemistry, Biology, Mathematics, Arts, Music, Language, Computers, AV, Innovation and Composite Labs, taking the total classrooms to 33.

We hope to see the children back to school soon and enjoy the world-class infrastructure spaces created for Active Learning.



Rane Vidyalyaya reached yet another milestone with the completion of Phase 2 of the building. What should have been a mega function was a scaled-down version due to Covid. However, we were happy and thankful that we had amongst us L Lakshman, Chairman Emeritus, RHL, and his wife Pushpa Lakshman for the function. Thanks

How A Steering System Works



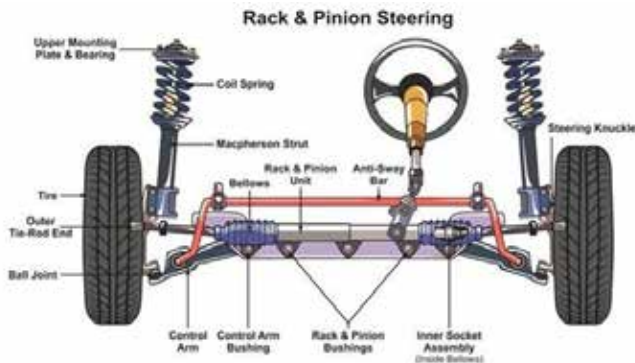
The Wheel That Turns the Wheels

The control of a car is in the hands of the person in the driver's seat holding the steering wheel. While every component of a car has a function to perform and is indispensable, the steering wheel is important because it helps to steer the car not only along a straight path but also turn in any direction as needed.

The steering system has also evolved over a period of time and is of two types:

- Rack and Pinion Steering System
- Recirculating Ball Steering System

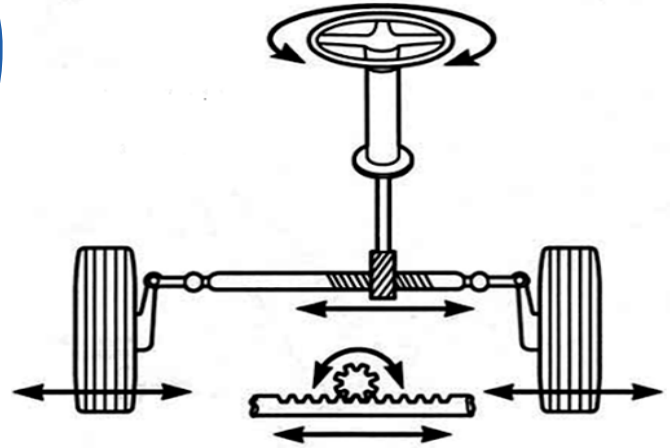
In current times, a power-assisted steering system or power steering is another innovation that further makes handling the car smoother.



Rack and Pinion Steering System

The rack and pinion steering gear is the most common steering system and is called so because it uses two

gears—a linear gear or the rack, and the circular gear or the pinion. Used mostly in passenger vehicles, it works on simple physics though it may seem complex.



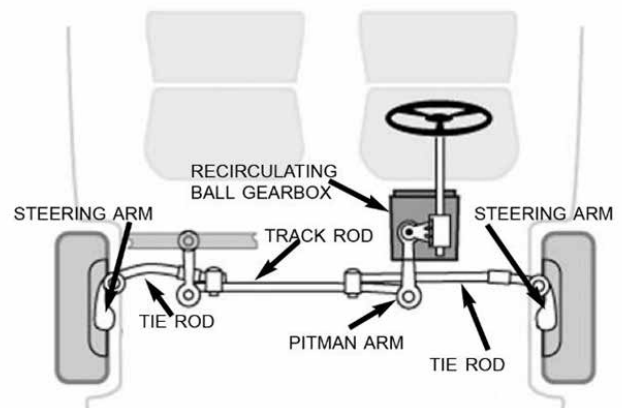
The Mechanism

The steering wheel is attached to a shaft, which in turn is attached to a pinion on the other end. The pinion, mounted on a rack, moves when the steering wheel is turned. The rack has a tie rod at the other end, which connects to the steering arm (Knuckle arm) that is connected to the wheel hub.

When the steering wheel is rotated, the shaft also rotates, causing the pinion placed on top of the rack to rotate. This makes the rack move linearly and the tie rod, connected to the steering arm, makes the road wheel turn in the desired direction.

A larger pinion requires less rotation of the steering wheel but is harder to control. A smaller pinion requires more turns to the steering wheel to make the car turn but provides greater control.

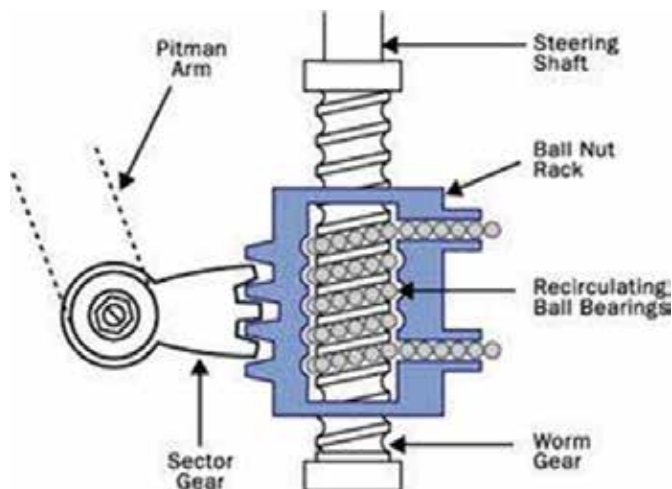
Recirculating Ball Steering System



Used in commercial vehicles, the recirculating ball steering system is also called the worm & sector and recirculating ball & nut system.

The Mechanism of the Recirculating Ball Steering System

This system too has two gears, the worm gear and the sector gear. A threaded shaft connects to a steering wheel

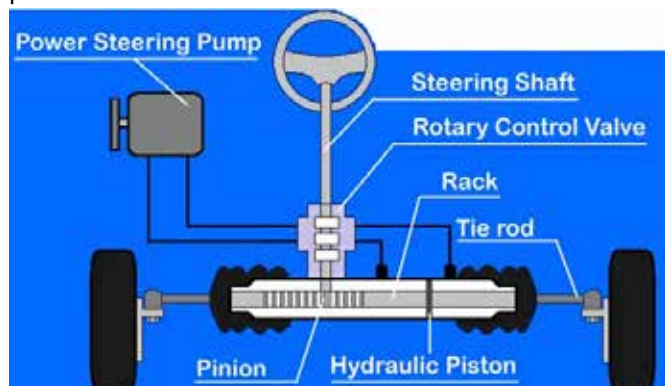


on one end and a block at the other. A worm gear goes through the block and is threaded such that it is inside the block. The thread is filled with balls. The sector gear connects to the gear teeth outside of the block and is then connected to the pitman arm. The pitman arm is connected to the tie rod.

The working is similar to the rack and pinion, as the shaft rotates along with the rotation of the steering wheel, the worm gear too rotates. This makes the block, not held by anything, move up and down, making the sector gear move, which in turn moves the pitman arm. The balls in the thread of the worm gear reduce friction and prevent the slop in gear.

Hydraulic Power Steering System

A Hydraulic power steering system is a support option that reduces the work of the driver in both these steering systems. In the rack and pinion system, the power steering system is enabled by the addition of a pump, pressure tubes, rotary control valve, fluid lines and a hydraulic piston.



The pump pumps the fluid around when needed while the rotary control valve ensures that the fluid moves only when the car is being steered. The hydraulic piston moves around based on which fluid line delivers the high-pressure fluid. Most of the force necessary to steer the car is applied by this piston movement on the rack, making it easier for the driver.

Electric Power-Assisted Rack-and-Pinion Steering (EPAS)

The EPAS system consists of vital parts such as torque sensor, electric motor, rotational angle sensor, controller, vehicle speed sensor and coupling between motor and steering mechanism.

When the driver gives input through the steering wheel, the electronic sensors attached to the steering column read the input and send them to the electronic control unit (ECU). The ECU analyzes these inputs and sends the voltage signal to the electric motor placed at the end of the steering column whose gear is in constant mesh with the pinion gear. Due to these voltage signals sent by the ECU, the motor that is driven by the battery of the vehicle starts and provides the particular torque/movement according to the value of the voltage signals received. This system gives the driver an enjoyable driving experience and easier maneuverability. An electric-assist system allows greater fuel efficiency than an engine-driven hydraulic steering system.

The amount of assist given is variable; it increases at low speeds to make tight turns easier, such as during parking maneuvers. Assist decreases at higher speeds to enhance road feel.

There are three types of EPAS systems, namely (1) Column assist (shown in the figure), (2) Pinion assist (3) Rack assist, depending on where the motor is fixed and provides assist to the steering system.



Award from Tata Motors

Rane (Madras) Limited has won the Best Quality Supplier South (2020-21) award from Tata Motors in the Tata Genuine Parts – Vendor Impact Programme 2021.



Rane QC Convention & Prof Washio Quality Award



To encourage, motivate, recognise and reward Quality Control Circles (QCC), Rane Group has been organising QC Convention at the Group level since 2008. The 14th Rane QC Convention was held Virtually on June 29,

2021, through G-Meet. The best QCC from each of the eight businesses, selected through a business-level QC Convention, participated. Organising the event virtually made it possible for LMCA to participate in the event this time.

The performance of the eight QCC was evaluated by an external jury. The QCC projects were based on the application of a systematic problem-solving approach, namely the QC story. The jury selected the Winner and Runner up based on their performance using the seven steps of the QC story approach.

Chairman, L Ganesh delivered the keynote address and the entire Senior Leadership team participated in the whole day event. Vice-Chairman Harish Lakshman delivered the Valedictory address.

'Winner' QCC of Rane (Madras) Ltd. – SLD, Puducherry, won the Winner's Award and 'Star Mail' QCC of Rane Brake Lining Ltd., Puducherry won the Runner-up Award in the 14th Rane QC Convention 2021.

The winner of the QC Convention, Rane (Madras) Limited, attained the Chairman's Excellence Trophy (Rolling Trophy).

Rane t4u – New Office Inauguration



Rane t4u Private Limited's new office was inaugurated on Wednesday, August 25, 2021. Harish Lakshman, Vice Chairman, Rane Group, participated in the inauguration ceremony and interacted with the team.

Leadership Boot Camp



The Leadership Boot Camp extensively focuses on enabling the entry-level talent to swiftly assimilate and integrate with the Rane culture.

For the year 2021-22, Rane Group recruited 44 Graduate Engineer Trainees, 1 Post Graduate Engineer Trainee, 9 Executive Trainees and 7 Management Trainees. The orientation program for trainees commenced on Sep 6.

On completion of joining formalities, a Campus to Corporate workshop was organised on Sep 6 and 7, 2021, to aid trainees in transitioning from student

life to professional life. The workshop covered topics on Business and E-mail etiquettes, Perception, Communication, Team Building, having a continuous learning mindset and handling management expectations.

This was followed by LOM - Learning on Machine, a 12-day, customised "Finishing School Concept" in Manufacturing Engineering for Graduate Engineer Trainees. A hands-on training was given in bench exercises, conventional machining, CNC machines, measuring instruments, pneumatics, hydraulics, PLC, robotics and Autocad. This entire program was conducted at our Rane Polytechnic Technical Campus, Trichy. To give product and process knowledge, the trainees also had plant visits to RTSS SGD P1, RBL P4 & RTSS OSD P2.

Another special feature of the orientation program was the trainees interacting with various business leaders. Parthipan, CEO – RTSS, Balakrishnan, President – RBL, Murali, President - REVL and Ayyappan, President – RTSS-OSD, shared their career experiences and answered questions from the trainees who found it quite inspiring. The bootcamp concluded with the valedictory ceremony on Sep 22 where Venkatanarayanan, President – HR, IT and CSR, addressed and interacted with the trainees.

We wish the trainees a long and fulfilling career with Rane.

Bidding Adieu to Chairman's Secretary of 36 Years



R Ramesh, who worked on various projects supporting Chairman and closely observed the group transformation over the past three decades, retires on September 30, 2021.

Ramesh joined as Assistant to L Ganesh at REVL in October 1985 and held successive positions before becoming Deputy General Manager in 2015. He ensured the smooth functioning of the Chairman's office, New Zealand Consulate administration, contributed significantly to special assignments such as CEO retreats, Rane Platinum Jubilee Celebration and other group-level activities.

- 25 years of New Zealand Consulate administration ever since Ganesh was appointed as Honorary Consul for South India in July 1996.
- Actively supported Chairman on various forums such as Madras Motor Sports Club, Madras Management Association, Automotive Component Manufacturers Association and Confederation of Indian Industry (Southern Region).

R Ramesh Recollects:

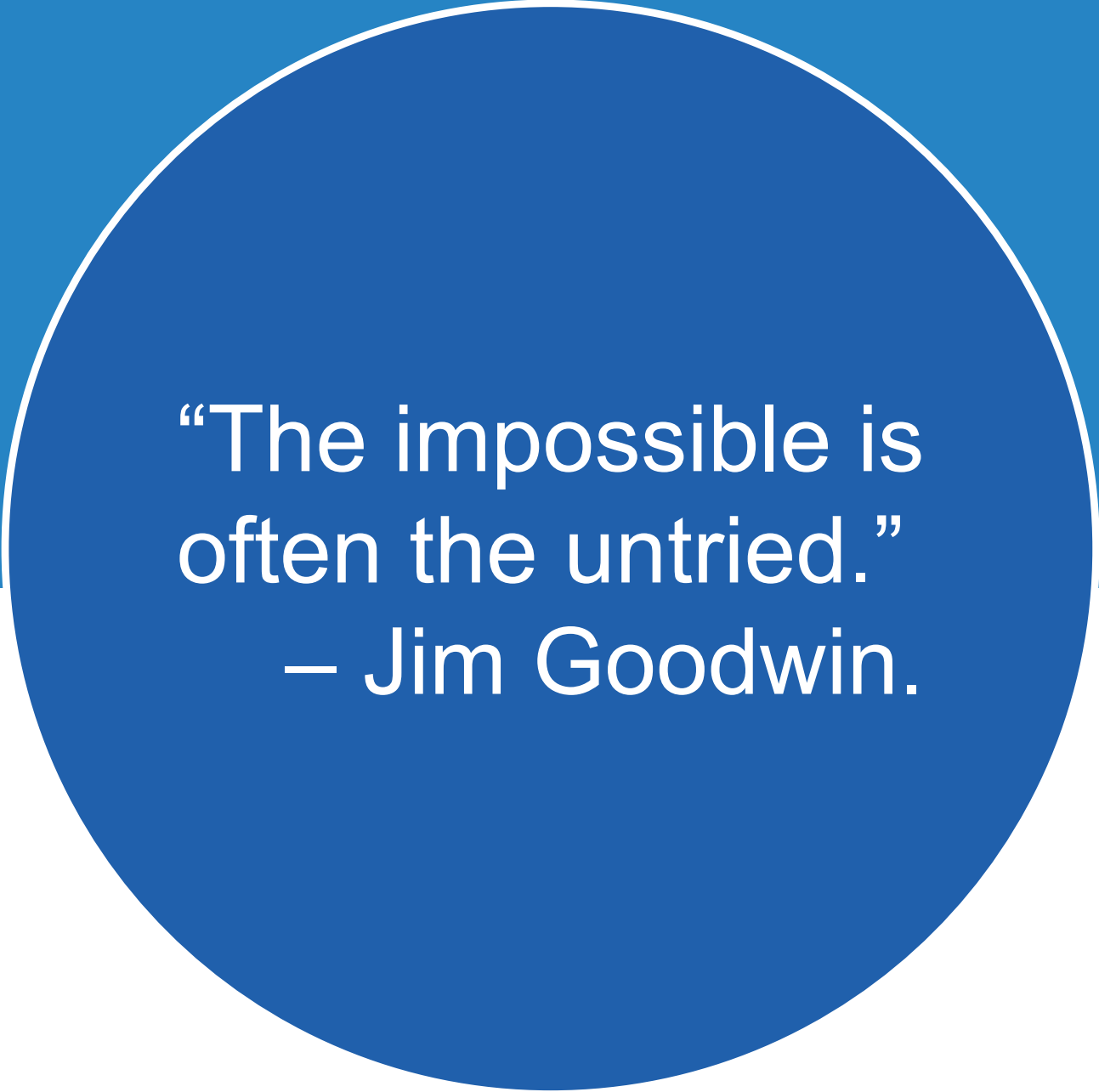
The guidance and support given by the management made me perform well. One of the most memorable experiences at Rane is to meet and work with a variety of people across functions and businesses. I have been able to build a good relationship with everyone in the organisation.

Inculcating strong values at an early stage and upholding these forever is a key role of Leadership. The leadership team at Rane takes care of all the stakeholders, respecting people and getting their opinions and feedback. Rane has invested in Values, Ethics and Culture, does not encourage politics and is run on completely transparent lines. This is a highly professional, responsible and ethical group.

I had the opportunity to work with three generations of the promoter family and would like to thank every family member and the organisation for giving me their unstinted support all these years.

**L Ganesh on
R Ramesh**

Ramesh has been a great support to me. His handling of my office and the New Zealand Consulate has been exemplary. A very versatile person with people skills.



“The impossible is
often the untried.”
— Jim Goodwin.



Winner of 14th Rane QC Convention – ‘Win...
QCC of Rane (Madras) Ltd. – SLD, Puducherry



Rane Corporate Centre

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