Confederation of Indian Industry

Industrial Innovation AWARDS 2023

Journey of Innovative Companies and Institutions

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FOREWORD

Mr. Vipin Sondhi

Chairman, CII Industrial Innovation Awards 2023 &
Chairman CII National Forum on Industry-Academia Partnership for R&D and Innovation

The Prime Minister has envisioned India to become a developed economy by 2047, a greatly inspirational vision. He has also given huge impetus to Science, Technology and Innovation by adding Jai Vigyan and Jai Anusandhan to the slogan Jai Jawan, Jai Kisan.

Further, all major advanced nations have had a strong industrial base and have grown on the back of an innovative workforce. I believe India will be no different.

The challenges of Energy, Food, Climate and Health will all have to be mitigated by innovative solutions to make the transition as smooth as possible, for India and the world to come out stronger on the other side

India's young and educated population, a large digitally enabled middle class and a huge market of 1.4 bn people are some of the rare advantages that no other country, apart from India has for exponential growth.

The much-coveted Industrial Innovation Awards instituted by CII celebrates innovation excellence in the Indian ecosystem. Since its inception, the awards have evaluated and recognized many world class innovations in organizations of all sizes. The top 50 award winners are short-listed after a rigorous assessment based on a robust innovation framework for industrial organisations developed by CII.

A jury comprising of eminent experts selected the category award winners. In this year's edition of awards, the high quality of applications has been a significant positive indicator of the importance that organisations are giving to Innovation; both capacity and capability building.

I am confident that the compendium will provide interesting insights into India's innovation trajectory; and expect it will become a rich source of information for all stakeholders – Govt., Industry, Academia, Start-Ups and National laboratories - in understanding the role and impact of innovation in the overall progress of a country's development.

I do hope you will enjoy reading it.

FOREWORD

Mr. Alok Nanda

Co- Chairman, CII Industrial Innovation Awards 2023 & CII National Mission on Technology, Innovation and Research

CTO, GE Aerospace India & CEO GE India Technology Centre, GE Global Research

Innovation has been the key driver for the sustenance, growth and prosperity of a nation's economy and has been instrumental for the measurable value-enhancement in any activity.

Towards this direction, India is redefining innovation in a larger perspective, putting social values as well as economic benefits at the centre stage.

In Indian industry's journey to be globally innovative, CII's focus and advocacy on firm level

Innovation capability building has remained outstanding, which is truly reflected through its

Industrial Innovation Awards Initiative. The Award Framework has encouraged many Indian firms to remain competitive in domestic as well as in global markets. This year the participation in all categories has increased with many globally competitive and disruptive innovations being filed for the Awards.

I truly believe that this presents an excellent opportunity for large and medium firms to encourage the companies in their supply chain to measure the excellence and competitiveness of all its businesses through Industrial Innovation Awards.

While this compendium is only a small bouquet of case-studies of top 50 companies and the top research institutions, which are recognized for their innovation and best practices in 2023, India is teeming with a large array of young innovators with enviable entrepreneurial spirits.

II

Top 50 Innovative Companies 2023

Abilities India Pistons & Rings Ltd

About the company

Abilities India Pistons & Rings Limited (AIP) was established in 1968 by Mr. RS Arora and is a renowned manufacturer of pistons and piston rings. The company holds prestigious certifications, including ISO 9001:2015, IATF 16949:2016, ISO 140001:2015, and ISO 45001:2018, affirming its commitment to quality, cost compatibility, innovation, and environmental sustainability.

AIP operates dedicated manufacturing facilities for pistons and piston rings, catering to the lawn and garden segment, as well as 2 and 4-stroke engines for the automotive sector. The company's expertise extends to the production of other machined parts, such as aluminium cylinders and covers. Utilizing Gravity Die Casting (GDC) and High-Pressure Die Casting (HPDC) processes, AIP ensures precision in piston production. Additionally, an Electroless Nickel Plating facility is in place for Flex Fuels.

With a global presence in the USA, Germany, Brazil, Japan, China, France, Turkey, Italy & Bharat, AIP achieved a significant milestone in 2019 by filing two patents, showcasing its dedication to innovation and technical excellence. Recently the company has received approval on one of the two patents.

The Innovation-1

AIP achieved a significant milestone in present year 2023 having received a granted patent for Electroless Ni-P-B plating. Electroless Nickel-Phosphorus-Boron (Ni-P-B) plating, providing a uniform coating for corrosion resistance, wear resistance, and enhanced lubricity, reducing NOX emissions and enhancing engine performance.

Electroless Plating (New Innovation):

1. Uniformity: Provides a more uniform coating compared to electrolytic plating.
2. Durability: Nickel coatings applied through Electroless plating can offer superior corrosion resistance.
3. Conductivity Not Required: Electroless plating can be applied to properly cleaned non-conductive surfaces, expanding its range of applications.
4. No Electricity Required: This process eliminates the need for electrical power, simplifying the plating process. Electroless plating has advantages in terms of uniformity, corrosion resistance, and versatility in terms of the types of surfaces it can be applied to. Electroless Ni-P-B Plating has less exhaust emission due to higher fuel efficiency. It is particularly valuable in industries where these characteristics are critical, such as automotive industries. However, the choice between electrolytic and Electroless plating depends on the specific requirements of the application and the properties desired in the final product.

The Innovation-2

High-Pressure Die Casting Piston Part:

High-pressure die casting is a manufacturing technique commonly used in the production of various metal components, excluding pistons earlier. Now AIP developed the technique to

produce pistons from HPDC using Hyper Eutectic aluminium alloy, referring to the benefits of HPDC Pistons.

Light Weight:

Pistons produced from HPDC are 10-15% lighter than GDC & find out 16.6 % more yield in PDC in comparison to GDC.

Productivity:

Productivity is almost double in PDC in comparison to GDC. In GDC we can make a maximum double cavity die but in PDC we can make a minimum four cavity die with less cycle time.

The Approach

AIP believes in learning from past failures, benchmarking best practices, and fostering process innovation. AIP regularly consults with subject experts and consistently promotes manufacturing excellence, cost innovation, and the adoption of new technologies among its employees to produce high-quality products. The company is committed to making its manufacturing process more sustainable and achieving digital excellence. Team spirit & CFT approach with positive attitude to solve any problem is our major key.

Benefits

After these innovations AIP find out below benefits -

High Pressure Die Casting Pistons: The development of high pressure die casting pistons is a remarkable achievement that has led to multiple benefits for our company. By creating lighter engine components, AIP addressed the industry's demand for enhanced fuel efficiency and reduced emissions. This innovation has not only increased our export business by up to 6%, but it has also positioned our company as a leader in providing lightweight and efficient solutions for the automotive sector.

Electroless Ni-P-B Plating:

Develop Electroless Ni-P-B plating, this processes have fetched a huge business for the company from various OEMs. Electroless plating has more advantages in terms of uniformity, corrosion resistance, and versatility in terms of the types of surfaces it can be applied to. Electroless Ni-P-B Plating has less exhaust emission due to higher fuel efficiency.

The Future

AIP is working to diversify its product range and manpower. AIP has developed a technique to produce pistons from HPDC using Hyper Eutectic aluminium alloy, highlighting the benefits of HPDC pistons. Pistons produced from HPDC are 10-15% lighter than those produced using GDC. HPDC pistons are lightweight and fuel-efficient. Similarly, Electroless Ni-P-B Plating results in lower exhaust emissions due to higher fuel efficiency. This technology is particularly valuable in industries where these characteristics are critical, such as the automotive industry. AIP has also been working for the past couple of years to make its manufacturing process more sustainable. Our focus is to capture future market opportunities in the manufacturing sector.

ACME Cleantech Solutions Private Limited

Leading Through Innovation

About the company

ACME Group, a leading global sustainable and renewable energy company founded in 2003 by Mr. Manoj K. Upadhyay and headquartered in Gurugram, India, has made significant contributions to renewable energy. They broke barriers by achieving a subsidy-free tariff of INR 2.44/kWh for solar power, accelerating solar adoption in India.

Acme has developed over 6.62 GWdc of renewable projects across 12 states in India and divested 1.45 GWdc out of the same. The current under construction and development pipeline is more than 10 GWdc, which includes RE projects for green hydrogen and ammonia plants in Odisha, Tamil Nadu and Oman. ACME aspires to be a major global green energy provider by 2032, producing 10 million tonnes/year of Green Ammonia and equivalent-Green Hydrogen.

ACME Group is dedicated to sustainability in challenging sectors like food, agriculture, steel, shipping, cement, and aluminum. Learn more at www.acme.in.

The Innovation

In 2021, ACME setup one of the world's first Integrated Green Ammonia Plants in Bikaner, India by strategically combining well-established technologies—solar PV, electrolysis, air separation, and Haber-Bosch loop for ammonia production—to create a groundbreaking integrated green hydrogen and green ammonia facility. While each technology has proven itself in isolation, ACME's innovation lies in their seamless integration to produce green hydrogen and green ammonia, an unprecedented accomplishment. This pioneering approach addresses the challenge of efficiently combining diverse technologies for maximum environmental benefit.

In Bikaner, Rajasthan, India, ACME successfully implemented this integrated concept through a proof-of-concept demonstration plant with a throughput capacity of 1750 MT/annum of Green Ammonia production. The green hydrogen plant, featuring a solar PV and electrolyzer unit, commenced operations in July 2021 while the green ammonia plant, incorporating ammonia synthesis and associated utilities, was commissioned in November 2021.

This demonstration showcases the feasibility and viability of integrating these technologies on a large scale, marking a significant milestone in the quest for sustainable and environmentally friendly energy solutions.

By converging these technologies effectively, ACME has opened new avenues for the widespread adoption of green hydrogen and green ammonia, addressing global sustainability goals. This demonstration plant serves as a cornerstone, laying the foundation for larger-scale projects that ACME plans to set up in Oman and in other geographical locations , including India .

The Approach

In Bikaner, Rajasthan, ACME harnessed solar power, averaging 2000 W/m2, for its integrated green hydrogen and green ammonia project. The solar PV plant, tailored for daytime energy production, powers the Electrolyzer unit, generating hydrogen. This hydrogen, combined with nitrogen from the PSA unit, fuels the ammonia plant. The system stores mixed gas during solar hours, ensuring 24/7 ammonia plant

operation. Grid Banking minimizes the carbon footprint by returning non-solar hours' power to the grid during solar generation. ACME's innovative design optimizes renewable resources for uninterrupted green hydrogen and green ammonia production.

Benefits

- Validation of the plant performance parameters of one of the World's first Integrated Green Hydrogen and Green Ammonia project paving the way for further improvements and selection of technologies for commercial scale projects.
- Gained knowledge and operational experience for variable operation of Electrolyzer, ammonia loop and balance of plant.
- In-house development of Energy Management System (EMS) for fully automated plant operation on forecasted PV generation for ammonia loop, Electrolyzer and balance of plant.
- Developed in-house engineering, safety measures, project management, vendor development and project execution capabilities for integrated facility.
- Reduction of CO2 by up to 4,400 tons/ annum

The Future

Capitalizing on more than a decade of experience in developing renewable energy projects and more than two years of learning from operations & maintenance of an integrated

green ammonia facility at Bikaner, India, ACME is developing a pipeline of Green Hydrogen and Green Ammonia plants starting with its flagship Project at Duqm, Sultanate of Oman. ACME also plans to set up similar scale of Green Hydrogen and Green Ammonia plants in states of Odisha and Tamil Nadu in India.

Adani Defence and Aerospace

About the company

Based out of its headquarters in Ahmedabad, Adani Defence & Aerospace is now a pioneer in defence design, development and manufacturing. Our products and services are trusted worldwide, ranging from small arms and ammunition to unmanned aerial vehicles, counter-drone systems, missiles, and aircraft services.

We take pride in providing safety and security to people around the world. We have partnered with Indian start-ups and MSMEs committed to the Aatmanirbhar Bharat initiative, aiming to develop a domestic defence ecosystem with an export-oriented mindset, best-in-class processes and quality management systems.

Our objective is to ensure that those we serve stay ahead of time and remain prepared for any untoward contingencies. We are committed to delivering excellence in everything we do.

The Innovation

We believe that innovation is the key to meeting the changing security and defence needs of the nation. We are the pioneers in the private sector for developing unmanned systems and precision-guided missiles in India, which are crucial for modern warfare, as seen in the recent conflicts between Russia- Ukraine and Azerbaijan-Armenia. We have recently been awarded India's firstever private sector missile contract for UAV Launched Precision Guided Missile (ULPGM), which is the first UAV launched missile system developed in the country by us in association with DRDO. This platform was driven by the needs of our armed forces and has been developed in a record time, taking just 18 months from design to successful user trials. This air-to-surface missile is fully autonomous and can destroy both stationary and moving targets. The missile is seeker guided and has a higher accuracy than an unguided bomb. The current range of the missile is 3.5 km, which will be gradually increased to 8 km and eventually to 15 km.

The Approach

We have been at the forefront of developing unmanned systems and precisionguided missiles in the private sector, working closely with DRDO to offer cuttingedge solutions. The ULPGM is a result of our understanding of the needs of our armed forces and our ability to address a key capability gap for the future. ULPGM is a stand-off, autonomous, Air-to-Surface weapon released from UAV, capable of hitting and destroying static and moving targets. It is one of the first products to go from development to user trials in 18 months, demonstrating our agility and efficiency.

Benefits

The ULPGM is a unique product that combines the advantages of two key technologies – drones and precision munitions. It is a technologically advanced missile that has enhanced stealth capability for attacking in an adversarial environment. It is the only indigenously designed and developed missile, jointly developed with DRDO. It will boost our domestic defence ecosystem and the Aatmanirbhar Bharat initiative, as sourced locally, the ULPGM contributes to strengthening the domestic defence ecosystem, offering MSMEs opportunities to advance technologically and benefit from anticipated export orders.

The Future

The ULPGM is a completely new product, designed and developed from scratch in collaboration with DRDO, is the only indigenous offering in its category. Adani's commitment to innovation drives us to continually enhance this groundbreaking product, aiming for even better operating parameters. With significant potential for both the Indian armed forces and the export market, the ULPGM stands poised as a game-changer in the future of defence technology.

Adani Energy Solutions Limited

About the Company

The Adani Group's journey in the transmission sector started in 2006, well before Adani Energy Solutions Limited (AESL) was formally established.

Today, AESL is the largest private transmission company and operates more than 14,100 ckt kms of transmission lines and around 20,400 MVA of power transformation capacity. AESL has further set an ambitious target to set up 20,000 ckt km of transmission lines by 2022.

AESL firmly believes that environmentally and socially sustainable businesses are cornerstones of prosperous society. Therefore, we continuously attempt to understand the needs and aspirations of the communities around us. AESL's initiatives in areas of inclusive decision making, education, occupational health and safety, environment conservation are aligned with different indicators under 17 Sustainable Development Goals.

We work actively with our implementation partner, Adani Foundation, on CSR programs focused on education, community health, sustainable livelihoods, and rural infrastructure development.

The Innovation

In a transmission line. transposition of its 3-phases is carried out for long transmission lines. In India, generally for lines longer than 100 km and for 400kV and above lines, transposition of conductors is required. This intends to reduce the unbalance of current and voltage in normal operation mode of electric system and for limiting the obstructive influence of transmission lines to low-frequency transmission channel.

We are proposing a novel idea for the transposition arrangement for double circuit transmission lines with all 3 phases of circuit in vertical configuration.

The Approach

Traditionally, modified Angle Tower are used for Transposition purposes. Cross arms are generally being extended and multiple insulators are proposed at various locations to meet the clearance requirements. Clearance maintenance & Tower strength is the biggest challenge for the traditional transposition tower.

Most of the time, some of the members tower also need to be strengthened. The following is a brief description of a traditional Transposition Tower.

To Maintain the clearances, Top and Bottom Cross arms need to be strengthened and extended. The modification has been done in existing B or C Type tower, which is a tested tower. The extended cross arms are designed on software but are not tested due to various reasons. To accommodate multiple pilot insulators and to maintain the clearances, the arrangement becomes too complicated.

In the proposed arrangement, B or C Type is used without any modification.

Phase change from Top Middle & Middle Bottom are done in similar manner as done in traditional transposition arrangement. To change the phase from Top Bottom or vice versa, instead of extending the cross arms, 2 nos. of narrow based masts are proposed on either side of the tower.

With the help of insulators used in the proposed mast, required electrical clearances are achieved. The proposed mast is accommodated within the stipulated corridor of the line. The proposed mast is not subjected to any load except wind on its body and insulators, hence the design of the mast is very light. Transposition is done in a similar manner as in traditional arrangement.

Benefits

- No Need to modify/strengthen existing B/C Type Tower.
- Tested tower is used; Lines are more reliable and the chances of tripping after charging is eliminated.
- Ease of construction, as the same tower is being used.
- The arrangement where one phase is taken away from tower and brought back to original line is more stable than to conventional arrangement.
- Easy to repair/ replace due to unforeseen circumstances.
- Spare of transposition tower not required in inventory.
- Regular type tested towers are adopted, without modification.
- This arrangement is safer to adopt.
- Required phase to earth and phase to phase spacing are available.
- In case of delay in supply of side masts on site, the stringing activity is unaffected. Only jumpers can be installed later. This may help in timely completion of the line.
- Cost of additional small towers are compensated by adopting DB tower instead of DC tower and avoiding extended cross arm.

The Future

The proposed idea is very convenient and can be accommodated within the stipulated RoW. We have already implemented the same in one of our 765kV lines and plan to implement in 2 more lines in the near future.

In the future, we are planning to adopt the same approach in 400kV lines also.

The idea can be adopted by other power utilities also, as it is more reliable and easier than the traditional approach. We are also in touch with relevant authorities to recognize the same and document in the future additions and guidelines of Transmission Lines.

AFCONS Infrastructure Limited

About the company

Afcons Infrastructure Limited is a part of the 155-year-old Shapoorji-Pallonji Group which is among the Top-2 Engineering & Construction groups in India. With a turnover of $ 1.6 Bn+, Afcons is among the Leading Infrastructure Development Companies in India with presence in 22 countries. AFCONS has successfully executed landmark infrastructure projects in areas- Rail, Metro, Highways, Bridges, Tunnels, Ports, Industrial projects, LNG, Hydropower & Water Works and Oil & Gas. Overseas, Afcons has delivered over 50 infrastructure projects across Africa, Asia & Middle East. Prestigious, Engineering News Record, USA has ranked Afcons 7th globally in Marine and Port facilities and 13th globally in Bridge Sector in its latest survey.

A two-time winner of the Most Admired Knowledge Enterprise (MAKE) Award(2016 & 2017), Afcons is the first infrastructure company globally to win Most Innovative Knowledge Enterprise (MIKE) Award at Global, Asia Pacific, and India levels every year from 2018 to 2022.

The Innovation

Afcons Infrastructure Limited's East-West Kolkata Metro project stands as a testimony to engineering ingenuity. This groundbreaking endeavour includes

- construction of nation's deepest underground Metro station,
- first-ever underwater Metro tunnel, and the
- deepest Ventilation Shaft.

The project's tunnels beneath the Hoogly river, spanning 520m, are a marvel of engineering, reaching depths of 26m below the water surface and 13m beneath the riverbed. River tunnelling poses unique challenges, given the inability to halt the process once initiated due to the risk of leakages and ground loss. Meticulous planning ensured continuous work by arranging for the removal of generated muck. To mitigate geological delays, investigative bore holes were strategically placed in the riverbed.

Howrah Metro station, sprawling across 5 lakh sq. ft. and positioned 30m below ground, is India's deepest Metro station. The diaphragm wall for this station measuring 1.5m in thickness and 46m in depth, sets unprecedented standards in Indian construction.

Tunnels originating from the Howrah Metro station descend to 37m below the riverbed, requiring a deep ventilation shaft, also known as vent shaft. This shaft, reaching a depth of 43.5m equivalent to a 15-storey building was excavated with attention to avoid hydraulic heave threats. To negotiate huge uplift due to high water table, construction involved innovative methodologies like Seepage analysis via PLAXIS, use of piezometers, 62m deep barrettes and piles, deployed state-of-the-art grab machine from Germany, BAUER GB-34 and Casagrande B-300 equipped with RKG-14 Kit.

Addressing the proximity to the Hooghly river and Kolkata's Circular Railway track, project adopted ingenious engineering methods to minimize impact. Inclinometers and settlement markers were deployed to monitor surface and track settlement during shaft's excavation. Overcoming challenges such as ancient alluvial

deposits and variable water tables, construction followed stringent quality measures, combining in-situ concrete rings and top-down strutting to achieve the 43.50m deep excavation.

The Approach

Afcons Infrastructure thrives on a culture of executing projects 'ahead of schedule,' 'within budget,' and 'with highest customer satisfaction,' ingraining innovative thinking into its core. Fuelled by customer challenges, intractable problems, or industry benchmarks, the organization encourages a distinctive approach. Leveraging deep knowledge from a vast repository and collaborating with internal and external experts, Afcons develops solutions at the point of deployment, swiftly implementing them. The trademarked Afcons Innovation Culture - IMPROVATION™, along with the copyrighted Improvation™ Framework and the 4-Way Test, exemplified our skills during the East West Kolkata Metro project.

Benefits

Overall, the commissioning of this project, will significantly ease the life of 24 lac passengers per day who must travel between two of Kolkata's most populous areas. The metro will offer these commuters a comfortable ride at the fraction of the time and with unparalleled reliability.

The innovations mentioned above enabled the Project to be completed within stipulated time despite several technical challenges. For the organisation, successful completion of this project strengthened its credentials to successfully navigate complex technical challenges related to under-water tunnelling and resulted in winning the prestigious High Speed Rail contract for under water tunnelling.

The Future

Afcons is adapting to the post-pandemic economy, evaluating changes and embracing Innovation. Committed to setting benchmarks, Afcons remains a stalwart in generating new-knowledge for the betterment of sector-and-society. We see ourselves in a future where our creativity shapes who we are and makes positive difference in the constantly changing world.

ALPLA India Pvt Ltd

About the Company

ALPLA is the leading global Packaging system provider in the field of Rigid plastics, engaged in manufacturing of plastic bottles, PET preforms and closures with a footprint of 190 plants in 47 countries.

ALPLA India is a seamless part of ALPLA Global. ALPLA India has 9 plants, ALPLA uses state of art of technology in Extrusion blow molding, Injection molding of PET Preforms, Injection stretch Blow molding of Bottles and caps and closures in mono and bi-injection through Cube, Core back and Turn-table technology.

ALPLA India has its Technical Center as well as ALPLA Mold Shop in Hyderabad. Our state of the art Future Centre which imparts technical education to Polytechnic students is also located at Hyderabad.

ALPLA's client list in India includes Procter & Gamble, Reckitt Benckiser India Ltd., Johnson & Johnson, Unilever, Coco-Cola, Amway, Godrej, Amrutanjan, Emami, Zandu, GSK, SC Johnson, IOCL, HPCL, Mondalez, Veedol etc .

The Innovation

Integrated Manufacturing Facility: As a customer obsessed company, we are always thinking of ways to create customer thrill. We began our journey in 1955 with focus on manufacturing plastic bottles and now we offer design support, prototyping, sample validation, manufacturing decoration and mold making.

We wanted to go extra mile thus we proposed an Integrated Manufacturing Solution to one of our biggest customers HUL

This idea was out of the box for this multinational company too and required big investment and risk taking. Knowing ALPLA our customer invested in us, and an Integrated Manufacturing Facility took shape in Silvassa. In a global first, here we manufacture packaging, the product and fill it on same line. We follow customer formulas and manufacture the products (Toothpaste/Creams/ lotions). Now we have a truly integrated line, where moulding, filling, decoration and sealing is done linearly on the same line.

This has Removed 1000s of trucks from our roads, created several new jobs and lead to material and energy savings for both us and our customers.

Weight reduction of Zandu balm and Pediasure bottles

a. Weight before : 56 gm (Pediasure)

b. Weight after : 53 gm

Material cost saving: Saving 3gm in weight has contributed to saving of approx. 20 tonnes of RM on annual basis.

Shipping and Transportation: Lighter bottles lead to lower transportation costs.

Dual Education Initiative in collaboration with Telangana Government & Technical Educational Institutes – In a first of its kind educational symbiosis in India, we implemented an apprenticeship-based learning opportunity in India. Students finish their first 2 years at college, post which they are selected for our program. The next 2 years at ALPLA is mixture of classroom learning and learning on the job with continuous evaluations. We realized that skilling is a priority for us as a nation and decided to take

responsibility to skill our young generation. We have so far had 4 generations of 20 – 30 students and all of them have been absorbed in ALPLA.

The Approach

Evolution of Integrated Manufacturing:

Step One: Hole in the wall 2020 - 2021: We began an inhouse plant at supplied bottles and caps.

Step two: Reverse hole in the wall 2022 : We began bottle moulding and filling at our Silvassa Facility resulting in 8 cr 5 S savings and 15% FG KMs reduction.

Step Three: No Walls 2023: Integrated Manufacturing resulting in 25% plastics reduction and 700 bps GM improvement.

Benefits

a. 25% plastics reduction and 700 bps GM improvement.

b. Lead time optimization

c. helps both us and customer achieve our sustainability targets.

d. Reduced cost of shipping

e. reducing our carbon footprint.

The Future

We develop innovative and competitive packaging solutions that are tailored to the needs of customers and their markets. To achieve this, we strive for operational excellence, establish standardized processes and implement integrated supply chain solutions. This is duly supported by a comprehensive continuous improvement process wherein we innovate and promote new solutions and technologies.

We learn and grow through challenges and through our willingness to accept qualified risk.

Anveya Living Pvt Ltd

About the company

Anveya is building innovative new-age consumer brands within the beauty and personal care category. The Beauty & Personal care category is one of the fastest growing consumer categories in the country. Aided by the growing youth population and their growing income, the adoption of beauty and grooming has put India on the map of this category worldwide. With this, the size of hair care and skin care market in India is projected to be at USD 10Bn$ in FY27 from USD 6Bn$ in FY22. We are a 4.5 years old company. Almost all of the products under our brand Anveya, ThriveCo, Curlvana and Sub-brand Colorisma are under 3 years old. This includes about 60 Hair Care, Skin Care, Body Care and Hair Colour products.

At Anveya, not only are our products formulated with the latest research, technology and science of modern skincare and haircare but are specially designed to delight – with awe-inspiring colours, indulgent textures, mesmerising fragrances and stupendous packaging, we wish for our customers to experience a dopamine shot at every step of the way!

The Innovation

Innovation is central to the new product development process at Anveya Living. From launching new categories altogether to reimagining solutions to existing hair and body concerns, we push boundaries to make formulations that deliver the most optimum and real results.

Some of our most innovative products/ product ranges are:

1. Our Temporary Instant Hair Colour range Colorisma™ is a new category that didn't exist in India - a fashionable hair colour that one can apply and remove instantly. This addresses the fear of commitment of people when it comes to funky hair colour. Thus allowing them to experiment and play with your hair without the worry of commitment or damage.
2. Curlvana - Curly Hair Care range. Curly hair has been ignored and discriminated against for a very long time in the Indian market. Curlvana is India's first Glycerin-free Curly hair care range that solves a major problem for curly hair community - frizz and unmanageability due to differing weather conditions. Glycerin, that is used in hair care products to add moisture to curls, tends to behave differently in conditions of different humidity. It can over-absorb moisture and disrupt curl pattern, causing frizz. Curlvana uses no Glycerin, thus providing sustained hydration and moisture-delivery.
3. Hyaplex™ is a complex 3rd-gen bond-building technology that repairs damaged hair at a molecular level by rebuilding the broken bonds in the hair and fortifies the hair strength from outside. This ingredient complex helps our hair care products have a damage reversing property thus making it ideal for hair that has suffered prolonged damage due to heat, bleach, dyes and Dark patches, scalp care, Healing

The Approach

As a young startup - we frequently handle new, never-attempted challenges. We are nimble and

hand-on as an organization which does not shy away from doing things differently.

For example, we do multi-crore business on our own eCommerce store without a technology team. Our website manager has self-taught herself and the org to handle the level of tech, product management and coding needed to run the website in-house.

In another example, most D2C brands rely on manufacturers and suppliers for their formulations and ingredients. Instead, our R&D lead is driving inhouse development of deep, innovative ingredient complexes like surfactants, emollients, hair-bond repair complex etc. These ingredients power the experience and effectiveness of our hair & skincare brands as our core-competency.

Benefits

As a startup, we win by executing 'Many Intelligent Experiments with Speed'. Learning from past successes or failed bets will continually improve the estimated probability of success of newer bets. This creates a virtuous loop of learning and success.

While many direct-to-consumer (D2C) brands typically depend on external manufacturers and suppliers for their formulations and ingredients, we have benefitted ourselves by taking a different approach. Our R&D team takes the lead in creating advanced and innovative ingredient combinations within our own facilities. These carefully formulated ingredients form the cornerstone of elevating the overall quality and effectiveness of our hair and skincare brands, establishing them as our central area of expertise.

The Future

Our vision is to be India's most innovative beauty and grooming company that is unafraid to break the status quo to empower its consumers to thrive.

Ashok Leyland Limited

About the company

Ashok Leyland is an Indian multinational with their headquarters in Chennai. It is owned by the Hinduja Group. It was founded in 1948 as Ashok Motors which became Ashok Leyland in the year 1955 after collaboration with British Leyland.

Ashok Leyland, flagship of the Hinduja group, is the 2nd largest manufacturer of commercial vehicles in India, the 4th largest manufacturer of buses in the world, and 19th largest manufacturers of trucks.

The revolutionary industry first truly modular trucks – AVTR from Ashok Leyland is transforming the business to next level. With standard interfaces, customizing trucks to your needs has now become reality – with a diverse of range of options based on load, terrain application requirements.

Paint sludge is an industrial hazardous waste material. It is mainly generated by industries that are involving painting such as automotive, appliance, and other manufacturing industries. The current methods for the disposal of the waste by incineration are not still completely effective in preventing the environment and the living creatures

On this aspect Ashokleyland Ennore Plant Team has done a project on paint sludge recycling which is very useful to our current situation in protecting our mother earth from all hazards.

An Outstanding Achievement from AL group for the project. Yet another milestone of AL under the Facilitator Mr T.S Anantha Rajan Head - Plant Engineering, under the leadership of Mr.A.LEO BERNARD, along with his Team Members Mr S Elangovan Manger, Mr D Nepolian Manger

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a tool used to assess the significant effects of a project or development proposal on the environment. EIAs make sure that project decision makers think about the likely effects on the environment at the earliest possible time and aim to avoid, reduce, or offset those effects.

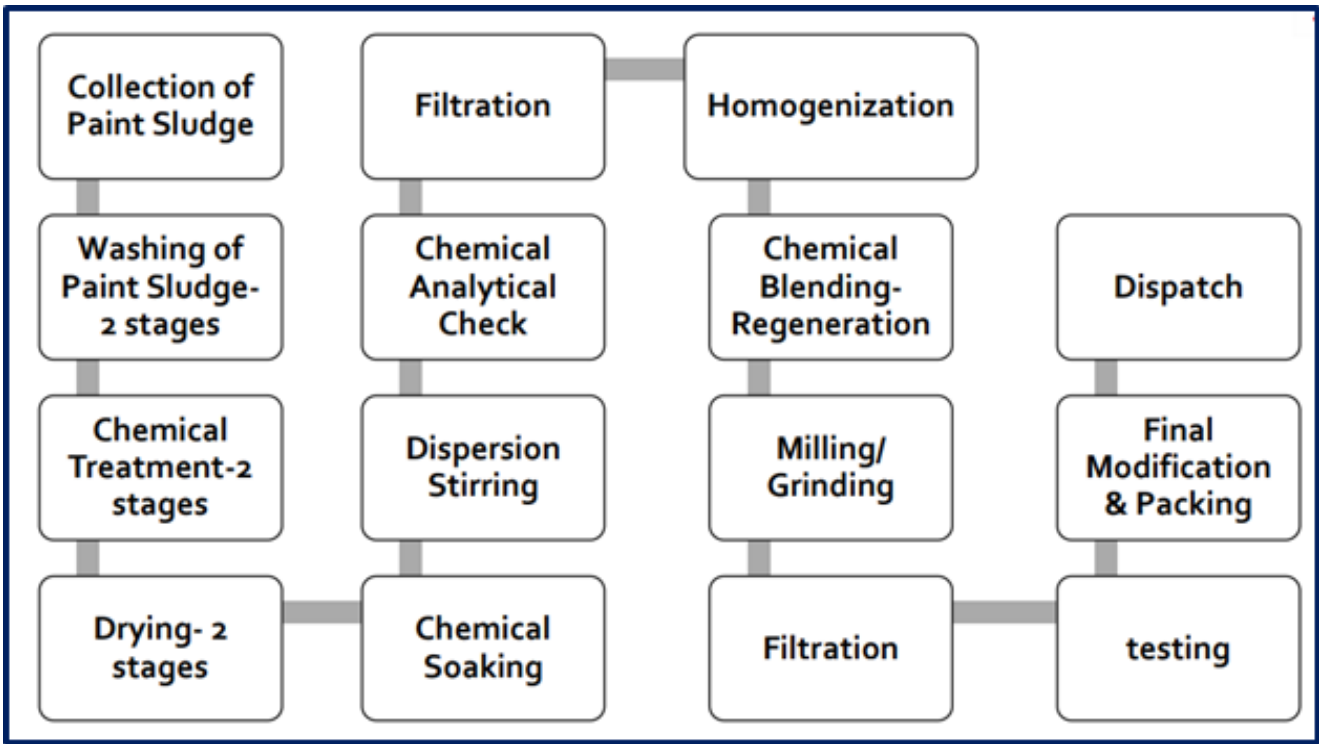
The Innovation

Paint sludge Recycling Process

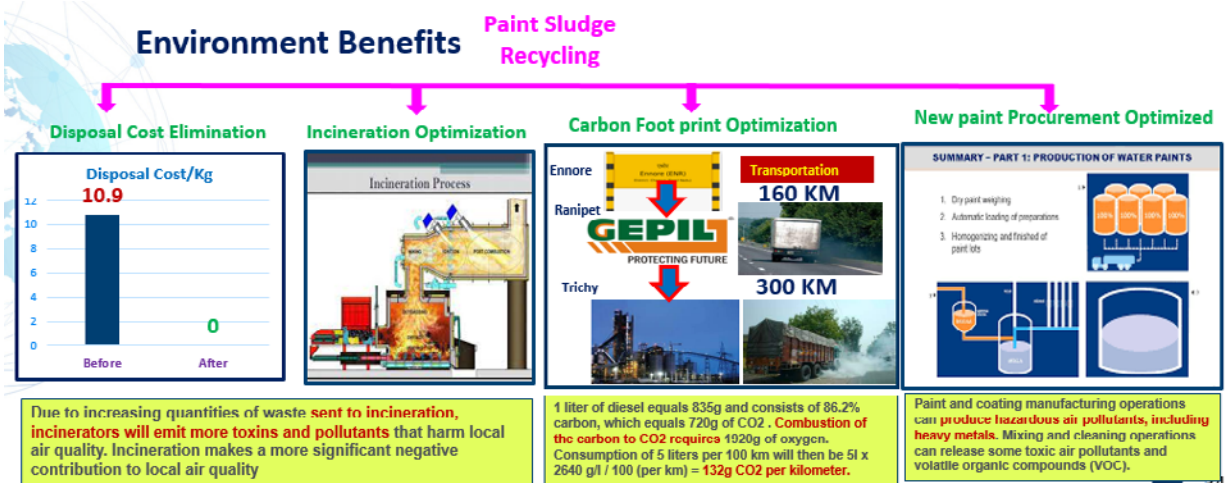
Homogeneity: Objects interacting with the main object should be of same material (or material with identical properties) . Basic concepts adhered in this achievement by Triz methodology

Paint sludge Recycled is used for secondary application inside the plant itself for the Storage pallets and Engine stillages

New Procurement of secondary painting application will be optimized in future through this recycling Improvement



Study and Analysis



painting applications and supplier side industrial applications pallets stillage, machine conveyors, roller conveyors and plant engineering application and Estate Maintenance road , paver blocks , under body applications

Future

We are planning to make recycled paint applications for casting component's primary

Paint Sludge Recycling Projects Got appreciations:

This project is shortlist for Environment awards2022 through Department of Environment and climate change –Tamilnadu

Bharat Forge Limited

BHARAT FORGE | KALYANI

About the company

A preferred Technology & Engineering driven development partner and global leader in metal forming. We serve several sectors including Automotive, Railways, Aerospace, Marine, Oil & Gas, Power, Construction and Mining. Being world's largest forging company and amongst one of the best aerospace forging companies and automotive forging company; we have transcontinental presence across ten manufacturing locations spread across India, Germany, Sweden, France and North America. We are also leading supplier of various components for aviation sector making us a renowned name amongst aerospace forging companies in India and around the world.

Part of the Kalyani Group - A USD 3 billion conglomerate with 10,000 global work force, we have largest repository of metallurgical know-how, design & engineering expertise, and manufacturing prowess in the region, which has established us as leading forging manufacturers in India. We are backed by more than 50 years of experience in manufacturing a wide range of high performance, critical and safety components.

Developing our own technology, constantly improving our technical processes, adopting the latest manufacturing processes and continuously training our workforce to create a talent factory has been the cornerstone of our success and has contributed towards making us a leading automotive forging company in India.

The Innovation

We are blazing new trails, driving innovation through Technology and Value Addition to become the preferred Engineering Driven Development Partner across the globe.

Innovation has been the driving force behind our company and is applied across every aspect of our business. The in-house R&D team is committed to working on various projects, including developing technologies to reduce carbon footprint and manufacturing light-weight products and requiring lower energy consumption.

We lead the innovation cycle in its diverse areas of operations whilst working closely with all our customers for new product development. Innovative application of latest technologies has helped us develop critical, high value added products for the varied sectors we serve. Today, we are an indigenous supply source for some of these products which were largely imported.

With innovation at our heart, we continue our endeavour of rising through diversification and manufacturing high quality products that drive change and sustainability.

Bharat Forge embodies innovation beyond theory; it's a driving force ingrained within the organization. Innovation at Bharat Forge is more than ideation; it's about commercializing ground-breaking solutions.

At the core of this innovation is a dedicated Research and Development (R&D) facility, fuelled by a significant 100 Crores investment. This commitment permeates the organization, fostering an environment where innovative ideas thrive within defined timeframes, driven by continuous mentorship.

Bharat Forge's innovation strategy allocates approximately 1-2% of total revenue to drive progress through investments in new technologies and R&D. A cross-functional team approach amplifies potential for ground-breaking

discoveries.

This culture of innovation has propelled Bharat Forge into lucrative segments, notably in additive manufacturing across aerospace, oil, gas, and automotive industries. Through light-weighting programs, it achieves substantial weight reductions in automotive components, setting industry benchmarks. Ultimately, Bharat Forge's relentless pursuit of innovation positions it as a trailblazer, shaping industries and meeting evolving market demands.

The Approach

Bharat Forge's Innovation Approach is a strategic amalgamation of robust Research and Development (R&D) investments and cross-functional collaboration. Anchored by a substantial 100 Crores investment in an R&D facility, the company fosters an environment where novel ideas thrive within specified timelines, driven by continuous guidance and support. This approach dedicates 1-2% of total revenue to drive progress through technological advancements. Beyond leading, it's about pioneering solutions that redefine standards and steer industries forward. Bharat Forge's persistent pursuit of innovation cements its standing as a visionary, reshaping industries and setting new paradigms.

Benefits

Bharat Forge's innovation initiatives yield an array of advantages, permeating through various sectors. By pioneering solutions, it elevates operational efficiencies, enhances product quality, and spearheads significant advancements across diverse industries. These innovations contribute substantially to reducing carbon footprints, fostering sustainability, and introducing cost-effective, high-value products. They fortify the company's ability to address evolving market demands, establishing a robust competitive edge. Bharat Forge's relentless pursuit of innovation not only reshapes industries but also solidifies its position as an industry vanguard, driving progress and setting new benchmarks in the global landscape.

The Future

Bharat Forge envisions an innovative future, leveraging technology to pioneer transformative solutions. With a steadfast commitment to R&D and cross-functional collaboration, it aims to continue shaping industries, introducing novel advancements, and setting new standards, positioning itself as a catalyst for progress in a dynamic global landscape.

Bosch Limited

About the Company

Bosch Group in India is a technology and services leader and specializes in Mobility Solutions, Industrial Technology, Consumer Goods, and Energy & Building Technology. Bosch India offers comprehensive engineering solutions, operating through 15 companies and 17 manufacturing sites with 38,700 associates. In FY22-23, it generated a 3.7 billion euros turnover.

Bosch Limited, the flagship company of the Bosch Group in India, is renowned for its technology and manufacturing expertise. It consists of businesses such as Powertrain Solutions, Automotive Aftermarket, Power Tools, Security Solutions, Two-Wheeler and Powersports. In 2022, Bosch Ltd. filed 66 patents, encompassing areas like Fuel Injection, Transmission Systems, and Electric Vehicles.

On its 100-year milestone in India in 2022, Bosch inaugurated an AIoT-enabled Smart Campus, spanning 76 acres. Certified as a 'Great Place to Work' for the third consecutive time, Bosch Ltd. prioritizes sustainability, and has achieved carbon neutrality in all Indian sites since 2020.

Awards received include the Golden Peacock CSR Award 2022 and the CSR Universe's Social Impact Award 2022 for Bosch's BRIDGE program. Recognition as winners for Best Innovation in Smart Cities category came at the 13th Aegis Graham Bell Innovation Awards.

The Innovations

1. TS2-E: A new temperature sensor platform for FCEV and BEV

   E-mobility applications require a robust thermal management system. Hence, a temperature sensor with higher accuracy and faster response time was required. At the same time, E-mobility also requires a cost competitive and high voltage withstanding capability sensor. These needs gave birth to TS2-E, a new temperature sensor platform for Fuel Cell and Battery EVs.

Features of the innovation

a. Compact housing to accommodate very small thermistor for faster response time

b. State of the art engineering material applicated to meet high voltage withstanding requirements

c. Economically and environmentally sustainable solution & innovative design for manufacturability

2. CB08c-16 w/ smart metering: Transforming Off Highway applications in India

   This is a forward-looking innovation keeping in mind the anticipated update to the Tractor Emission Norms (TREM) to advance towards TREM V. CB08c-16 is a tailor-made common rail pump to aid TREM V emission norms for <56kW Off-Highway applications. Features of the innovation:

a. Crafted for Indian Off-Highways, a cost-effective solution engineered for excellence and made in India

b. Smart metering: Limp home feature at reduced cost

c. Increased life: The solution has a useful life of 8000 hours

3. Gasoline fine filter for passenger car applications

   The innovation was born out of the need to create a superior fine filter

for passenger vehicles with a service interval of 80,000 Kms and which is also compatible with Methanol and Ethanol blended fuels.

Features of the innovation:

a. Enhanced filter to be housed within the same existing design

b. New joining process like Infrared welding, eliminating the use of industrial glue and design of specific profile for ultrasonic welding

c. Optimized media curing and media layout

The Approach

Bosch has developed a modern innovation process, which provides appropriate methods, tools, and criteria considering the innovation context.

The Bosch Innovation Framework (BIF) provides the platform for such processes. It is founded on the understanding of an innovative product's end-to-end lifecycle. The BIF emphasizes the early stages of innovation where ideas are refined into validated concepts fast and efficiently in order to focus our efforts on those businesses that demonstrate the most promise to scale profitably.

How the BIF fits into an end-to-end product lifecycle is depicted below:

Benefits

1. TS2-E
   a. Faster response time: < 3 sec
   b. High accuracy.: 0.5 K at RT
   c. Less weight with plastic interface: ~ 9 g
   d. High voltage withstand capability: 2500 V DC
   e. High usage life: 30000 hrs

2. CB08c-16 w/ smart metering
   a. Limp home function for enhanced vehicle reliability
   b. Cost-efficiency through elimination of Pressure Limiting Valve
   c. Versatile retrofitting onto existing engines without modifications

3. Gasoline fine filter
   a. Extended service performance with cost benefit
   b. Quick and easy fulfillment of production ramp-up
   c. Localization for Indian market and future fuel norm changes
   d. Additional cost benefit through saved import duty and shipping charges

The Future

1. TS2-E
   a. Flexible thermal units
   b. Electrolyzers
   c. Hydrogen Engines
   d. Electric transmission
   e. ICE application for future emission norms

2. CB08c-16 w/ smart metering

   Smart metering features being explored in Europe and China, signaling potential expansion and integration into international markets.

3. Gasoline fine filter

   Application can be extended to meet future Indian fuel norms of M15 and E20 fuel blends by 2025.

Burckhardt Compression (India) Pvt. Ltd.

Burckhardt Compression

Compressors for a Lifetime™

About the company

Burckhardt Compression creates leading compression solutions for a sustainable energy future and long-term success of our customers. Our customized and modularized compressor systems are used in the Chemical/Petrochemical, Gas Transport & Storage, Hydrogen Mobility & Energy, Industrial Gas sectors, Refinery and Gas Gathering & Processing.

Burckhardt Compression India Pvt Ltd (BCIN) is a wholly owned subsidiary of Burckhardt Compression AG. This is a world class facility having cradle to crave product ownership of Standard High Pressure Compressor package including product design, development, sales, operations and customer service for the region. In addition, we have centre of competence for API 618 and Standard Laby® Compressors.

Under the able leadership of Mr. Milind Wagle, with a focus to build an ecosystem that is conducive to performance, innovation, growth, we have over 450 competent, passionate, customer-oriented and solution-driven workforce. We are ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 and proudly, GreenCo "Gold rated" only compressor company, by CII.

The Innovation

Burckhardt Compression is having >175 years of history developing new products and services with >50 patents. We are the only global company with a full range of reciprocating compressor technologies and services catering around the world, round the clock. Over and above, we developed the capability to service other brand compressors involving multi-level innovation in people mindset, product benchmarking, process innovation, serviceability etc.

BCIN has an intense focus and developed various technologies and services for regional customers

1. Product innovations @ BCIN: Developed various water-cooled models (CW, HW, SW, TW) for Indian Defence and MHP for global marine application involving various technologies,
    - Detachable water-cooling jacket for cylinder cooling with simple casting design
    - Highly compact inter-stage coolers
    - Metallic and non-metallic efficient piston rings
    - Compact Dual mounted motor
    - Noise attenuator to avoid noise signature.
    - Development of materials for CO2 / lean H2 gas and case hardening process
    - Gas tight crank case design & management
2. Product innovations @ BCIN partners: With an equal importance and encouraging innovation at our partners, we developed various technologies,
    - Sea water compatible oil cooler with significant R&D with material, brazing process etc.
    - Indigenous development of Pressure maintaining valve with Marine standards ensuring standardization & cost reduction

- Development of special filters, maintaining air quality suitable for Breathing application

3. Process innovations @ BCIN: Proactively developed Casting technology, materials, nitriding process etc for sea water compatibility
4. Innovation in market capturing: Connected to the influencer in MoD, benchmarked with imported product, influenced through Indigenous products, and expanded the customer base to other defence segments through testimonials.
5. Innovation through Sustainability: Various innovative ideas implemented in the factory to ensure zero discharge and become first compressor company to become CII "GreenCo"
6. Encouraging innovation: Year through events/ celebrations to encourage innovative ideas from employees and awarding/empowering them as owner for implementation.

The Approach

A multilevel roadmap is followed, primarily with Mid-Range Plan (MRP), organizational strategy for 5 years and dynamic market driven intelligence & competition. The goals deduced from roadmap and percolated through top-down approach. Top management drives the innovation culture assisting with budget, project approvals and displays innovation culture through readily accepting success & failures. Company follows open innovations culture; however, a dedicated R&D team leads the projects following a structured GATE review process. An agile consisting of cross-functional teams focuses on project execution, whereas middle management is empowered for decisions and drives rigorous review mechanism to ensure the delivery with quality.

Benefits

We observed benefits are multi-fold. Our sea water compatible innovative solutions are implemented in various water-cooled models, catering new markets, providing an edge over the imported and competition. This boosted our employee confidence through ownership & new learnings of marine systems and defence related extreme tests. Nevertheless, we improved our process, implemented structured approach, and refined our systems for incremental & breakthrough innovations. The challenges encouraged us to develop our suppliers to become partners for innovation. Business outcome is clear, with increased revenue >5X in the last 3-5 years with improved brand equity and social impact.

The Future

The future is very bright with new innovations, and we have plan for various products with latest technologies for upcoming global markets. One of the important innovations in hydrogen market will be a significant breakthrough contributing to "Sustainability" and will be a premium product with improved margin & reduced costs.

Cadila Pharmaceuticals Limited

About the company

Cadila Pharmaceuticals Ltd. is one of the largest privately held pharmaceutical companies in India and is headquartered at Ahmedabad, Gujarat. Since 1951, our company has been developing and manufacturing pharmaceutical products in India with distribution in 90+ countries around the world. For over last seven decades, we have been spreading universal wellness through high quality, affordable medication – guided by our late Founder Chairman, Shri Indravadan Modi, popularly known as the "Medicine Man of India" with the philosophy The Care Continues.....

As an integrated pharmaceutical company, our presence is across the entire life sciences value chain i.e. R&D, API, formulations, marketing and distribution. Research plays a pivotal role in our company, wherein we had always been at the forefront of bringing innovations for the betterment of medical care to the last man of society. We are the only pharma company of India to have multiple innovations regularly over the years.

Our focus has been to bring our impactful innovations in the areas of unmet medical need and address the diseases of major public health concerns in India such as TB, Cardiovascular diseases, Cancer, Sepsis, Rabies etc.

- Some examples of the path-breaking first-in-the-world innovations Cadila has developed and commercialized are:
    - RABELOC I.V.: World first intra-venous rabeprazole formulation
    - SEPSIVAC: World first immunomodulator in sepsis management, approved for the treatment of Gram-negative Sepsis
    - POLYCAP: Polycap was introduced as the world's first innovative five-drug combi kit to prevent Cardiovascular diseases. The combination is recently endorsed and included by World Health Organisation (WHO) in the list of essential medicines 2023.
    - RISORINE KIT: For boosting Rifampicin for TB patients.
    - CADIFLU-S: A virus like particle vaccine for seasonal influenza.
    - MYCIDAC-C: For treatment of non-smaller cell lung cancer, it is the first indigenously developed adjuvant immunotherapy approved for Non-small-cell lung cancer (NSCLC).
    - ThRabis: World's first 3-dose Rabies G Protein Vaccine – to contribute in the Rabies Eradication Programme of India with Dosage Reduction Strategy towards Rabies Free India by 2030.

The Innovation

(1) POLYCAP

Aligned with United Nation's target of reducing the deaths by cardiovascular diseases by 25% by 2025, the need for combined five drugs dosages (including lipid lowering agent, three blood pressure lowering agents and a platelet aggregation inhibitor) in a single pill as an effective public health intervention was critical. As a globally relevant solution to address the cardiovascular deaths, Polycap was appreciated by American College of Cardiology and was recognized by World Heart Federation, European Cardiology Society and won the grant funding from the Welcome

Trust. The innovation and its clinical research performed in 10 countries around the world was published in "The Lancet" journal with an editorial and additional coverage. The product is patented in India and across the world. It is now included by WHO in the list of Essential Medicines. [India : IN 283909, Title: Stable pharmaceutical composition for Atherosclerosis] and [Global: CA 2754134 C, AU 2010212580 B2, CN 102480954 B, EP 2395838 B1, GB 2482432 B, US 9789187 B2, NZ 595127A, WO 2010092450A1].

(2) SPESIVAC (Poly TLR Modulator)

Sepsivac is a biological product and contains heat killed mycobacterium w (0.5x 109) in 0.1 ml of normal saline with thiomersol as a preservative. It was originally approved for reducing duration of therapy for multi-bacillary leprosy. Further research on this product identified unique properties which led to its development for gram negative sepsis under New Millennium Indian Technology Leadership Initiative (NMITLI) program of Council of Scientific & Industrial Research (CSIR). This is the first product approved from gram negative sepsis in the world.

The development involved in vitro, in vivo, and Phase I, II and III human clinical studies prior to its approval spanning more than 12 years. Patented in India and across the world. [India: IN 1931/MUM/2006, Title of "Poly-TLR Antagonist"] and [Global: US 8333978B2, JP 5358450 B2, ZA 200903523 B, AU 2007323134 B2, CA 2670124 C, EA 023046 B1, GB 2450580 B].

(3) Valdone /KQmin

Addressing the unmet need to develop pharmaceutical composition of curcumin with desired bioavailability, Cadila have been able to provide curcumin formulation with desired bioavailability by judicious selection of excipient and manufacturing technology. This is first of its kind in the world. Our pharmaceutical composition is the only approved curcumin formulation with desired bioavailability in India, supported by studies and is marketed under the brand names of Valdone and KQmin. The product is patented in India and worldwide [India: IN 283059, Title: Pharmaceutical composition of curcumin] and [Global: US 9474727B2, EP 2616053B1, WO2012035480A2].

(4) ThRabis

Aligned with Govt. of India's Rabies Eradication Programme - Rabies Mukht Bharat by 2030, Cadila Pharmaceuticals introduced world's first 3-dose Rabies G Protein Vaccine – by breaking the 40 years era of 5-dose Rabies Vaccination spread over 30 days timeline. India accounts for one-third of the yearly mortality burden due to rabies. Contributing through Dosage Reduction Strategy, ThRabis is a proven, safer, shorter regime intra-muscular ready-to-use vaccine (just 7 days vis-à-vis 30 days) and one of the easiest and preferred modes of injections. It is also extremely convenient for doctors being ready-to-use and does not require reconstitution prior to use. The vaccine has used recombinant nano particle technology, uses Rabies G protein and does not use virus in any form, whereas all current vaccine use inactivated virus. This is the reason for a better safety profile for ThRabis.

The Approach

- Cadila Pharmaceuticals constantly aligns with national public health goals for delivering Innovative products for the society. The key highlighted innovations are a testament to our motivation and dedication in applied Research & Development resulting in patented novel product developments from India.
- Our approach has been to identify globally relevant public health problems and offer innovations to meet the current therapy gaps. To achieve these goals, we have a number of collaborative partnerships in India and abroad. We have public : private partnership with CSIR, NII, AIIMS and a number of leading academic public institutions in India. Similarly, we have also developed partnerships with number of universities, companies and institutions across Europe, USA, South Korea etc.

Benefits

(1) POLYCAP

Polycap overcomes all the challenges of combining five ingredients as a single pill in a judicious composition comprising Atenolol, Ramipril, Simvastatin, Hydrochlorothiazide and Aspirin using appropriately selected excipient and manufacturing technology. Polycap® has a shelf life of two years and has been validated for retained bioavailability, pharmacodynamics properties, safety and efficacy through multiple clinical studies around the world. In global clinical trial it has shown to reduce the mortality of cardiovascular disease by over 30%. It has shown massive economic benefit to the patients and health systems around the world for reducing deaths and cost of hospitalization and complications.

(2) ThRabis reduces the number of injection to 3 from currently 5. The regimen of injections gets shortened to 1 week from current 1 month.

Compliant (3 Dose against 5 Dose Conventional Vaccine): Prevents missing the dose, assured protection from Rabies.

Compatible (VLP vaccine with recombinant nano particle): Better Safety and efficacy.

Convenient (No reconstitution required and less painful): Doctors and patients friendly.

ThRabis vaccine was awarded Two Awards as "Innovative Product of The Year" in 2023. One of them was by Economic Times and the other one was Global Tiger Award, Malaysia.

(3) SPESIVAC (Poly TLR Modulator)

Sepsivac has been shown to hugely benefit the critical patients in ICU suffering with sepsis. In the clinical trial conducted in patients with gram negative Sepsis, it reduced the mortality by 55% compared to the control arm. The drug was also used in large number of patients in management of COVID-19 during epidemic successfully – saving many lives.

(4) Valdone / KQmin

Cadila Pharmaceuticals' breakthrough innovation of Valdone and KQmin are found useful in the management of Ulcerative Colitis, other inflammatory diseases and cancer. Compared to other available formulations this product ensures several fold more bioavailability.

The Future

We continue to invest in scientific talent and state of the art research infrastructure innovations and our current pipeline includes novel therapies for various cancers and novel vaccines for life threatening viral diseases. Cadila Pharmaceuticals Limited is committed to bring future innovations that are globally relevant, can benefit the mankind and are commercially successful.

Cyril Amarchand Mangaldas

About the company

Cyril Amarchand Mangaldas (cam) is India's leading law firm with a global reputation of being trusted advisers to its clients. The Firm advises a large and diverse set of clients, including domestic and foreign commercial enterprises, financial institutions, private equity and venture capital funds, startups, government and regulatory bodies. The Firm generalists, specialists and senior ex-regulators expertly guide clients across a spectrum of transactions, sectors and regulations. With over 1000 lawyers including 180 Partners, the Firm is one of the largest full-service law firm in India and offices in key business centres at Mumbai, Delhi-NCR, Bengaluru, Ahmedabad, Hyderabad, Chennai, GIFT City and also in Singapore.

Pioneering the integration of technology, we proudly stand as the first Indian law firm to leverage AI for enhanced service delivery. This technological integration facilitates efficient problem-solving, enabling us to set precedents and provide ground-breaking solutions in today's intricate legal landscape.

The Innovation

In our unwavering commitment to excellence, we consistently stay ahead of the curve through early adoption of technology. Our primary emphasis is on delivering client-centric, best-in-class services. Through our dedicated Innovation Team, we prioritize the continual enhancement of legal services delivery, striving to elevate both, the business and practice of law.

We firmly believe in the amalgamation of people, processes, data and technology as the driving force of legal innovation.

People: Recognizing that collaboration and communication are pivotal in today's world, we pioneered, an annual initiative which empowers our firm to crowdsource ideas during an ideation week. Additionally, under the firm's leadership, we launched Prarambh, India's first Legaltech incubator, in 2019, joining forces with young entrepreneurs to develop home grown technology-based solutions for the legal industry. Recognizing the evolving needs of legal education, we introduced CLIC a customized program for law students and legal professionals, and AILP which aims to educate our associates. Both programs focus on practical use of Legaltech, innovation in law and problem-solving using design thinking methodologies.

Process: Transitioning from people-dependent to process-dependent systems is essential to enhance efficiency and productivity. We have played a pivotal role in developing in-house apps like Onecam, Collaborate, and The Deal Analytics Tool.

Technology: CAM believes that technology is an enabler. It makes tasks efficient and people productive. As the first law firm in India to adopt Artificial Intelligence (AI) and Machine Learning (ML), we integrated legal technologies into our daily practices for drafting documents, due diligence, contract review, evidence management, litigation strategy, legal research, intellectual property, and proofreading.

To summarise, our journey has been captivating, marked by pioneering the introduction of new technologies, developing in-house tech, supporting early-stage domestic legaltech startups, fostering curiosity among lawyers, and reshaping Legaltech education, among other milestones.

The Approach

We innovate with the goal of delivering superior, faster, and more efficient legal services. Constantly identifying and addressing problem areas, we measure their impact and collaborate with stakeholders to innovate. Our approach encompasses both internal and external innovations, integrating technology and process enhancements. Employing a dual top-down and bottom-up strategy ensures active stakeholder participation, cultivating a culture of innovation at every level. This shift has transformed our approach from traditional to being contemporary and collaborative.

Benefits

Our innovations have resulted in quantifiable benefits such as considerable cost savings, increased efficiency, improved accuracy, quality service delivery, client satisfaction and faster turnaround time. These innovations have also influenced the culture of the firm, the mindset of the lawyers and our relationship with our clients. We have seen efficiencies increasing by as much as 40%, leading to a better work life balance for our lawyers. This, in turn, allows our lawyers to upskill, transform and focus on improving their learning curve.

The Future

CAM aspires not just to witness but to drive change in the legal landscape. Anticipating a transformative period, the next three years will see significant growth in Legal Innovation. Our primary focus will be on Generative AI, online dispute resolution, data analytics, deeper tech integration with mainstream practice and building customized solutions for clients.

Daimler India Commercial Vehicles Private Limited

Daimler India Commercial Vehicles

About the company

Daimler India Commercial Vehicles (DICV), a wholly owned subsidiary of Daimler Truck AG, Germany, and operating under the umbrella of Daimler Trucks Asia, is a full-fledged commercial vehicle player in India with a brand dedicated to its home market: BharatBenz. DICV produces and sells trucks from 10 to 55 tons, as well as BharatBenz buses, Mercedes-Benz coaches, and bus chassis. DICV's state-of-the-art manufacturing plant at Oragadam near Chennai spreads over 400 acres (160 hectares) including a highly modern test track and is home to the company's headquarters, R&D, and training operations. With one global quality standard, it also produces Daimler Trucks' brands of FUSO, Mercedes-Benz, and Freightliner. Products and parts are exported to more than 60 markets in Africa, Asia, Latin America, and the Middle East. DICV represents an overall investment of more than INR 9,560 crores.

The Innovations

DICV's BharatBenz, renowned for having a strong track record of setting high standards in the Indian CV industry with its engineering, safety, comfort, and reliability, has pioneered many industry-first technologies that have kept its trucks and buses ahead of the curve. DICV aims for CO2 neutrality in driving operations ("tank-to-wheel"), by accelerating the reduction of CO2 emissions. In July, at the G20 Energy Ministers Meet, we unveiled the H2 fuel-cell luxury concept coach in collaboration with Reliance Industries towards testing viability for a greener tomorrow. The hydrogen fuel cell propulsion technology used on a fully customized BharatBenz coach chassis is being engineered to offer a range of approximately 400 km. This study will also help understand how viable H2 Fuel Cell technology for inter-city travel is.

In response to unsafe driving conditions due to weather and terrain, an industry-first innovation is the DICV Intelligent Lift Axle control based on ratio of wheel speed that reduces tire slippage at low-friction surfaces like wet or icy roads thus, enhancing safety & drive comfort using existing wheel sensors also resulting in enormous cost savings.

DICV's Simulated Driver Trainer (SDT) is a new to market service - a combination of a computerized and digital experience for any BharatBenz driver who gets to feel the real BharatBenz heavy-duty truck (HDT) cabin that is technologically tethered to real-world dynamics. It offers an immersive multi-sensory digital experience imparted in 5 languages and 27 driving modules with interstate, intercity, intra-city, hilly and mining applications that will precisely study the driver training process through AI.

The simulator for truck drivers enhances their driving skills, helps them to learn and adapt to modern technology in our BharatBenz trucks, better their logistical efficiency, drive safer than before and strengthen their driving capability. modules generate reports to help track and improve driving performance.

The Approach

In line with our strategy of "Making Our Customers Successful", "We start with listening" - Our leadership team and engineers meet our customers in different regions regularly, collect the voice-of-customer, convert them into technical inputs, and address their pain points with utmost importance.

We observe customers' operations in their business environment as part of our cross-country ethnographic study which is incorporated within our product & service development cycle to enhance end-customer experiences.

We have a dedicated CX officer and Transformation Office to get closer to the customer and a "Fail fast, Learn Faster" culture and 'Failure Houses' to learn from failures towards success.

Benefits

As one of the oldest pioneers in the automotive industry, we innovate to attain one goal: to create better and sustainable products for our customers who keep the world moving.

Through these innovations, DICV is able to provide better value to our customers, in line with our strategy to 'make our customers successful'.

DICV focuses on key metrics such as Customer Lifetime Value, Total Cost of Ownership, Revenue per Customer and Service usage level to continuously monitor customer value.

Our efforts have resulted in huge market disruption, greater sustainability and social impact, profitability, greater stakeholder collaboration, improved employee retention and greater market share.

The Future

'Adapt. Grow. Evolve' is the mantra that DICV lives by. At DICV, we will continue to develop mobility solutions to embrace a better life for the people and planet. Beyond offering innovative, cutting-edge products, we want to be a trusted partner to our customers and create greater value to them by being a one-stop total solutions provider. Together with our customers, we want to shape the transportation of the future.

Distinct Productivity Solutions

About the company

Distinct Productivity Solutions is a Bangalore Based, export oriented precision component manufacturer. The founders are from strong technical background of manufacturing technology. Passionate about cutting the metal creatively and innovatively we manufacture competitive products with uncompromised quality and deliver to domestic and international customer base. 45% of our produce are exported to many European countries, USA and Canada. Distinct about us is that we retain competitive edge by in-house developed capabilities like development fixtures, dies, moulds, special purpose machines, frugal automations, Industry 4.0 solutions. With this in-house capability, the ideas are transformed into reality much faster to reap the benefits. We are a SME with 3 manufacturing locations, International Certifications, fleet of 100+ CNC machines and 200+ skilled and motivated team.

The Innovation

Operation Innovation: DPS manufactures different varieties of precision machined components in different volumes ranging from 1pc to 500000 pcs per month. Once such component is bushing which we import substituted to one of Indian OEM manufacturer for their gear pumps. The volumes steadily increased over last 7 years to reach 20000 pcs per day. This was accomplished using several machines and operators, many tools, work stations, large floor space, litres of coolant, large capex and opex. In- spite of employing all these it was not being possible to reach the delivery actualization due to large number of variants that were creeping into the operations. DPS worked out a machining solutions by change of manufacturing strategy from Flexible Manufacturing System to Dedicated Machining Method. This resulted in a perfect lean situation wherein we started producing more quantity from less machines, less operators, less floor space, less power, less rejections, less coolant. This strategy of building own SPM is one of its kind for an SME organization which is generally followed by big players in the component manufacturing domain. The success inspires us to take on many such challenges in the days to come.

Product Innovation: In the advent of digitalization it has become easy to solve many manufacturing problems which were once treated non-solvable. DPS by virtue of its manufacturing experience, developed a digital gateway by name MyMachine to monitor equipment and operations performance. MyMachine is a personal gadget for the operator near the machine and serves as an Internet gate way between manufacturing operations and the cloud. It captures the performance of the machine and operator effortlessly to create a virtual layer of the manufacturing shop. MyMachine is a generic platform which is equipped with many digital pins and analog pins which integrates various sensors to keep a track of various performance parameters of the equipment. These pins are versatile to accept different types of sensors depending on the nature of the application and environment. This makes the whole product very generic to adapt to any type of industry with minimum customisation. While the manufacturing industry is in the midst of Industry 4.0 revolution, MyMachine makes a significant impact to digitalize the machine shops and reap the benefits of digitalization. As MyMachine is carved out of our own experience of solving our own problems, we see that it is very apt to

many manufacturers like us. It is a new business vertical at DPS.

The Approach

All our innovations are raised out of need. We have built a strong kaizen culture across the organization which provokes people at all levels to think innovatively in their work. The kaizen programs, suggestions schemes bring out many ideas to the floor. Management enables an environment to implement these ideas after validation. Small ideas get converted on the floor with the help of cross functional teams. Big ideas will be strategically handled by the management. Both the above case studies are the result of such ideation made to reality.

Benefits

Special Purpose Machine : This Operation Innovation Resulted in substantial cost reduction in the process cost. The whole system became lean and IoT enabled to produce more from less resources. The company gained knowledge and eco-system to develop its own machines for such applications.

MyMachine : This Product Innovation resulted in a new business vertical. In this era of digitalization in manufacturing, MyMachine is a significant milestone to capture all the activities digitally. MyMachine has the capability to make the whole manufacturing machine shop paperless while giving about 15% productivity improvement after full implementation.

The Future

We formulated strategies to achieve rapid expansion, taking advantage of the favorable growth conditions of Indian manufacturing sector. We backward integrated to High-Pressure Die Casting facility and forward integrated to assembled components. Equipped with enhanced value proposition we are currently engaged in emerging sectors such as components of Electric Vehicles, Hydrogen Energy, Solar etc. The in-house developed industry 4.0 solution MyMachine is time tested and is emerging as a new business vertical in the digitalization era of manufacturing. These strategic endeavors are propelling us towards new horizons in the foreseeable future.

Dow Chemical International Private Limited

About the company

Dow Chemical International Private Limited (Dow India) aims to be the most innovative, sustainable, inclusive, and customer-centric materials science company in the world. We are committed to delivering the right solutions to customer's global challenges. We deliver differentiated science-based products and solutions for our customers in high-growth segments, such as packaging, automobile, infrastructure, and consumer care.

A Great Place to Work® Certified company with approximately over 1000 employees, its operations comprise of manufacturing sites, innovation centre, established centres of excellence, and commercial office.

Our strategic vision is reflected in our work with non-profit partners towards empowerment of communities and sustainability of the planet. Through our Corporate Social Responsibility program, we drive targeted programs for persons with disabilities, women, and children. To accelerate our sustainability agenda, we have set multi-decade targets to put us on a path to achieve carbon neutrality and eliminate plastic waste.

The Innovation

DOWSIL™ GP 4314 -wettable dispersible granule (WDG) form antifoam for fungicide application

DOWSIL™ GP 4314 is novel antifoam in WDG format for fungicide formulations. Traditionally used formulations sometimes tend to disintegrate and become powdery, defeating the purpose of granulation. Attempts to add binder over and above to impart granulation does not help since the binder holds the granules together and does not let it disperse easily in water during spraying. In addition to the antifoaming performance when dispersed in water, This WDG antifoam product was found to eliminate disintegration of granules leading to better efficacy, stability, and reduced dust inhalation. It's unique structural composition of active siloxane and binder helps resolve the issue of disintegration and provides a robust end formulation.

VORALAST™ GL831/GE143 & VORALAST™ GF783/ GE143 - PU systems for footwear application

PU systems are used to make microcellular foams/soles for footwear application. We strive to consistently innovate and create value added products for the footwear manufacturers which can further provide enhanced comfort to end user. These VORALAST™ systems developed at Dow, India offers smooth material processing at 5-10% lower molded density compared to incumbents. Despite lower density (360- 390 g/l), the systems maintain excellent performance in terms of aesthetics, abrasion resistance and belt flex resistance thereby enhancing consumer comfort and product longevity.

RHOBARR™ 325 – Sustainable coatings for Paper Board packaging

It is a mixture of olefin polymers dispersed in water using Blue Wave technology. The incumbent heat-sealing technology using Polyethylene and per- and polyfluoroalkyl containing substances are not sustainable. The Polyethylene used for heat sealing sticks to the substrate during re-pulping process to recover the plastic, which generates micro plastic, contaminating our oceans. Usage of RHOBARR™ ensures better re-pulpability of the dispersed form of polymers avoiding extrusion associated with existing PE technology.

The Approach

Dow, India development center primarily caters to the requirements of Indian customers and therefore the application, processing & service conditions in India are the basis of any new product development. Dow, India lab is well equipped to support product development and pilot scale testing for most of the business segment along with close support from customers/other Dow labs wherever needed. The projects are identified with inputs from multiple stakeholders and are mapped through Stage gate process with key stakeholders' accountability and following SAVDC (Shaping , Analysis , Validation , Development commercialization process).

Benefits

DOWSIL™

- 60-70% lower dosage levels compared to traditional organic antifoams.
- Reduced inhalation hazard – Spray application.
- Disperses well in water - easy to administer in the fields.
- Efficient foam knockdown – Uniform/ optimal spray of fungicides.
- Optimal Binding performance ensures easy dispersion of granules.

VORALAST™

- Light weight footwear: 5 -10% weight reduction.
- Enhanced consumer comfort (light weight) and longevity (Performance).
- Less PU consumption per unit footwear production: Reduction in carbon footprint.
- Higher profitability for footwear manufacturer: RM cost reduction.

RHOBARR™

- 50%-70% Reduction in Water borne coating weight for heat sealing and barrier properties.
- 10% lower article weight, compared to traditional extruded coatings.

The Future

Dow plans to extend/enhance each of these user friendly and sustainable technologies to multiple application areas. The above VORALAST™ systems developed in India are already being leveraged across geographies for similar application and are also being used as a base to develop next-generation products for Indian customers. The team aims to further optimize the dosage of DOWSIL™ in fungicide application and explore other industrial and chemical processing applications. RHOBARR™ team is in process of developing arylic emulsions and polyolefin dispersions produced from bio source while also looking to protect food and dry goods from moisture and oxidation.

Eaton Power Quality Pvt. Ltd.

Powering Business Worldwide

About the company

As a global power management company, we help our customers solve their greatest power challenges through our industry leading electrical, aerospace, hydraulic and vehicle products, and services. For more than 100 years, our teams have helped people work more safely, be more energy efficient and live more sustainably.

Eaton is dedicated to improving the quality of life and protecting the environment for people everywhere. We are guided by our commitment to do business right, to operate sustainably and to help our customers manage power today and well into the future.

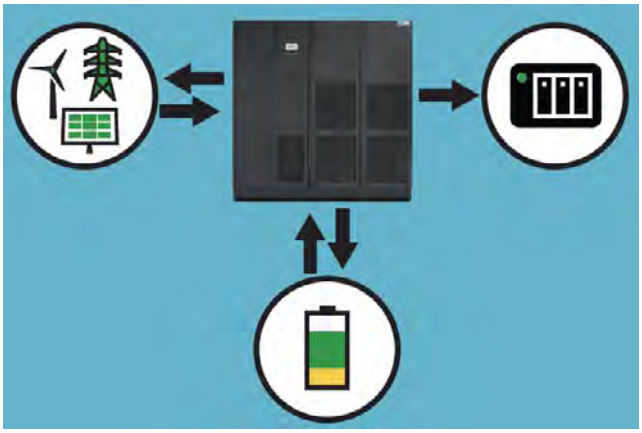
Eaton's Electrical business in Pondicherry, India is providing power distribution, power quality, back-up, control and automation, power monitoring and management solutions, and services to commercial, residential, utility, alternative energy, IT, and data centers, public sector institutions, and OEMs.

The Innovation

The Eaton® EnergyAware UPS combines tried and-true UPS technology with advanced energy storage functions. Protect valuable equipment from power disturbances events while leveraging UPS batteries to reduce facility operating costs or earn revenue through energy market participation.

EnergyAware enables facilities to support sustainable energy solutions, optimize the

cost of powering buildings and earn additional revenue from assets currently deployed.



Put UPS and battery assets to work for your bottom line:

- If your utility rate structure includes high demand charges, UPS batteries can be called on to curtail peak power draw from the utility, reducing costly demand charges.
- For facilities with time-of-use rates, supplement your load with UPS batteries during periods of high energy rates, re-charging batteries during times of low energy prices.
- Supplement existing load reduction techniques or generator use when participating in utility-sponsored demand response (DR) programs. Seamlessly integrate UPS assets to multiply payout for DR participation.
- Deploy UPS assets to participate in frequency response programs—available in the Mid-Atlantic (PJM) region today, with other regions coming soon.

- Ideal for facilities with UPS assets in need of battery replacements. Utilize existing UPS hardware, while upgrading to longer-life lithium batteries.

- Enables full utilization of available capacity. Perfect for N+1 systems.

EnergyAware enables complete control of deployed UPS and battery assets:

- You decide when to participate and how much capacity to allow.
- Configurable HMI screens give the user control of all aspects of the system.
- Utilize Eaton's scheduling and dispatch functions, or command externally through the MESA-compliant Modbus TCP interface.
- Programmable minimum runtime and load levels to ensure critical load is always protected.
- Eaton's proprietary algorithms secure the pre-determined battery capacity for mission critical applications, never sacrificing the primary objective of clean and secure backup.
- Fully scalable and can flexibly adapt to your regional utility programs, rate structures and load profiles.

The Approach

Eaton is expanding the role of the UPS, enabling the customers and users to do more with deployed assets. Gone are the days where a specific product is developed to a particular job, adding multiple dimensions to a product, and making it intelligent is the key requirement from customers and markets to improve the solutions effectiveness and maximum utilization of assets in which huge capitals are invested.

Being the world leader in innovation and technology for UPS products with bi-directional converters, Eaton came up with the idea of adding intelligent features to the UPS product with the addition of energy feed back to the grid, controlling the energy consumption during the peak demands and maximizing the consumption as per customer selection.

Benefits

Less than 3-year payback! 50% loaded 1MW UPS with 10 minutes of excess capacity could EARN $35,000 A YEAR.

Demand charge management

User avoids demand charges by discharging at peak times.

Time-of-use optimization

Shifts energy consumption to avoid peak energy usage.

Demand response

Utility company requests reduction in power usage.

Frequency regulation

Charge or discharge battery on command to stabilize the grid.

Aggregation services

Manage multiple assets in a building or campus to work as a single entity.

Generator replacement or offsetting

Utilize extended battery capacity as an environmentally friendly alternative to diesel generators.

The Future

Eaton invested in such futuristic innovation to lead the market and provide sustainable solutions to customers to increase the solution efficiency. Eaton will be expanding this feature to all high power UPS that support small to large datacenters and industries.

ELICO Limited

About the Company

1. An industry trailblazer for seven decades, stands as the vanguard in India's Analytical Instrumentation Sector.
2. Developing Indigenous technologies and setting benchmarks through continuous innovation and expertise.
3. Elico has over 100+ registered intellectual property rights, a testament to our relentless commitment to innovation.
4. Elico's illustrious track record is adorned with a multitude of prestigious national and international awards.
5. Elico's commitment to India's growth, spearheads comprehensive research, innovation, and manufacturing endeavors.

The Innovation

Innovation – I

Affordable Water Quality Monitoring Solution

1. Advanced sensor technology provides unparalleled accuracy in simultaneous measurement of residual chlorine and turbidity in water.
2. Comprehensive sensor system with 3 Measurement Techniques – Amperometric,

Nephelometric, Potentiometric

3. SENCON controller – Multiple sensor interface, supports Analog & Digital communication, integrated AIOs & DIOs
4. Integrated Fluidics control system – Controlled flow control and pressure regulation provide consistent results.
5. Membrane based Chlorine sensor – Long life an inexpensive replaceable membrane and electrolyte.

Innovation – II

Portable Multiparameter Water Quality Analyzer.

1. Portable Instrument for field use.
2. Integrated with 4 Measurement Techniques – Potentiometric, Electrical Conductivity, Colorimetric / Photometry & Nephelometric.
3. IoT & Cloud enabled system "Bringing Lab to Field" instead "Sample goes to Lab"
4. Can 30+ Drinking Water Parameters including (Physical Parameters, Non-Metals, Metals Toxic Metals, Non-Toxic Metals, Organic Compounds)

The Approach

a) Constraint

- Free Residual Chlorine remains the most critical parameter to be monitored for a water testing solution.

b) Current Method

- The standard method, which is still being used worldwide is a reagent-based approach.

c) Challenge

- To develop an ideal system for Indian Rural infrastructure and Environment that could work with minimal intervention, is cost effective and have low operational costs and maintenance.

d) RC Sensors

- Elico's R&D team started working on the residual chlorine sensor, and to develop a system to overcome the challenges.

e) The Instrument

- Integration of all the 3 basic parameters (pH, Turbidity, Free Residual Chlorine) in a single instrument in a compact and portable casing was done. This instrument is also designed to control external factors like pressure, flow etc. to allow a reliable and precise reading.
- The IoT implementation on the sensor is designed to allow remote transfer of data and monitor the sensor performance.

Benefits

Innovation – I

Robust, Reliable, Low Maintenance and Cost-Effective Water Quality Monitoring Solution

1. A Cost Effective and Comprehensive Analyzer for Online Measurement of pH, Turbidity & Free Residual Chlorine.
2. Aquasense (RC+TU) monitors the chlorine dosing in drinking water and gives the feedback to dosing system to make sure that 0.2ppm is maintained in the distribution line.
3. Developed for Durability and Reliability to work in Harsh Environmental Conditions, Longer Life & Low Maintenance.
4. Deployed in more than 500 Villages till date and 2,500 in due course of next 6 months.

Innovation – II

1. Reduce Laboratory Infrastructure Costs, and no requirement for dedicated laboratory space.
2. Simple to use, Unskilled manpower should be able to operate the instrument.
3. Pre-calibrated for Water Parameters
4. The Portable Multiparameter Water Quality Analyzer results match with the Laboratory results since the same technology and methods are used for measurement.
5. Ready to use reagents eliminate the complexity of preparing chemicals.
6. The data captured from the instrument and stored on the cloud can be used for identifying the patterns and predictive analytics.

The Future

1. To Provide Innovative Technologies in Water Quality Monitoring to address the Current & Future Challenges.
2. Elico is continuously working towards designing and manufacturing of fully automated water quality monitoring & testing solutions.
3. Elico sees a bright future of India and Working towards a self-reliant India.

EXIDE Industries Limited

About the company

Exide is one of the leading manufacturer and distributor of lead acid batteries and storage solutions, committed to providing unparalleled solutions and services for multiple energy applications world wide. We are strengthening our market share in lead-acid batteries and storage olutions,across both automotive and industrial sectors. Company is rapidly expanding capabilities on lithium-ion batteries aimed at building a sustainable economy and meeting the needs of diverse end-user industries.

Exide, with its innovative product portfolio, strong customer orientation and large network delivers values to Customers and all its stakeholders. Being Country's No.1 Energy storage solution provider, company is meeting the evolving needs of customers. Widespread presence in segments Automotive, Solar, Traction, Power, Projects, Mining, Railways UPS and submarine etc. has enabled it to build and manage the technologically know how in efficient and effective way. Company has always been providing the products that is best in Industry, competitive and best economic value while ensuring environmental and social standards remains at global standard.

The Approac h

Company has institutionalized innovation mechanism across the organization. It has in-depth mechanism in place for supporting the future needs. Leadership strongly empowers the professionals, scientists, and engineers to fully exploit the creativity and allows freedom to experiment. Accumulated know how build over 75 years of experience, diversified capabilities to innovate product, technology and process through wide spread knowledge base present across the length and breadth of organization.

Innovation culture is promoted through key enablers through leadership behaviours. Knowledge sharing and well-articulated schemes like young- old scientist creates in depth and homogeneous technology know how while ensuring collaborative approach best fit for exploring challenging opportunities.

There exists stable innovation organization structure with responsibility and accountability in place. The team has set direction keeping in view short and long term objectives. Strategic direction includes,

- Digitization
- Million Dollar Innovation Scheme (Prize Money)
- Product Life Cycle Management
- Young –Old Scientist Collaboration

Innovation management mechanism is one of best in Industry, some of best-in-class practices are

- Effective horizontal & vertical communication
- Problem centric idea generation & conceptualization
- Simulation using Finite Element Analysis
- State of art tools, techniques & solutions
- Leveraging people creativity for idea generation
- Integrated Risk Management Promoting Experimentation

- Learning from failures & cross sharing
- Prototyping, Alfa & Beta Testing, Validation & Launch
- Functional, aesthetics & performance
- Sourcing know-how from Customer

As we move forward, with the right tailwinds, demand in the automotive and the industrial sectors is expected to remain high. In lead-acid battery and storage solutions business, we continue to leverage our global collaborations and work towards introducing products and solutions with advanced features based on market demand. We are also undertaking capex for increasing capacities for niche technology applications and taking steps to further enhance customer experience.

In exports, we are expanding into new markets and tailoring our product portfolio to meet the needs of customers worldwide. Finally, we are also rapidly expanding our capabilities in lithium-ion batteries to ameliorate our contribution to build a sustainable economy. Leveraging our future-ready

product portfolio, customer-centric business model, expansive national and international presence, digital transformation and a robust balance sheet, we remain poised to capitalise on emerging opportunities and stay a step ahead of competition.

The Innovation

New product to Company

AGM VRLA (Valve Regulated Lead-Acid) battery, commonly known as a sealed lead-acid battery, is a type of rechargeable battery designed for various applications, including automotive use, especially under the bonnet (hood) of a car. VRLA batteries have gained popularity due to their maintenance-free and spill-proof design, making them ideal for under-the-hood installations.

Key features and benefits of VRLA batteries for car applications under the bonnet:

1. Maintenance-Free: VRLA batteries are sealed, eliminating the need for regular maintenance like adding water or checking electrolyte levels. This feature is particularly advantageous for automotive applications where easy accessibility and maintenance can be challenging.
2. Spill-Proof: The sealed design of VRLA batteries prevents acid leakage and makes them safe for use in confined spaces, like the engine compartment of a car. This minimizes the risk of damage to other vehicle components and ensures a clean and safe environment.
3. Low Self-Discharge: VRLA batteries have a relatively low self-discharge rate, meaning they can hold their charge for extended periods, even when not in use. This is crucial for cars that may sit idle for extended periods, as the battery will be ready to start the engine when needed.
4. Reliable Starting Power
5. Suitable for partial state of charge application

SLI AGM battery for under bonnet application is under development to cater OE & Export segment. Presently prototypes under development and will be introduced after successful validation. Different variants are produced and will be validated with respect to most stringent standard applicable for SLI battery.

New product to Market

Initially ISS batteries were made to support the vehicles where Idle stop start feature was present. Gradually with introduction of other features like regenerative braking, acceleration support, sailing etc. application requirements are becoming more stringent and EFB technology introduced to achieve desired performance level. EFB is the most advanced form of ISS battery which are complying latest EN specification requirements.

Benefits of EFB: -

- High Static Charge Acceptance: - The battery should be charged within a short duration in a partial state of charge condition where

battery state of charge mostly varied within 80% - 90% level.

- High CCA: - The battery should be able to provide cranking power after every idle phase.
- Low Water Loss: - Better maintenance free characteristics.
- High Endurance Cycle Life: - EFBs are complying endurance cycle tests as per EN 50342-6 which simulates actual application requirements.

Endurance in cycle test with 17.5 % depth of discharge – The purpose of this test is to check the cycling capability of the battery under partial state of charge condition. EFB batteries should have superior throughput of energy as compared to standard flooded batteries

Endurance in cycle test with 50 % depth of discharge at 40°C & preceded deep discharge – This test determines battery ability to withstand deep discharge without losing its cycling capability. In vehicles designed for micro-cycle applications, during engine-off phases the battery needs to support entire electrical load. Based on Volkswagen requirement, Exide initiated development of EFB battery. The battery was developed and validated in Volkswagen, Germany as per their specification VW 75073. After successful validation, EFB product introduced 1st time in India from Exide's Chinchwad plant in Feb'22.

Innovation Case Example-1

Plastic Intensive Plate Design for Improving Energy Density in E-Mobility Application

The energy density of the battery plays a major role in the E-mobility domain for battery operated vehicle. This essentially defines the efficiency of the battery, the dead weight of the vehicle and thus the range and also material usage and thus cost.

In case of batteries for the most popular E-mobility solution for India, the E-Rickshaw, the plate design has been innovated to provide lower Lead input, reducing the plate weight and thus improving the energy density per plate basis.

The passive Lead component in the plate has been partially replaced by plastic thereby reducing the weight, Lead consumption and improving the energy per weight ratio (gravimetric energy density). The innovation has reduced passive lead by 22% and improved energy density by 27%. This innovation comes without any compromise on other performance parameters like life and drive range.

Innovation Case Example-2

Design Innovation of Positive electrodes made from Punched process using rolled lead strips.

Objective :- Address the failure related to Grid growth through structural analysis.

Methodology :- In the new design grid mass distributed in different quadrants along with pellet size optimisation w.r.t to the current collector tab to minimize the current density and structurally reduce the possibility of growth.

The new design was subjected to ANSYS simulation w.r.t existing design. Subsequently Prototype press tool was developed locally, and the product was evaluated in bench. The bench test result shows significant improvement of the new design over the existing grid design.

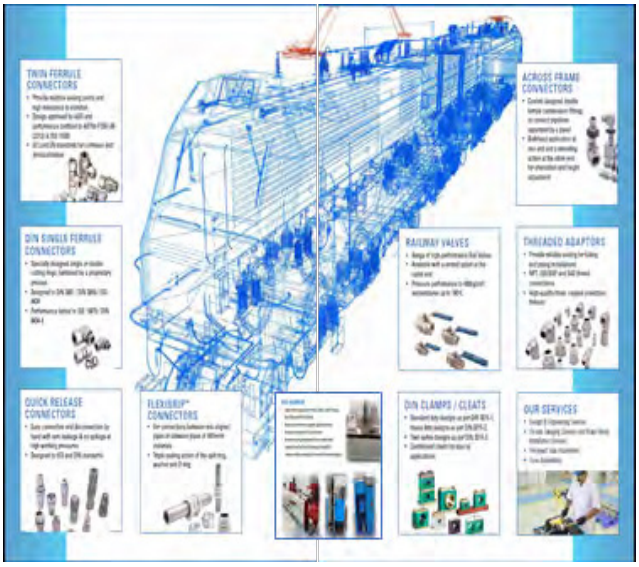
Result :- Based on the above CAPEX has been approved by the top management and the mass production tool has been ordered to the relevant tool manufacturer. The press tool under development and expected to be used for mass production from April24.

Fluid Controls Private Limited

About the company

Started way back in 1974, Fluid Controls' goes to Global and Local market by Primary 5 business verticals i.e. Railways (Metro, Coaches, Locomotives), Oil and Gas, Power (Nuclear, Thermal), Defence and Aerospace Industries (NADCAP and AS9100D Certified).

Fluid Controls' Design, Engineering, Manufacturing and Test-Lab are at Chakan, Pune where we have a state-of-the-art R&D centre which offers clients customized solutions based on analytical formulations, 3D Modelling and Finite Element Analysis. Fluid Controls® R&D is recognised by the Government of India(DSIR) as an "In House R&D Unit". Fluid Controls Test Lab is NABL (ISO17025) certified which gives us edge in our offerings. Fluid Controls offers NADCAP (Fluid Distribution Systems) and AS9100D certified Aerospace Connectors.



Innovation: 1 – Case Hardening Processes for Ferrules made of Stainless Steel and Carbon Steel

The Innovation-

A process for heat treating austenitic stainless-steel ferrule and carbon Steel Ferrule to impart a balance of good surface hardness and good corrosion resistance which can be processed in mostly available nitriding furnaces.

Benefits- Good corrosion resistance. Mostly available furnace can be used. Uniform case depth.

The Future- Reduction in cycle time of the hardening process.

DEFINE The Problem

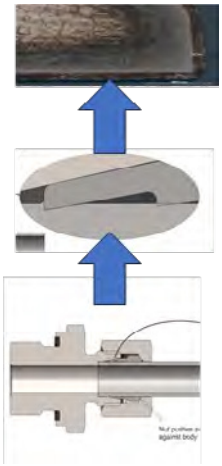
MEASURE The Data

ANALYZE The Process/Design

DESIGN The Process/Product

OPTIMIZE The Changes

VERIFY The Process



Innovation: 2 – Aerospace Connectors and ISO17025(NABL) Test La

DEFINE The Problem

Aerospace Connectors i.e. Sleeve-Nut-Body AS18280 needs to be designed and tested per ISO17025

MEASURE The Data

The Approach-

Certification: AS9100D, NADCAP (Fluid Distribution System) and ISO17025

ANALYZE The Process/Design

The Approach-

Certification: AS9100D, NADCAP (Fluid Distribution System) and ISO17025

11 types of Tests with 99 details and Options

Salt Spray S-N Flexure

- Joint Strength
- Hydrostatic
- Pneumatic
- Chemical
- Impulse
- Proof Pressure
- Burst Pressure
- Reuse (Reliability

We learn and grow through challenges and through our willingness to accept qualified risk.

DESIGN The Process/Product

Benefits- Under the one roof Connectors development and Testing “Make in India”

OPTIMIZE The Changes

The Future- Reduction in COST and Cycle Time of Connectors

VERIFY The Process

Garware Hi-Tech Films Limited

A. About the Company

Garware Hi-tech Films Ltd (GHFL) was co-promoted by the Chairman and Managing Director Dr. S.B. Garware in the year 1957 along with the Founder Chairman Late Padma Bhushan Dr. Bhalchandra (Abasaheb) Garware. The current board is also chaired by the three daughters of the Chairman, as Directors holding different responsibilities.

Today, we are the leading manufacturers of high-quality, durable, and highly innovative polyester film supplied internationally. An ISO 9001:2015 company with a customer base of 88+ countries across the globe.

- GHFL is a global technology-driven organization and pioneer in manufacturing value-added Polyester Films, Sun-control Window Films, and Paint Protection Films in India for the last six decades.
- Vertical integration of making our raw materials to finished Polyester Films and Window Films which runs 24X7.

We are continuously diversifying to meet new challenges and reach new horizons by developing unique innovative products.

B. The Innovation

An organization's ability to innovate is recognized as a key factor for sustained growth, economic viability, increased well-being, and the development of society. Our innovation capabilities include the ability to understand and respond to changing conditions of its context, to pursue new opportunities, and to leverage the knowledge and creativity of people within the organization.

Innovation management system guides us to determine its innovation vision, strategy, policy, and objectives and helps to establish the support and processes needed to achieve the intended outcomes.

We have adopted the following core values, "Innovation" being one of the keys. We have also developed an elaborate innovation management procedure in line with ISO 56002 guidelines.

Apart from the companies Vision and Mission we also formulated Innovation Vision and Mission policies.

Innovation Methodology

GHFL Innovation comes under two Pillars namely "Development Management Pillar" and "Kobetsu-Kaizen (Focused Improvement Pillar)". GHFL has formed three separate Cross-Functional teams, two teams under the Development Management (DM) Pillar and one team under Focused Improvement (FI) Pillar.

With the help of above cross-functional teams, as an example, the following two innovative products were showcased.

1. New-to-Market: PPF (Paint Protective Films)

PPF is a Thermoplastic Polyurethane film applied to painted surfaces of a car to protect the paint from Scratches, Bug damage, extreme weather conditions, and UV radiation. It also has self-healing properties against dents and scratches. Additionally, it has a high gloss and optical clarity.

2. New- to- Firm: IR (Infrared Films)

It was mainly designed for Automotive and Front Shield applications and constitutes nano–ceramic particles and IR-blocking materials that reject up to 96% of infrared electromagnetic radiation and 99% of harmful UV rays. Innovative solution applied to overcome the challenge of vision and clarity of front shield glass after usage of infrared films.

C. Innovation Approach

A. ANSOFF Matrix: We used ANSOFF Matrix tool to categorize our products namely-

   1. Existing Product in Existing Market
   2. Existing Product in New Market
   3. New Product in the Existing Market
   4. New Product in New Market. Our focus was to introduce the products in 3rd & 4th segments.

B. BCG Matrix: BCG Matrix helped us to identify the positioning of the product.

C. Feasibility Study:

A feasibility study was carried out with the help of 26 points marketing checklist which included (Product Information, Key Test required for acceptance, technical data sheet, and End Applications, Competitive Mapping and Study of Infrastructure and Resources feasibility, Selling price of the product, Statutory and Regulatory requirements etc.

We have adopted a well-planned Design and Development methodology which ensures that the project is completed within the time frame provided and meets the budgetary requirement. The process involves Design and Development:

1. Planning
2. Inputs
3. Controls
4. Reviews
5. Verification
6. Validation
7. Outputs and Customer Feedback.
8. Commercialization
9. Product Cost Reduction and Product Quality Improvement through Innovative Solutions for productivity improvement and input material optimization.

D. Benefits

For Liner Product, after implementing Innovative Ideas/ Kaizen we have achieved the following results.

1. Operating Expenses (OPEX) reduced through reduction of:
   a. Raw Material cost by more than 20%.
   b. Productivity Improvement by 20%.
   c. Production Rate increased by 25%.
2. Quality Rejection reduced from 13% to 2% (i.e.84%)
3. During the above exercise, we increased the number of products from “18 products in 2019-20 to 58 products in 2022-23”. The revenue from New Products increased from 12% to 19.87% of Sales Turnover in the last 3 years.
4. GHFL’s ability to adapt to changing market conditions and invest in high-margin value accretive products has allowed it to thrive in a competitive and volatile environment which has resulted in the following achievements.

E. The Future

We have set a new target of 70 Nos New Products FY 2025, which includes highly specialized film like Safety Glazing Film, Pearl Float Shrink Film & to reach 87 channel Partners for PPF application.

Strategic Roadmap includes - Diversified Product Portfolio, Global reach & Expansion and Focus on new Innovative & Cost-Effective Specialized Products.

Statement of Purpose (Feasibility Study)

F/DD/32/XX

Garware Hi-Tech Films Ltd. Date :
Page : 1 of 2

STATEMENT OF PURPOSE

1)	Product name / Information	::
2)	Product being used currently	::
3)	Key tests required with criterion for acceptance	::
4)	Sample as a bench mark	::
5)	Data sheet / Technical specifications & End applications	::
6)	Process in brief for application of product by customers.	::
7)	Current manufacturers & their capacity in	::
	a) Indian	::
		::
	b) Overseas	::
		::
8)	Quantitative demand in market	::
9)	Quantitative current supply in market:	
10)	Demand / Supply gap	::
11)	Future trend of product for five years: a) Increasing	::
	b) Decreasing	::
12)	Life of product	::
13)	Selling price of product	::
14)	Expected product price	::
		::

F/DD/32/XX

Garware Hi-Tech Films Ltd. Date :
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STATEMENT OF PURPOSE

15)	IPR status in depth	::
16)	Statutory requirements	::
17)	Regulatory requirement	::
18)	Safety requirements	::
19)	Certification / Approvals required	::
20)	Test methods / standards	::
21)	Expected R&D period	::
22)	Expected contribution a) per kg of film	:: ::
	b) per month	::
23)	Approximately cost of Development	::
24)	Names of buyer list / consumer list	::
25)	Why they will buy from us	::
26)	Substituting Products	::

Prepared By Marketing Dept. Executive Committee CMD / Joint MD Approval

FY	2017-2018	2022-2023	Q1 2023-2024
Revenue from operations (From Specialty Business)	874 Crores	1438 Crores	380m Crores
EBITDA Margin	9%	18.7%	19.2%
PAT Margin	2.5%	11.6%	11.5%

Havells India Limited

About the company

Havells India Ltd. is a well-recognized Fast moving electrical goods (FMEG) company with a rich pedigree in Innovation, strong in-house manufacturing, and pioneering smart products distributed globally under well-known bands like Havells, Havells Studio, LLOYD, Standard, Crabtree, and Rio.

Key figures for FY 2022-23 are as below:

- Annual turnover of INR 16,868 Cr.
- 20 Product verticals with 15 own Manufacturing plants.
- Approximately 1% of Net sales are spent on R&D.
- 34% of R&D spent on sustainable products and technologies.
- 31% Share of revenue from NPD.
- To date 177 patents and 1,038 design registrations.

Havells Innovation ecosystem is led by a DSIR-approved world-class Research and Innovation organization spread across 3 main centers, housing 650+ talented and motivated employees.

With the vision of going deeper into Consumer homes, our efforts are focused on 3 strategic pillars of "Consumer-centric Innovations", "Ownership of critical technologies" and "End to product responsibility".

The Innovation

The problem effecting Billions of people

Indoor air pollution is the degradation of indoor air quality by harmful chemicals and other materials; it can be up to 10 times worse than outdoor air pollution.

This is because contained areas enable potential pollutants to build up more than open spaces. Various studies in India have reported the harmful effects of indoor air pollution.

While most of the domestic air purifiers focus on PM 2.5, the spawn of the problem extends beyond to finer and organic pollutants.

To address the problem Havells introduced the Havells Studio Meditate Air Purifier. Designed, and manufactured in India for the world with many world's first features as below:

- Delivering 400 CADR, meditate can cleanse the air of a sufficiently large room (~51 m2).
- It is equipped with 6 Stage purification including a Medical-grade HEPA 14 filter.
- Going beyond PM 2.5 filtration, it addresses the larger issue of VOCs (volatile organic

compounds) through the world's first TiO2-based Space Tech. that disintegrates the pollutants into harmless molecules.

- Another world's first feature is its mobile AQI (Air quality Indicator) for real air purity checks across the space and comes along with a useful wireless mobile charging pad.
- Meditate is a device with an intelligent interface that can run with minimal inputs, learns, and adapts from user behavior, and can be remotely operated through connected and geo-sync features.
- Further, with predictive analytics, it can fetch weather data from official portals and advise users on best settings.
- Along with all these cutting-edge features, Meditate is aesthetically superior, with a form inspired by musical instrument making it a delight to place within our living space.

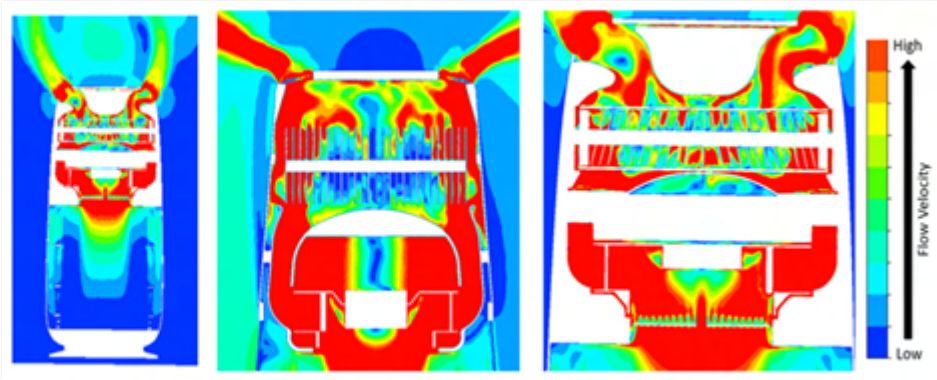
Overall Meditate delivers a Zen-like peace to consumers against a critical problem of air pollution in indoor spaces, hence living up to its name.

The Approach

Meditate is a demonstration of our commitment towards solving meaningful problems for consumers and society through technological breakthroughs.

- Using methodologies like design thinking and ethnographic research we discovered the latent consumer pains leading to the problem statements around indoor air pollution.
- As the world struggled with scale-defying air pollution, we researched the globe for a breakthrough and uncovered a potential technology used in space stations.

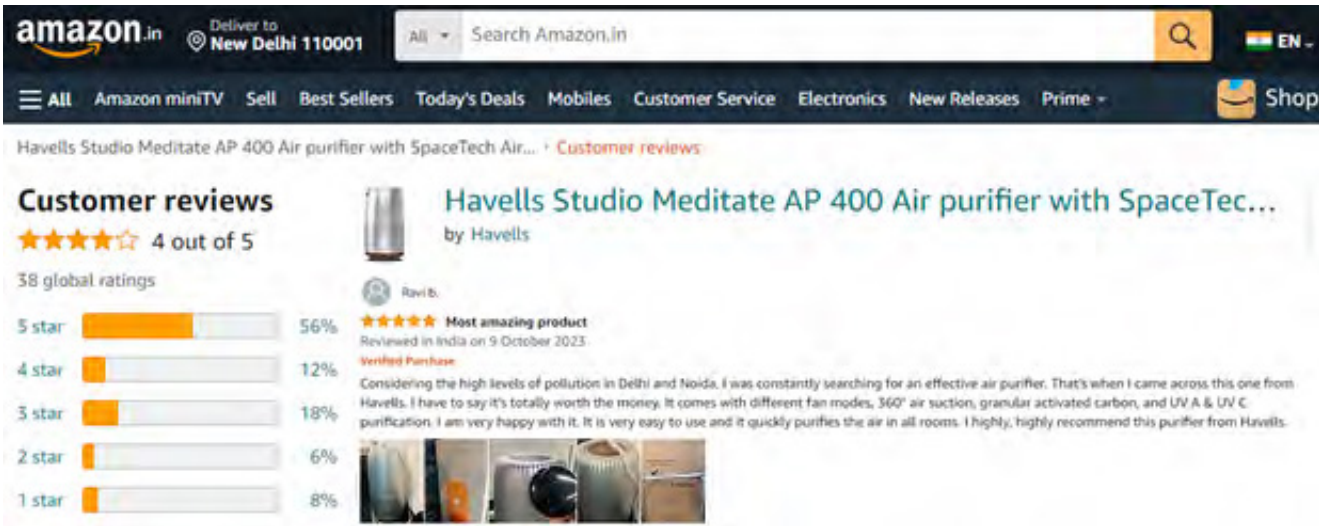
- With no domestic precedence, our team took the risk of developing Space Tech in-house to deliver an air purification breakthrough.
- Advanced methods like EM simulations were used to reduce the development cycle time.



Benefits

With many world and class-leading features, along with being designed and manufactured in India Meditate has acquired a leadership spot among Indoor Air purifiers.

- While it's early days for assessing the revenue impact, Mediate has found placement with many prominent dignitaries.
- It marks a bright spot on the wave of made in India for the world, a testimony confirmed by many domestic and international awards. E.g., iF and Red Dot Design Awards 2023.
- For Havells specifically, Mediate adds to the strive of achieving Innovation leadership and a steppingstone towards the Super premium and experiential space with Havells Studio.



The Future

We have plans for using technologies and capabilities developed with Mediate for future Innovation platforms. The roadmap for the next few years includes the following:

- Extending Meditate range to different CADR variants for wider consumer use cases.
- Taking Meditate to global markets with a “Made in India for the world” view.
- Extending Space Tech, Wireless power, Intelligent interface etc. to other product ranges.

IntelliSmart Infrastructure Private Limited

About the company

IntelliSmart Infrastructure Private Limited is India's leading smart metering and digital solutions provider. It is a joint venture of National Investment and Infrastructure Fund (NIIF) and Energy Efficiency Services Limited (EESL), established with the core purpose of becoming the most preferred digital partner of the utilities. Our organisational culture is built on the core values of Integrity, Respect, Innovation and Sustainability, which influence our everyday endeavours and collective practices.

Over the course of more than three years, IntelliSmart has rapidly grown to become India's leading smart meter solutions provider. As a testament to its unique business model and robust solution, IntelliSmart has bagged the country's first smart meter tender floated on DBFOOT arrangement. Our contribution to the adoption of the TOTEX model and the development of the Standard Bidding Document have been substantial. Our track record of winning and executing projects remains unmatched.

The innovation

The IntelliSmart consumer mobile application aims to provide an improved customer experience. The platform offers easy options for recharging and paying bills, helping change consumer payment habits. Utilising smart meter data, the application presents customers with user-friendly dashboards that display information about their power usage. This empowers users to monitor and compare their monthly power consumption, ultimately leading to more energy-efficient habits.

Available on both Android and iOS, the application also provides information about the balance of remaining electricity in units and in monetary terms. It facilitates enhanced user engagement and experience by offering consumers intelligent energy usage insights by integrating and analysing data from smart meters in near real-time. While the application is customisable as per the utility needs, the O&M is free for ten years for Discoms. In the long run, the platform can assist demand response opportunities for Discoms, enabling them to create new revenue streams and simultaneously support consumers manage and conserve energy effectively.

The Approach

The approach behind developing the consumer mobile application was to create a prepaid payment system for electricity, allowing users to pay for it just like any other product - on a "pay as you use" basis. Through the app, the customer is made aware that he is consuming a product 'Electrical Energy'. The application will empower consumers to take control of their electricity usage and budgeting. With this innovative tool, users will have near real-time access to their electricity usage data, allowing them to make informed decisions and manage their energy consumption effectively.

Benefits

The IntelliSmart consumer mobile application offers a range of benefits that set it apart in the industry.

Improved customer experience & seamless bill payment

The mobile application facilitates enhanced user engagement and experience by offering

consumers intelligent energy usage insights by integrating and analysing data from smart meters in near real-time. The application also offers ease of bill payment with multiple digital payment avenues. This could significantly push consumers to pay bills without any hassles, leading to an overall increase in customer satisfaction.

Reduction in customer care call volume & personalised dashboard

The digital platform ensures a reduction in customer care call volume as it helps build superior customer experiences by providing users with their energy usage information in intuitive formats and personalised dashboard. The dashboard also displays a customisable image section where utility can broadcast energy tips or any message to customers. Furthermore, the mobile application offers customers a view of their current balance, projected usage, and bill amount before a billing cycle ends.

Decreased energy usage and driving conservation

The smart meter mobile application with its digital customer experience (CX) platform enables users to track their usage actively. The platform can, in the long run, assist DR opportunities for Discoms, enabling them to create new revenue streams and simultaneously support the consumers in managing and conserving energy effectively.

The Future

The energy demands of the nation are growing at a rapid rate with increased urbanisation and population growth. The long-term vision of IntelliSmart with the digital innovation platform and the smart metering system is to create a robust, reliable, and flexible smart grid network, which will be able to meet the nation's increasing power demand by seamlessly integrating renewable energy into the grid.

KONE Elevators India

About the company

At KONE, our mission is to improve the flow of urban life. As a global leader in the elevator and escalator industry, KONE provides elevators, escalators, and automatic building doors, as well as solutions for maintenance and modernization to add value to buildings throughout their life cycle. Through more effective People Flow®, we make people's journeys safe, convenient, and reliable, in taller, smarter buildings. In 2022, KONE had annual sales of EUR 10.9 billion, and at the end of the year over 60,000 employees.

KONE India serves customers all over the country through its 50+ branches and provides sustainable People Flow™ solutions. KONE's production unit in Chennai produces elevators and escalators for the Indian market as well as for export. KONE's global technology and engineering center in Chennai, is one of the largest global R&D centers, which supports the latest technology and development of future solutions.

The Innovation

Kone was awarded 8 times, the world's most innovative companies by FORBES magazine and is the only elevator & escalator company to be featured in it. At KONE, with our strong R&D we hold more than 3,000 patents across our businesses.

Few examples of KONE's breakthrough innovations:

KONE ECODISC® MOTOR

The KONE Eco Disc hoisting motor is the heart of KONE's elevator solution. The machinery was completely renewed in 2012 providing several advantages. The new innovative copper winding system reduces the amount of energy lost as heat, making KONE elevators even more energy efficient than before. The compact design eliminates the need for machine room in the building, thereby saving construction time and space. This innovation not only changed the elevator industry but also impacted the construction industry.

KONE ULTRAROPE®

KONE Ultra Rope®, sets a new benchmark for high-rise buildings. The super-light KONE Ultra Rope technology provides unrivalled elevator eco-efficiency, reliability, and durability, while also improving elevator performance. It eliminates the disadvantages of existing steel ropes – high energy consumption, rope stretch, large moving masses, and downtime caused by building sway. KONE Ultra Rope can enable future elevator travel heights up to 1,000 meters.

KONE DX CLASS ELEVATORS

KONE DX Class elevators, the world's first elevator series with built-in digital connectivity. KONE DX Class elevators bring a new user experience to life through a combination of design, technology, new materials, applications, and services.

KONE 24/7 PLANNER

KONE Care 24/7 Planner is to extend the 24/7 Connected Services platform offering to support asset management planning of future repairs and modernizations.

It is the most desired asset maintenance management service in the elevator & escalator industry;

serving building owners and facility management through data driven AI.

The Approach

DX Class Elevator

We have adopted customer centric approach to conceptualize, design, and build the DX solution. Our approach with the new technologies like Application Programming Interface (APIs) enabled an adaptable solution to the changing building needs by integrating different smart systems in a building space providing a Seamless People Flow Experience for the users.

KONE 24/7 Planner

Objective is to utilize 24/7 connectivity and advanced analytics to improve the way we do asset management planning for more accurate results and efficient end-to-end process.

Service sold as value-added service to the maintenance contract with 24/7 Connected services.

Benefits

DX Class Elevator

For buildings that aspire to be intelligent, KONE DX Class elevator provides:

- Customers to activate digital services easily and remotely when they need to, like KONE 24/7 Connected Services, Elevator remote call, Media screens etc.

- Secure APIs for third-party solutions, which create new possibilities to integrate with service providers like robotic systems, access control, visitor management systems and other building applications to bring new levels of sophistication to the people flow experience.

KONE 24/7 Planner

- Direct positive impact on customer loyalty through market differentiation, transparency, and predictability of total cost of ownership to customer.

The Future

DX Class Elevator

At KONE, we are merging the technologies of tomorrow with the buildings of today thereby future proofing it.

KONE 24/7 Planner

KONE 24/7 Planner takes asset management to a new level with recommendations that help prolong the lifetime of elevators.

L&T Technology Services Ltd.

L&T Technology Services

About the company

L&T Technology Services Limited (LTTS) is a listed subsidiary of Larsen & Toubro Limited focused on Digital Engineering and R&D (ER&D) services. We offer consultancy, design, development and testing services across the product and process development life cycle. Our customer base includes 69 Fortune 500 companies and 57 of the world's top ER&D companies, across industrial products, medical devices, transportation, telecom & hi-tech, and the process industries. Headquartered in India, we have over 23,800 employees spread across 22 global design centers, 28 global sales offices and 102 innovation labs as of September 30, 2023.

The Innovations

The details of innovations highlighted in the CII application are as below:

Chest-rAi™ - AI based Chest X-Ray Radiology suite for symptom detection, localization and intelligence reporting. The suite has the potential to detect ~34 of the most common lung-related abnormalities. This translates to >85% of diagnosis encountered at a medical institution. Chest-rAITM produces preliminary reports with findings adhering to the reporting practices of medical institutions.

AiCE - An integrated AI tool that performs systematic review and reporting related to clinical literature. The tool uses cognitive capabilities, such as a search feature with a filter, and is integrated with multiple databases, enables multiple users to simultaneously work on the same project. It uses customized and LTTS-owned Bio BERT LLM model to create an innovative ranking model for rating documents based on their comprehensiveness. It then enables metadata extraction and auto-summary features using FLAN and LaMDA LLM models. Finally, it uses AI-based DAPR & TOFSC models for scoring the articles (based on parameters like quality) and final CER (Clinical Evaluation Report) creation based on included documents. AiCE can run customized workflows compared to commercially available solutions, enables quick decision-making in alignment with regulatory norms, enhances accuracy by > 85%, and boosts productivity by over 30%.

Direct Carbon Capture & Conversion into Methanol - LTTS collaborated with Pandit Deendayal Energy University, Gandhinagar to focus on exploring alternate fuels and energy sources to meet emission norms. One of the joint solutions is supporting ability to absorb greenhouse gas (CO_2) from various sources and simultaneously convert into green methanol by using catalytic hydrogenation methods. The solution being developed can capture CO_2 from air and convert into methanol with a yield of more than 30-35% in continuous mode of reactions.

The Approach

LTTS is committed to fostering a culture of innovation which is reflected in its investments in R&D, its team of experts, and its strategic partnerships with leading academic institutions and technology providers. It leverages cutting-edge technologies such as Artificial Intelligence, Machine Learning, and IoT to develop innovative solutions that address the unique challenges faced by its customers.

LTTS enables innovation with all its engineers at heart through focused programs like Reveries (a

blue-sky, thought-provoking platform), Techgium (Open Innovation platform harnessing intellect of engineering graduates & academia), tekshetra (a knowledge sharing platform on existing, new & emerging technology trends) amongst others.

Benefits

Chest-rAi™

- Detects ~34 of the most common lung-related abnormalities.
- Current accuracy of solution is ~92.3% for prominent 10 symptoms.
- Reduces treatment enrolment time by 50%
- Increases chances of detecting symptoms or new cases in the 1st instance by 5-6%

AiCE

- Enhances accuracy by > 85%
- 50 - 70% productivity enhancement compared to manual processes depending on criticality of medical device
- Enables quick decision-making in alignment with regulatory norms

Direct Carbon Capture & Conversion into Methanol

- Converts CO2 into methanol with more than 30-35% yield in continuous mode of reactions.

The Future

LTTS is well-positioned to continue driving innovation across all aspects of its operations, leveraging latest technologies and expertise. With investments in emerging technologies, exploring new business models and a focus on fostering a culture of innovation, LTTS will continue delivering cutting-edge solutions that address the evolving needs of its customers.

Lakshmi Machine Works Ltd.

About the company

Lakshmi Machine Works Limited, a leading Textile Machinery Manufacturer in India and is one among the three in the world to produce the entire range of Spinning Machinery. In 1962, LMW was founded to provide Indian textile mills with the latest Spinning Technology. With 5000+ workforce & manufacturing facilities in India, China & Dubai It caters to the domestic market as well as export products to the Asian and Oceanic regions making 3400+ Cr turnover annually.

LMW's diverse product range includes Textile machinery, CNC machine tools, foundry products, and Advanced technology Centre catering components for aerospace industry.

With a strong emphasis on research and development, LMW continuously strives to introduce cutting-edge technologies.

LMW with its vision "To enhance customer satisfaction and our image globally and achieve exponential growth to leadership through world class products and service" follows a customer centric innovation policy.

The Innovation

Research & Development being the front runner with its own objective "Identify, Design and Develop Innovative, Sustainable, Smart, Reliable & Viable solutions that meet the requirements of the global spinning industry & ensure customer delight" develops and launches innovative products year after year

Design engineers are continuously in the field playing an anthropologist role in observing directly various levels of users starting from the worker who handles the machine to the Chairman of the company who invests. The explicit needs of all above customers is captured and the intrinsic needs of customer is also identified.

LMW serving a highly capital intensive Spinning industry which hardly makes a turnover of 1.5 times the investment and EBITA in single digit continuously remains on its toes with respect to development of innovative products. We develop and launch Smart products with a focus on higher productivity, best quality and optimal cost of production.

With pandemics like COVID and the resurgence of the overall global concern towards sustainability the targets are dynamic, the products are customized and flexible to suite the customer specific requirements.

With the global norms of reusage of at least 25% of the fabric should be made out of recycled fibres, LMW has developed and launched a new line of machinery suitable for processing recycled fibres into yarn thus serving the global sustainability needs.

With a structured IP management process, LMW develops innovative products fenced by 311 in-force patents out of 630 applied and 260 patents are commercialized. In order to encourage designers to innovate LMW has a policy of awarding the designers based on the commercial value of the idea.

The Approach

LMW follows 'Customer first' philosophy with a strong commitment towards customer needs

through innovative solutions & 'Strategic Business Planning' approach in identifying the current and future goals of the company. All the stake holders of the company are aligned towards meeting the SBP goals by means of Policy Deployment across all levels.

Identified needs are converted into product specifications using Quality Function deployment. The concept team uses process like "Design thinking" and create solutions. Internally developed process named "ACDE" (Accelerating Competence for Design Excellence) ensures flawless engineering design & First time right products to customer.

Engineering design is converted into the actual product through structured project management approach involving all stake holders and periodic review with Quality stage gate process.

Benefits

Despite all the European, Japanese & American competition setting up factories in India, LMW has been able to retain its market share of above 70% over years with its innovative product pipeline.

LMW's contributions to the industry have earned it numerous awards and accolades, solidifying its reputation as a pioneer in the field. The company's dedication to customer satisfaction, coupled with its progressive approach, positions it as a key player in shaping the future of the textile machinery sector.

The Future

LMW is focusing towards sustainable & artificial intelligence enabled machines inline with Industry 5.0. and aiming to increase the global presence, become 'World No. 1' spinning solution provider.

Larsen & Toubro Construction, Water & Effluent Treatment

L&T Construction
Water & Effluent Treatment

About the company

L&T Construction is India's largest construction organization and ranked among the world's top infrastructure developer. L & T contribute significantly to build the image and stature across the world and drive its reputation as 'the builder of the India of the 21st century' by offering EPC solutions to execute large industrial and infrastructure projects from concept to commissioning on turnkey basis with single-source responsibility. Our multiple businesses encompass distinct but complementary capabilities, that address different segments of infrastructure and industry.

L&T Construction's Water and Effluent Treatment business segment is an independent company which provides complete water solutions through its concept to commissioning capability covering design, detailed engineering, procurement, project management and execution. The services offered in this business are mentioned below.

- Urban Water treatment & Supply
- Rural Water treatment & Supply
- Wastewater Treatment plant & Network
- Lift irrigation Projects
- Industrial Water treatment
- Desalination plant
- Smart Water infrastructure

The Innovation

Precast Technology - Overhead Tank

This technology has been implemented in UP tube well project (2500 Nos. overhead tanks) under Jal Jeevan mission where the project duration required by customer was very stringent. In Conventional method the execution time for 16m high Cast in situ Overhead Tank is 150 days & in Precast technology the execution time reduced to 25 days. When it's iterated to 2500+ tanks the saving in terms of Time, labour, Productivity is huge. This technology has helped in maintaining high quality construction & execution within the stipulated time frame.

Attached Growth Bio Reactor (AGBR)

Attached growth bio reactor is a new technology developed for sewage treatment plant which is much superior & more efficient than the current running technology like SBR, A2O etc. The main feature of this technology is using a special media inside the bio reactor. Here the media used is increasing the area of raw sewage contact which increases the efficiency of the treatment. This technology has acquired patent right for implementation.

Dusk To Dawn Construction

The innovation has revolutionized the way sewer pipelines are being laid. The complete cycle of excavation, bedding, pipe laying, backfilling and road restoration is completed in a 12-hour window (8:00 PM to 8 :00AM) which is achieved through micro-planning. Entire activities of work are completed in one stretch during nighttime and could be handed over to the corporation for public use. In Conventional way of laying the sewer pipeline, all the activities are done in normal working day causing major inconvenience for the people and the traffic.

The Approach

Precast Overhead Tanks

Considering the high volume of work in 18 months, the project team with R & D team has applied different thought process to give the best solution suiting the Timelines and Cost Parameters.

Attached Growth Bio Reactor

The existing sewage treatment technologies were occupying more footprint & increased power consumption. Our R & D team has developed this AGBR technology to combat the issues.

Dusk to Dawn Construction

Inconvenience to the public & regular traffic block during the construction work of sewage network has made our innovation team to come up with this breakthrough solution.

Benefits

Precast Technology - Overhead Tanks

- Reduction of execution time by 80% compared to the Conventional in-situ concrete.
- 80% savings in manhours is achieved.
- High Quality product

Attached Growth Bio Reactor

- 10-15 % reduction of volume of Bio Reactor. This results in the reduction of the footprint area.
- Up to 20 % reduction of Sludge Quantity.
- 10 % reduction in the power consumption during O&M.

Dusk to Dawn Construction

- Complete construction cycle time has reduced to 12 hours from 6-21 days.
- Increase in Cost savings from 2 % to 7%
- Residual Risks - Zero Incidents

The Future

PRECAST TECHNOLOGY: Sets way forward in replacing the Cast In situ overhead tanks with precast tanks.

ATTACHED GROWTH BIO REACTOR: Implementing the technology in STPs for the upcoming projects.

DUSK TO DAWN: The initiative has the potential to change the way in which India executes utility works.

Lumax Industries Limited

About the company

Lumax Industries is a publicly listed company under the renowned Lumax-DK Jain Group, founded by the visionary Late Sh. S.C. Jain. From a modest beginning to soaring heights, Lumax Industries is now a market leader in Automotive Lighting. Started as a trading company in 1945, it is a full-capability provider of premium quality automotive lighting solutions for four-wheeler, two-wheelers, commercial vehicles, and FES catering to automobile manufacturing in Indian & Global markets.

The company endeavours to raise the bar to consistently develop technologically advanced lighting systems cost effectively. It has nearly four decades long partnership with Stanley, Japan and more than 25 years with SL Corporation, South Korea. The state-of-the-art manufacturing plants are spread across India in 6 states - Haryana, Maharashtra, Gujarat, Uttarakhand, Karnataka, and Tamil Nadu in India. It has two Engineering & Design Centres in India and two Design Centres in Taiwan & Czech Republic.

The Innovation

At the core to Lumax's innovation is the New Technology Group (NTG), an integral development unit steering the company toward groundbreaking advancements. This dynamic group acts as the driving force behind Lumax's steadfast commitment to pioneering innovations and wholehearted embrace of cutting-edge technologies. A key aspect of Lumax's approach involves vigilant monitoring of emerging technologies, propelling the company to the forefront of progress in the automotive and non-automotive sectors.

The focus on optical systems innovation at Lumax includes the development of state-of-the-art technologies. This ranges from Slim Line modules with a slender 15mm tall light-emitting aperture to advanced systems collaborating with onboard vehicle sensors, offering consumers Advanced Driving Beam (ADB) functionality and or Advanced Front Lighting (AFS) to enhance safety and comfort. Lumax's development efforts extend to the signal lighting field, encompassing microstructures, Micro Lens Arrays (MLAs), thick optics elements, new RGB animated systems, logo projections, and logo illuminations. These innovations not only improve signal lighting but also foster greater connectivity and communication potential with other traffic members, such as pedestrians or cyclists.

As an integral part of our innovation initiatives, we regularly present the latest prototypes and developed technologies during innovation technology days with our customers. Additionally, we actively participate in conferences and symposiums such as ISAL, ISOL, ACMA, CII facilitating direct comparison and verification of the status of new technology development.

In essence, Lumax's innovative edge is a multifaceted synergy of internal excellence through NTG and external collaboration, resulting in a continuous stream of pioneering solutions that positions the company as an innovator in advanced technologies.

The Approach

Lumax's approach revolves around a dual commitment to improvement and collaboration. The company focuses on enhancing existing solutions by optimizing optical efficiency,

managing thermal load, achieving weight savings, and adopting energy-efficient measures. Simultaneously, Lumax actively collaborates with external partners, including new suppliers, innovative optics and electronics companies, as well as universities and research institutes. This collaborative approach ensures that Lumax stays abreast of the most advanced and future-oriented ideas while meeting the demands of its customers.

Benefits

The tangible benefits of Lumax's approach are manifold. Enhanced safety and comfort for end consumers result from the implementation of advanced systems like Advanced Driving Beam (ADB) and Advanced Front Lighting (AFS). Additionally, signal lighting innovations, such as microstructures, RGB animated systems and logo projections, improve connectivity and communication potential with pedestrians and cyclists. The collaborative efforts with external partners not only contribute to the industrialization process but also yield significant cost benefits, aligning Lumax with customer demands and expectations.

The Future

As Lumax pioneers ongoing innovations and collaborations, the future promises even more advanced solutions. Developing new optical systems and signal lighting innovations positions Lumax as a key player in shaping the future of exterior lighting. Active participation in conferences underscores its commitment to staying at the forefront of technology.

Mahindra & Mahindra Limited

About the company

Founded in 1945, the Mahindra Group is one of the largest and most admired multinational federation of companies with 260,000 employees in over 100 countries. It enjoys a leadership position in farm equipment, utility vehicles, information technology and financial services in India and is the world's largest tractor company by volume. It has a strong presence in renewable energy, agriculture, logistics, hospitality, and real estate.

The Mahindra Group has a clear focus on leading ESG globally, enabling rural prosperity and enhancing urban living, with a goal to drive positive change in the lives of communities and stakeholders to enable them to Rise.

The Innovation

Introducing the XUV400, the first all-electric SUV from the house of Mahindra which offers a compelling proposition of superior Performance, Design, Space and Technology. The XUV400 takes Mahindra's legendary performance a notch higher still. Experience class-leading acceleration of 0-100km/h in a blistering 8.3 seconds, delivered with a best-in-class torque output of 310 Nm. Available in 2 variants XUV400 EC & XUV400 EL with 5 exciting colour options. XUV400 EL is powered by a 39.4 kWh lithium-ion battery, offers a MIDC range of up to 456 km and XUV400 EC is powered by a 34.5 kWh lithium-ion battery, offers a MIDC range of up to 375 km.

Introducing our revolutionary new platform OJA Derived from the Sanskrit word OJAS , which means energy, The Mahindra Oja Compact Series tractors are here to transform vineyard, orchard, vegetable, inter-culture, and paddy-farming. With its three state-of-the-art technology packs, PROJA, MYOJA and ROBOJA this tractor is all set to revolutionize the way you farm. OJA tractors empower to address the global tractor market needs including North America, Europe, Brazil, South Africa, Australia, SAARC and ASEAN region.

In the year 2002, Mahindra launched Scorpio, it was Mahindra's first vehicle for the global markets. Fast forward to 2022 and the all-new Scorpio-N is in for an even bigger shout when it comes to mass appeal. Scorpio-N has multiple innovative features including Adrenox Connect, Auto seat adjust, Built-in Alexa, Valet mode for safeguarding from guest drivers, Intelligent Park Assist, Multi Zone AC, My documents to catalogue all your important documents in one folder in your vehicle, Highest Suspension Travel Suspension equipped with Frequency Dependent Damping & advanced shock absorbers with MTV-CL technology to swallow harsh impacts, 6-Speed AT with Torque Converter Technology, Next-Gen 3G Frame withstand the force with a frame that endures it all with advanced bending and torsional stiffness, world-class structural rigidity, off-road capability and high-speed stability and 5 star GNCAP safety rating.

The Approach

Intellectual Property (IP) Policy

At M&M, IP policy is built on 3 pillars – Being vigilant and IP aware; Create, Protect and Enforce our IP; Respecting others' IP. Policies are based on the following principles of ethics, transparency, and accountability:

-To recognize and respect the rights of the people who may be owners of traditional knowledge, and other forms of intellectual property.

-To respect the interests of, and be responsive towards its stakeholders, especially those who are disadvantaged, vulnerable and marginalized.

Team Strength

The Intellectual Property & Knowledge Management is a 20+ strong team supporting both Auto and Farm Sectors of M&M.

Best Practices

- Innovation, IPR protection and risk mitigation linked to NPD process
- IP Cell contribution across product life cycle
- Improving Innovation through Knowledge Management Index
- Mahindra Inventors Academy – Inventors come forward, share their experiences, best practices, and guiding upcoming inventors
- Rewards & Recognition
- Academic Partnership

The Future

Customer Focus - Our Innovation purpose is to drive positive change in the lives of communities, stakeholders and enable them to Rise.

Innovation & Growth Focus - We strive to build an Innovation and growth mindset within the organization by practicing collaboration, agility and boldness.

Future Focus - We are building Born Electric Vehicles which is a Game changer in Indian Auto Industry. We are democratizing technology for farmers with small land holdings through our lightweight tractors, smart implements & precision farming.

Matrix Comsec Private Limited

About the company

Established in 1991, Matrix is a leader in Security and Telecom solutions for modern organizations. Matrix offers a comprehensive range of solutions for IP Video Surveillance, Access Control, Time-Attendance, and Telecom applications.

As an innovative, technology-driven, and customer-focused organization, Matrix is committed to keeping pace with the revolutions in the Security and Telecom industries. With around 40% of its human resources dedicated to developing new products, Matrix has launched over 60 cutting-edge products and solutions.

IP Video Surveillance provides solutions like Video Management Systems, Network Video Recorders, and IP Cameras. Likewise, Access Control and Time-Attendance solutions include Visitor Management Solutions, Elevator Access Control, Panels, Door Controllers, and Readers. Telecom solutions include Unified Communications, IP-PBX, Universal Media Gateways, VoIP and GSM Gateways, and Communication Endpoints.

The Innovation

Automatic Number Plate Recognition (ANPR) stands as a revolutionary innovation at the intersection of technology and security, poised to redefine our approach to surveillance, law enforcement, and urban management.

By seamlessly integrating optical character recognition and machine learning algorithms, ANPR empowers real-time identification and interpretation of vehicle license plates with remarkable accuracy. Its applications span across multifaceted domains from law enforcement agencies in swiftly identifying vehicles linked to criminal activities to optimizing traffic flow and enhancing public safety in smart cities.

This cutting-edge technology transforms conventional surveillance systems into dynamic and proactive tools. ANPR enables authorities to monitor effortlessly and track vehicles, identifying stolen cars, wanted individuals, or vehicles involved in illicit activities within seconds, aiding in comprehensive report generation. Furthermore, its role in traffic management is unparalleled, facilitating smoother traffic flow, toll collection, and parking management through automated processes. ANPR's adaptability extends to various sectors, including transportation, security, and urban planning, thereby presenting an all-encompassing solution for contemporary challenges. Moreover, ANPR's evolution is far from stagnant. Continual advancements in AI and data processing techniques promise even greater accuracy and efficiency, propelling its potential for broader integration into smart city initiatives globally. Despite challenges related to privacy and data security, ANPR's innovations strive to ensure compliance with regulations while maintaining the highest standards of confidentiality. In essence, ANPR epitomizes a transformative innovation with the capacity to redefine surveillance, law enforcement, and urban infrastructure management. Its seamless integration of technology not only augments security measures but also paves the way for a more connected, efficient, and secure future.

The Approach

ANPR integrated into Video Management Software (VMS) employs IP cameras to capture vehicle footage, extract license plates, and use Optical Character Recognition (OCR) for character

interpretation. Sophisticated algorithms cross-reference this data with the trained datasets, logging information and triggering actions, like gate access for only authorized vehicles. This integrated system extends beyond real-time identification, aiding in comprehensive report building. ANPR within VMS amalgamates data for statistical analysis, generating detailed reports vital for law enforcement, traffic analysis, Smart parking, and urban planning. Its adaptive nature, refined through deep learning algorithms, revolutionizes surveillance and infrastructure management, aligning seamlessly with the dynamic requirements of modern smart cities, and with the demands of evolving smart city initiatives.

Benefits

ANPR, within Video Management Software, presents an array of benefits. It revolutionizes surveillance and security, enhancing law enforcement by swiftly identifying suspect vehicles and aiding in crime prevention. Additionally, ANPR optimizes traffic flow, streamlining toll collection, and enabling efficient parking management. Its integration with broader systems fosters proactive decision-making and aids in data-driven urban planning. Moreover, ANPR reduces manual labor, minimizing errors, and significantly cutting operational costs. Its adaptability, coupled with continual learning through machine algorithms, ensures heightened accuracy over time. Ultimately, ANPR stands as a transformative technology, bolstering safety, efficiency, and resource optimization across various sectors within smart cities (like speed detection, traffic congestion control over different lanes, and many more).

The Future

The future trajectory of ANPR within Video Management Software is exciting. Integration with smart city initiatives will see ANPR becoming pivotal in optimizing traffic flow, law enforcement, and enhancing safety measures. Predictive AI analysis will enable proactive decision-making, while speed detection capabilities will contribute to enforcing traffic regulations effectively. This holistic approach ensures ANPR's evolution as a versatile and indispensable tool for shaping smarter, safer cities.

NeuroEquilibrium Diagnostic Systems Pvt. Ltd.

About the company:

NeuroEquilibrium is a Deep-Tech Remote Diagnosis Platform for super-specialty healthcare. NeuroEquilibrium is the world's largest chain of clinics for Vertigo, Dizziness, and Balance disorders, with over 170 clinics in 7 countries and 54 cities in India. The super-specialty Dizziness clinics are based on patented proprietary technology developed in-house.

The Innovation

NeuroEquilibrium has developed a proprietary deep-tech remote diagnosis platform for super-specialty healthcare that integrates cloud technology, a clinical decision support system, a digital history-taking module, virtual reality & augmented reality, wearable devices, electroceuticals, AI, and computer vision. All these technologies have been developed in-house. The company has applied for eight patents, of which six patents have already been granted. We are doing cutting-edge research, collaborating with leading institutes worldwide, including Johns Hopkins, Harvard Medical School, Maastricht University Netherlands, and jointly publishing in top-rated international journals, including Frontiers in Neurology, European Journal of Neurology, etc. We have also developed the world's first digital twin for the disease BPPV.

The Approach

NeuroEquilibrium has set up super-specialty clinics with an asset-light, Clinic-in-Hospital revenue share business model leveraging its remote-diagnostic cloud platform and proprietary diagnostic lab. NeuroEquilibrium has clinics in top hospitals, including Apollo, Fortis, Max, Medanta, Manipal Hospitals, NH Hospital, Wockhardt Hospital, etc, and installations in prestigious government institutes like AIIMS Delhi, AIIMS Raipur, AIIMS Bhopal, AIIMS Kalyani, AIIMS Mangalgiri, RML hospital, AFMC Pune, etc.

Benefits

With innovative technology and the remote diagnostic platform, NeuroEquilibrium is able to differentially diagnose over 40 diseases of the ear & brain that cause Vertigo, Dizziness, and Balance disorders and thus provide permanent cure to chronic patients.

The Future

NeuroEquilibrium plans to expand to 500 clinics in India and 1000 clinics globally to treat a million patients by 2025

Nokia Solutions and Networks India Pvt Ltd.

About the company

At Nokia, we create technology that helps the world act together. As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs. Adhering to the highest standards of integrity and security, we help build the capabilities needed for a more productive, sustainable, and inclusive world.

In India, Nokia has been connecting people since 1995 - the first GSM call was made on a Nokia handset over a Nokia built network. From enabling growth of the 2G technology, bringing high quality 3G services, pioneering 4G to now steering India towards the 5G revolution, we have been an integral part and celebrate this journey of 25 years of mobile telephony in India. The manufacturing operations, global delivery centers and research and development setups in India reflect Nokia's unwavering focus on the country and enhanced proximity to its customers.

Vision

An agile and smart Manufacturing Service, fully automated and green that is self-learning and able to predict and prevent: "The Conscious Factory"

R&D - "A sustainable Gigabit world for all"

Mission

Being a trusted innovative partner providing cost-effective and time to market advantages to business groups and customers using DART+C transformation to support new product introduction, volume, and end of life production.

DART+C (Digitalization, Analytics, Robotics, Transparency, Connectivity) strategy is used to drive innovation mind set based on our stakeholder inputs/expectations. We collaborate with our ecosystem partners to drive innovation to bring in new products and services. Our ecosystem partners include Nokia Business Groups, External Technology Partners & University Partners.

The Innovation

MAC - A MAC (Modular Automation Cell) line is a fusion of human and machine, interlinked wirelessly across stations. The quantity of cells is structured in accordance with the products. Predominantly, processes that are both critical and monotonous/repetitive undergo automation, encompassing tasks such as screw fastening, thermal gel inspection (By assessing attributes such as consistency, air bubbles, spreading, and adhesion, we ensure the effectiveness of heat management systems across all products), bullet assembly, and OGI(Outgoing goods inspection, often referred to as outgoing quality control or final inspection, is a crucial step in the manufacturing and supply chain process. It involves the thorough examination of products before they are shipped to customers or distributors). This solution boasts heightened adaptability and scalability, proficiently accommodating 11 distinct variants without necessitating any transition time within the product cluster and enabling transitions between products in under 10 minutes. The line incorporates both single-head and dual-head robots within a cell configuration, chiefly aimed at curtailing cycle durations and optimizing spatial

efficiency. This setup is underpinned by cutting-edge technology, inclusive of data collection and a traceability system, ensuring a holistic and forward-looking approach.

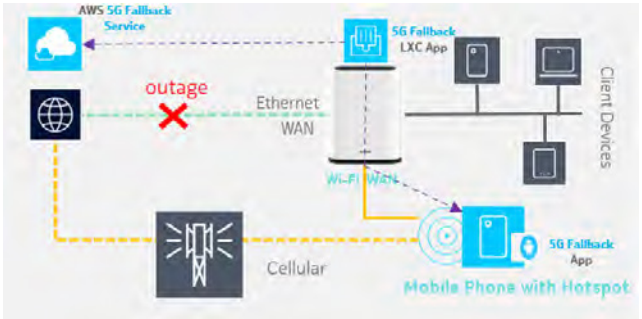
Unbreakable Internet source

The main idea is to provide an unbreakable Internet source for continuous Internet connectivity in the event of a WAN outage which is provided on demand or necessary basis.

The first step is for the user to setup one or more mobile phones as an unbreakable Internet source using Nokia Wi-Fi Mobile APP.

On detection of internet (Ethernet WAN) outage, user will be notified about Internet outage using captive portal to switch ON the Hotspot. Nokia router will then connect to one of the mobile phones configured as a Hotspot using the 5G radio (STA mode) and setup routing via the Wi-Fi WAN.

On restoration of internet connectivity in the primary Ethernet WAN, the Nokia Router will switch back to Ethernet WAN and disconnect from the Hotspot.



Nokia Network Digital twin:

The new Nokia Network Digital Twin empowers enterprises to monitor real-time network characteristics from individual devices, ensuring alignment with their specific use case requirements. Designed for private wireless networks, it leverages Nokia Industrial devices for on-premises monitoring, allowing organizations to uphold network SLAs and receive guidance for addressing performance issues. This foster improved planning as future scenarios can be evaluated without disrupting ongoing operations. Particularly beneficial for innovative industrial applications, the solution harnesses the capabilities of private wireless 5G SA networks, enabling flexible reconfiguration of operational space to meet evolving business needs. By offering real-time monitoring and predictive maintenance insights, the Network Digital Twin enhances efficiency, minimizes disruptions, and optimizes productivity. It provides a virtual representation of communication networks and their environments, enabling users to view, troubleshoot, and test new scenarios seamlessly. Aligned with Industry 4.0 initiatives, this solution is pre-tested with Nokia's Digital Automation Cloud and Modular Private Wireless offerings, ensuring its reliability and efficacy.

Benefits & Future

MAC:

1)Productivity is increased by 20% by deploying dual head robots, quick changeover etc.

2) Changeover time is reduced from 8 hrs to 10 Min (major advantage of MAC line)

3) Cycle time reduction by 50%. Flexibility of running 11 variants.

The thermal gel robot and screw assembly robot is internally modified and inbuilt to adapt to our requirement. Reduction in future Capex spends as this can be modified for the upcoming and future products e.g. 6G etc.

Unbreakable Internet source innovation:

Availability of internet increased to100 %

This has been pitched in the Indian and Canadian markets already for commercialization. Looking forward to exploring the other markets in the coming days.

Nokia Network digital twin:

In the realm of full digitalization and Industry 4.0, data is the linchpin for transformation. However, manufacturers relying on private wireless networks within their operations often grapple with scanty data. Enter the Nokia Network Digital Twin, a solution that unveils unprecedented visibility and capabilities. It empowers you to:

1. Unearth the past (historical data), comprehend the present (real-time insights), and predict the impact of novel use cases.
2. Discern performance gaps before deploying automated or semi-automated machinery in factories or enterprise campuses.
3. Attain crucial insights into network performance and user device experiences.
4. Automate troubleshooting, nipping problems in the bud without on-site worker dispatch.
5. This solution is a boon for those navigating challenging environments such as ports, mines, and warehouses. It furnishes real-time visibility into device telemetry, swiftly pinpointing issues, identifying performance shortfalls, and offering retrospective analysis. For a myriad of scenarios, Nokia Network Digital Twin emerges as the quintessential tool, fortifying operations with proactive insights and effective problem resolution.

Already deployed in American markets and the customer is happy with the outcome, plans to deploy in other markets are in progress.

Rockwell Automation India Private Limited

About the company

Rockwell Automation is a global leader in and digital transformation. We connect the imaginations of people with the potential of technology to expand what is humanly possible, making the world more productive and more sustainable. Founded in 1903, Rockwell Automation is headquartered in Milwaukee-Wisconsin, USA, employing approximately 29,000 people in more than 100 countries. In India, we have completed 40 successful years of presence, starting our journey in 1983.

We are a team of dedicated innovators and engineers delivering smarter, connected solutions to the world around us. We expand what is possible for our customers, by combining the best of industrial automation with the latest in digital technologies, to provide leaders with relevant, reliable information to create a truly 'Connected Enterprise' that delivers more productive, sustainable, efficient and nimble business outcomes.

To learn more about how we are bringing The Connected Enterprise to life across industrial enterprises, visit us at https://www.rockwellautomation.com/en-in.html

The Innovation

In Rockwell Automation India, our commitment to innovation aligns closely with one of our core cultural principles – 'have a steady stream of ideas'.

Towards this direction, we had been spearheading unique innovations across multiple areas of industrial automation, smart manufacturing, and digital transformation by simultaneously pursuing several avenues, such as – Innovation with Employees; Innovation with Customers (i.e. local machine manufacturers, end-user industries); Innovation with Partners (i.e. distributors, system integrators); innovation in Business Process Improvement; Innovation through Research, Development & Design; Innovation in Engineering Business Services; and Innovation in Sustainability.

Examples of Innovation with Employees:

(i) **Innovate Platform** - a hub for employees to collaborate, share ideas and work collectively for solving challenges.

(ii) **EmPower Program** - a program to identify and resolve product/process related challenges and collaborate across teams to develop novel solutions.

(iii) **Innovation Challenge** – an annual competition to share best innovative ideas across multiple domain and areas.

(iv) **Engineers' Week Celebration** - a celebration of engineering talent and propagate solutioning mindset.

EmPower

The EmPower Program Empowers YOU to make a global impact on the way we do business

(v) **Annual Hackathon** - intensive collaboration over a defined period to develop innovative software solutions, rapid prototyping, out-of-box-thinking for breakthrough ideas and solutions.

Examples of Innovation with Customers

Innovations with Industrial Machine Manufacturers

(i) World's fastest multi-track vertical form fill seal machine for CPG industry

(ii) India's first robotic loader for LPG cylinders

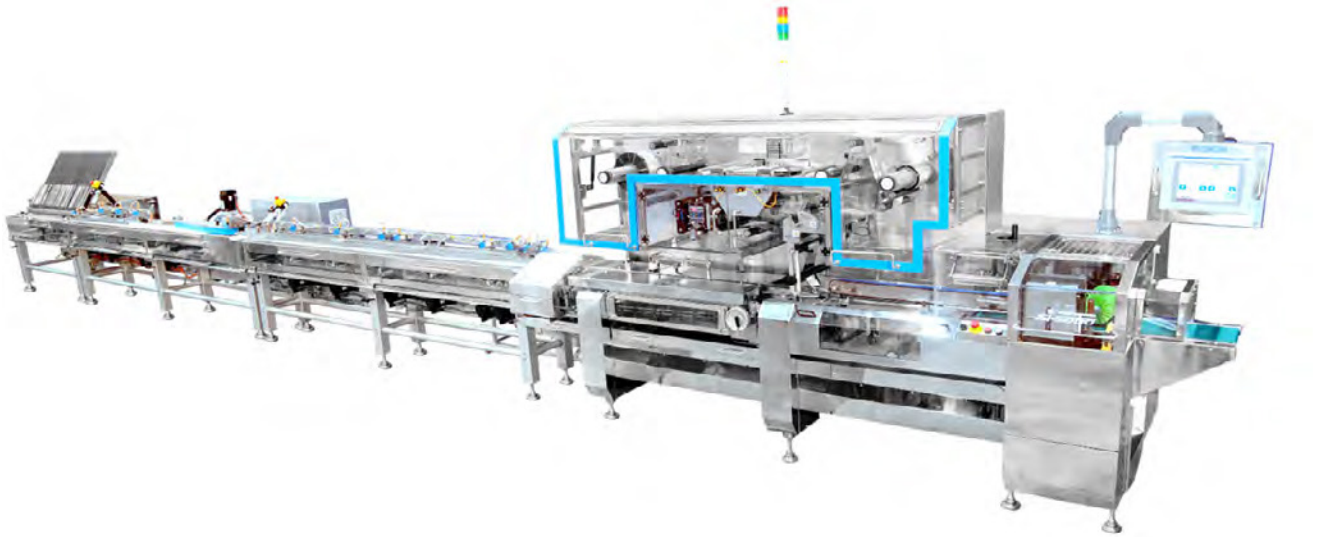
(iii) India's first aseptic packaging machine

(iv) High speed flow wrapping machine complying with global standards

(v) Linear motion solution machines for warehouse and e-commerce industry

(vi) Unified robotics capabilities for custom-design robots integrated with standard machine controls

World's Fastest Multi-Track Vertical Form Fill Seal Machine – developed with Akash Pack Tech



High-speed Flow Wrap Machine for Consumer Package Goods Industry – developed with Omori India

Examples of Innovation with End-User Industries:

(i) AI-based real-time prediction of health & anomaly detection in wagon tippler motors

(ii) Optimization of spray dryer performance with Edge based process optimizer

(iii) AI based prediction for burning zone temperature in cement kiln for highly reliable and accurate measurements

(iv) Real-time prediction of Zinc coating thickness for timely control and process optimization

(vi) Standards based batch process implementation leading to better quality, energy saving and time saving

Examples of Innovation in Business Process Improvement:

(i) Significant improvement in customer experience

(ii) Reduced process lead time

(iii) Reduced process cycle time

(iv) Substantial financial savings, revenue realization, cost reduction and risk mitigation

Examples of Innovation through Research, Development & Design:

(i) Simplified On-Machine™ I/O platform for higher flexibility for demanding machine performance

(ii) Smart solution for miswiring during commissioning and services - patent filed

(iii) Implementation approach for using sustainable resins in Rockwell hardware products

(iv) Optical bonding method for cover lens, sensors and display of next-gen graphics terminal device [patented]

(v) Maintenance grounding device in motor control center with integrated interlock [patented]

(vi) Systems and method for flat cable installations [patented]

(vii) File Parser Fuzzer Tool for M800

(viii) Remote debugging for faulted controllers

(ix) Generic SOC for form-factor reduction and improved resiliency

(x) License-based feature enable in PLC

(xi) MES modernization for high business resiliency and deep analytics

(xii) FactoryTalkTM DataMosaix for enriched asset model

(xiii) Converged data services for standardized and contextualized data meshing service across IT/ET/OT systems

(xiv) Intelligent asset monitoring contextualized through pre-built industry-specific asset models

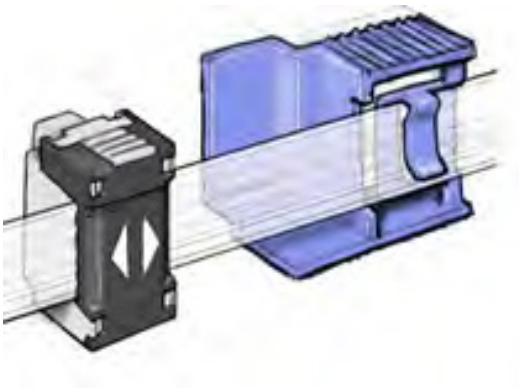
(xv) Batch performance analytics for improved control of process variability, product quality and asset utilization

(xvi) FactoryTalkTM Energy Manager for insights and controls on energy consumption, intensity, costs and emissions.

Design & Development of Distributed I/O for ControlLogix® 5580 & CompactLogix™ 5380 Controllers

App-Based Solution for Avoiding Miswiring During Commissioning & Servicing of Control Circuits

Innovative Optical Bonding Method for Cover Lens, Sensors & Display of Next-Gen Graphics Terminal Device



Innovative Systems & Method for Flat Cable Installations

Examples of Innovation in Engineering Business Services:

(i) Intelligent Contract Renewal System

Innovative Maintenance Grounding Device in Motor Control Center with Integrated Interlock

(ii) Adoption of Robotic Process Automation (RPA) / BOT for 3rd Party PO Processing

(iii) Smart Hiring App

(iv) Execution Framework for PlantPAx Distributed Control System

(v) IIoT Cross-Domain Authentication using Identity Federated Smart Contracts

(vi) Industry specific service delivery library and standard functionalities for accelerated go-live, delivery risk mitigation, cost savings and standardization

(vii) Intelligent control systems for industries like auto, tire, battery, pharma, dairy, e-commerce warehouse etc.

Innovative Robotic Process Automation

PlantPAx
Distributed Control System

- High Performance, Wider Range, Scalable System
- Reduces Space & Optimizes Performance
- Smart Device Integration
- Promotes Standardization & Reusability
- Robust Data Architecture
- Measure Benefits to Support Investment

Innovative PlantPAx DCS Execution Framework

Examples of Innovation in Sustainability:

(i) Central control room for air quality index monitoring

(ii) National Clean Air Program management system

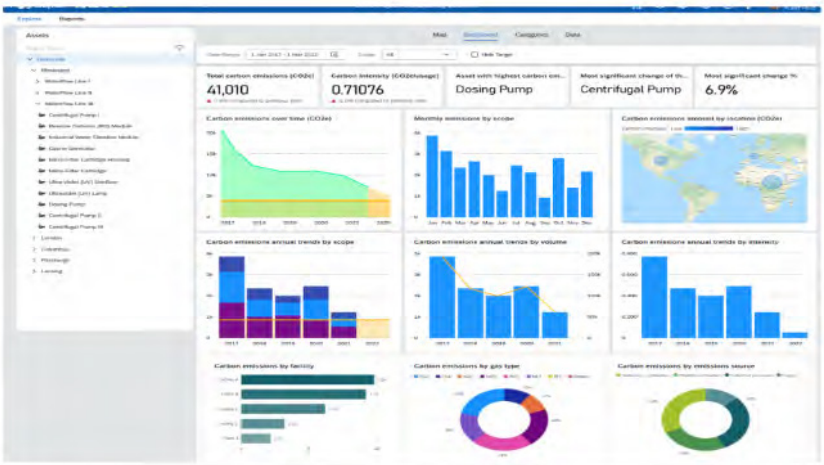
(iii) Bio-medical waste management system

(iv) Single-use plastic management system

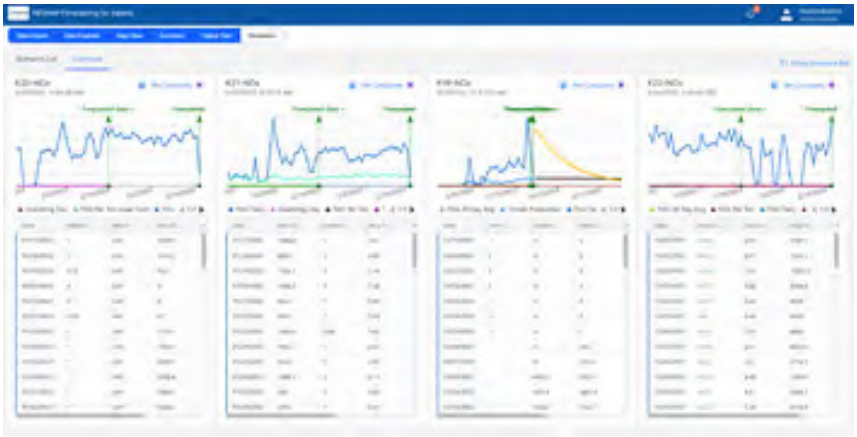
(v) NESHAP predictive modelling

(vi) Plastic waste EPR management system

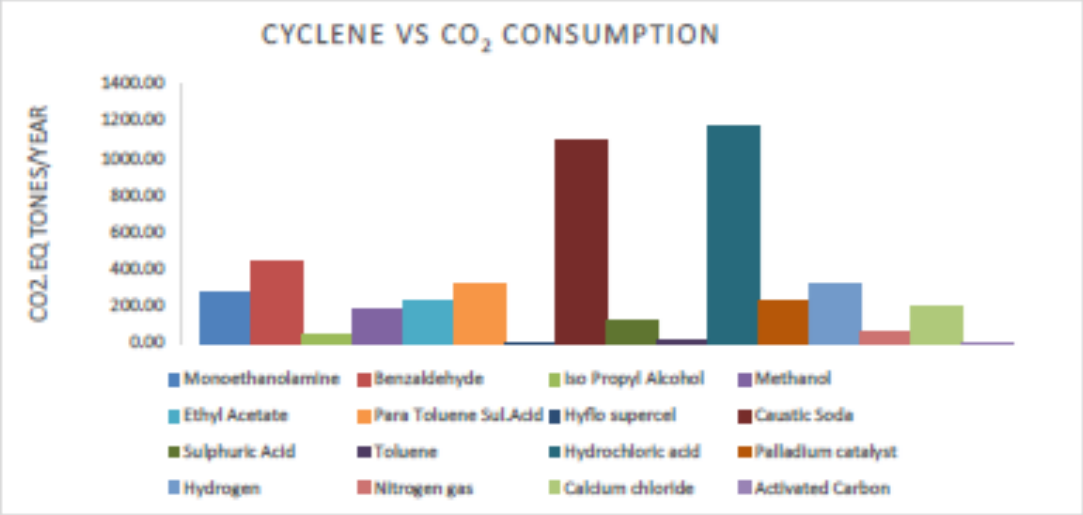
(vi) CETP & STP monitoring system for Ganga basin rejuvenation project under Ganga Tarang program



Carbon Accounting & Net-Zero Reporting Solution



Emission Forecasting Solution


CYCLENE VS CO_2 CONSUMPTION
CO2. EQ TONES/YEAR
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800.00
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400.00
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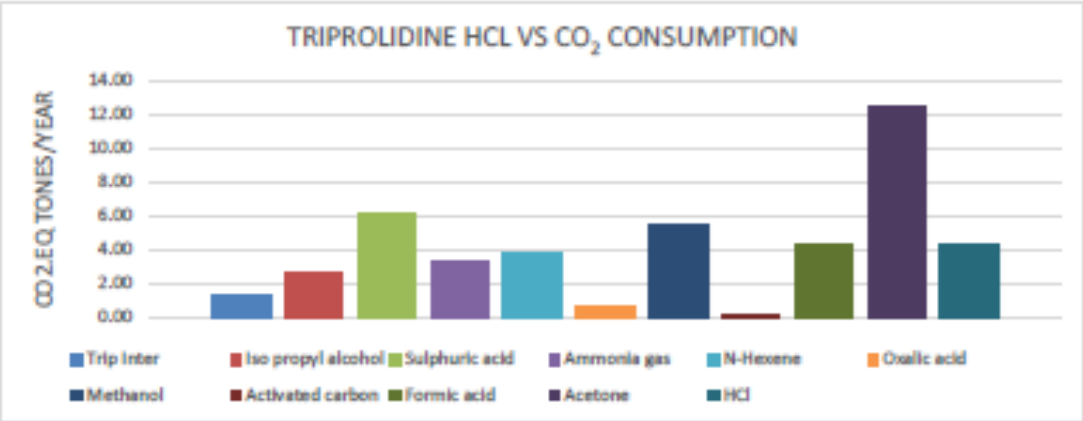
0.00
Monoethanolamine
Benzaldehyde
Iso Propyl Alcohol
Methanol
Ethyl Acetate
Para Toluene Sul.Acid
Hyflo supercel
Caustic Soda
Sulphuric Acid
Toluene
Hydrochloric acid
Palladium catalyst
Hydrogen
Nitrogen gas
Calcium chloride
Activated Carbon


TRIPROLIDINE HCL VS CO_2 CONSUMPTION
CO2.EQ TONES/YEAR
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Trip Inter
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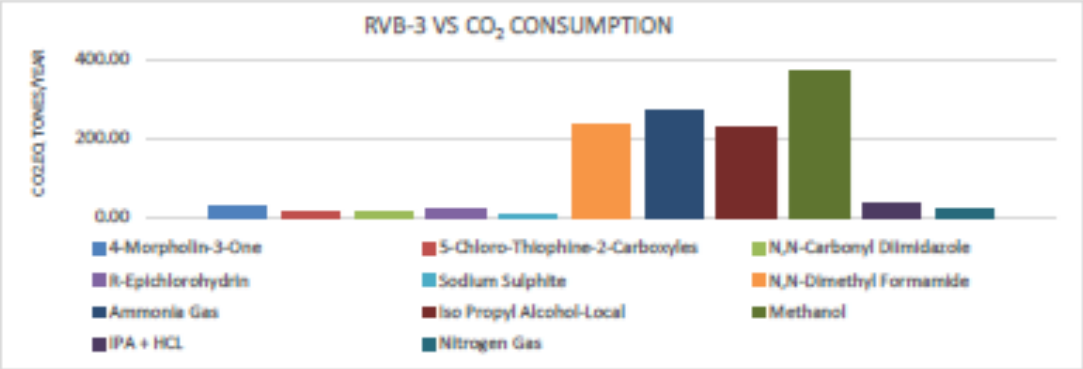
Sulphuric acid
Ammonia gas
N-Hexene
Oxalic acid
Methanol
Activated carbon
Formic acid
Acetone
HCl


RVB-3 VS CO_2 CONSUMPTION
400.00
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4-Morpholin-3-One
5-Chloro-Thiophine-2-Carboxyles
N,N-Carbonyl Diimidazole
R-Epichlorohydrin
Sodium Sulphite
N,N-Dimethyl Formamide
Ammonia Gas
Iso Propyl Alcohol-Local
Methanol
IPA + HCL
Nitrogen Gas

The Approach

Our approach to innovation is ingrained in our innate affinity to identify practical challenges of our industrial customers and develop outcome-based solutions through new product development and process-related interventions, through judicious mix of our vast knowledge base around industry-specific expertise in core automation and the prowess of digital capabilities. We strive to create lasting value for our customers and partners that are effective, appropriate, results-driven and sustainable for the planet.

Benefits

Our innovation benefits can be factored across six different areas of business operations for manufacturing industries, such as - People, Sustainability, Connected Enterprise, Customer Experience, Big Bets and Efficiency. These factors act together to constitute the unique value-proposition of our solutions, which helps our customers to operate better and faster, along with high efficiency, low downtime, less raw material consumption, minimal wastage and least environmental footprint from operations.

The Future

Our innovation initiatives are directed towards creating a smart, connected and sustainable future for industries around the globe. Towards this objective, we will keep engaging with customers wherever they are in their transformation journey and enable them with our market leading hardware, software and services. Going by our corporate motto, we will continue to build the future by 'expanding human possibilities'.

RSB Transmissions (I) Ltd , Pune Plant

About the company

RSB Transmission (I) ltd was established 50 Years back in Jamshedpur to supply automotive parts.

Today RSB transmission is having 13 plants across India & 2 plants overseas, manufacturing propellor shafts, gears , Gearbox ,Rear Axle, front Axle & other parts(Casting/Forging machining) for various automotive and non-automotive OEM in India.

This innovation examples mentioned herein is from Pune Plant, This plant is established in 1996.

Its customer base includes TATA Motors Pune (Commercial & Passenger Car Divisions both), Tata Motors Jamshedpur, Ashok Leyland, John Deere India Ltd, Fiat India Ltd.

RSB Pune Plant has won the coveted Deming Award for Quality 2013. This plant is also practicing TPM methodology to improve efficiency and Plant will challenge TPM Excellence Award in 2025.

This Plant is certified for ISO 9001:2015 , IATF 16949:2016 , ISO 45001:2018 , ISO 14001:2015

RSB has also group company named as – I Design Engineering Solutions. Its strong in-house design capabilities help RSB to develop new products as per customer requirement on fast track.

The Innovation

Innovation project 1: Fastest Design & development of 2.8T Gearbox for LCV :

RSB has designed & manufactured Gear box for LCV application in 2015. RSB is supplying this gear box to Ashok Leyland for more than 6 years with consistent quality.

Based on RSB's proven track records on this Gear box development, customer approached us again to join them for development of new 2.8 Ton LCV Gear box. Customer wanted it to be developed based on market demand & wanted to launch this vehicle on urgent basis since LCV market was growing.

Customer has given following target in this new development.

- Proto development time 6 month (completed within 6 months).
- Improve in Gear shift quality (shifting load reduced drastically in design which customer also agreed).
- Change from floor mounting to dashboard mounting shifting system.
- Weight reduction of 2.35 Kg from current design

The Approach

RSB started interacting on daily basis with I design (RSB's group company doing Design & Testing).

Concurrent engineering played a major role in the fastest developing of gear box . All lessons learnt in the past were discussed in every part & modification in design/ process were done to avoid loss of time.

Every drawing /design was discussed in detail for cost, manufacturing simplification, commonization of Tools/ Fixture/ Dies to reduce development time .

Outcome : RSB successfully ,achieved all above target as per customer & built proto Gear box for validation.

This Gearbox is in production for last 11 months with consistent supply quality.

Benefits

Concurrent engineering helped RSB to speed up development & added Sales revenue in a short time.

- Reduction in development time.
- It reduced development cost drastically.
- With customer support, RSB could address one more market segment.

Future

RSB learnt art of developing variants of existing model to meet different market segmentation in short time.

This will help to develop different models of gear boxes for different customer but similar application.

Which will give a competitive advantage. Customer satisfaction will create more business opportunities for RSB.

Innovation project 2: Design & development of E axle

Post Covid, there was a metamorphism taking place in the automotive industry. Almost every manufacturer (2, 3 & even 4 wheelers) started developing of Electric variants of their vehicles, including the addition of new manufacturers in this domain. The rising fuel prices are one of the reasons behind it, which is equally backed by new policies by Government for faster adoption. Emission norms getting more stringent was another major reason.

Historically, RSB was in to design & manufacturing of Axles and their aggregates for various application including majority in commercial vehicles.

Approach

In 2020, one startup company in the field approached I-Design for designing rear axle for their Electric 3 wheeler. The customer was dependent on importing e-axles from China. I-Design made the design and prototypes, but large-scale manufacturing could not be realized due to cost expectations which was bench marked against cheaper import alternatives. However, I-Design got exposure to engineering and performance requirement of this sector during the development.

In due course of time, when organized vehicle manufacturers ventured in this domain, I-Design could showcase their understanding and capabilities in this domain clubbed with manufacturing expertise of M/s RSB. The capability of complete product development which includes design, verification, proto building, lab testing, and mass manufacturing attracted the attention of certain OE manufacturers planning to venture into the E-Vehicle domain. Thus, bagged their first E-Axle order from M/s Switch Mobility.

Customer found the proposed design cost effective and adaptable for their e-LCV application needs.

Outcome : Proto sample of E axle was manufactured & tested successfully. Currently PPAP batch for this axle is under manufacturing. Thus RSB developed E axle for LCV application for the first time successfully.

Benefits

E-Axle gave a competitive edge to meet new market demand, as well as technological advantage to RSB to remain abreast in the market.

It also laid the foundation for developing E-axle for different application /load capacity of different customers.

This added growth in the top line as well as in bottom line.

FUTURE

There is technological shift in automotive industry & people are preferring e vehicle over fossil fuel vehicle.

This product (E-axle) will help RSB to meet new market requirements as well as in replacement product for existing Axle becoming obsolete.

So far, RSB was manufacturing parts for IC engine variants of vehicle. Now, RSB is prepared for embracing the future.

SEG Automotive India Private Limited

About the company

We are the Motor-for the mobility of today and tomorrow .....

SEG Automotive is a leading global supplier. Accordingly, almost all major car makers rely on our products to power their vehicles.

Our Starter motors ensure you can reliably begin your journey and they withstand even the toughest conditions. With our advanced start/ stop solutions, you can save both fuel and CO2 emissions.

During the ride, our Generators deliver a stable energy supply to the growing number of electronic consumers, providing you safety and comfort. Their high efficiency further decreases the fuel consumption of your vehicle.

We also offer vehicle manufacturers an efficient and highly cost-effective entry into the world of hybridization with our 48V e-machines, that are highly cost-effective and easy to implement.

Our scalable e-motor concepts enable rapid adaptation of high-voltage e-machines to various customer applications – from light-weight motors for auxiliary units such as air-conditioning compressors to high-powered engines and components for passenger cars and commercial vehicles.

The Innovation

SEG Automotive's innovation is exemplified by our scalable high voltage e-machine traction platform, tailored to meet the diverse requirements of any powertrain. This platform facilitates rapid customization of power and package dimensions, maintaining exceptional levels of quality, reliability, and economies of scale. The platform boasts the highest machine efficiency and power density, extending driving range with scalable output power and flexible speed-torque performance.

Our innovation extends to offering a choice between oil or water-cooled concepts for the machine, providing versatility in meeting specific vehicle needs. In tandem with this, our commitment to continuous advancement is evident in our ongoing development of a high-voltage inverter on a global scale. This scalable inverter concept accommodates adapted customer derivatives for both passenger cars and commercial vehicles.

The modular software concept further streamlines the customization effort, contributing to efficient industrialization and production. Our approach includes a leading global electronic manufacturing services (EMS) partnership, ensuring optimal synchronization between the inverter and e-machine through a 2-in-1 system. Moreover, our broad supply base, especially for power semiconductors, reinforces the robustness and reliability of our innovative solutions.

EM portfolio: Features & advantages

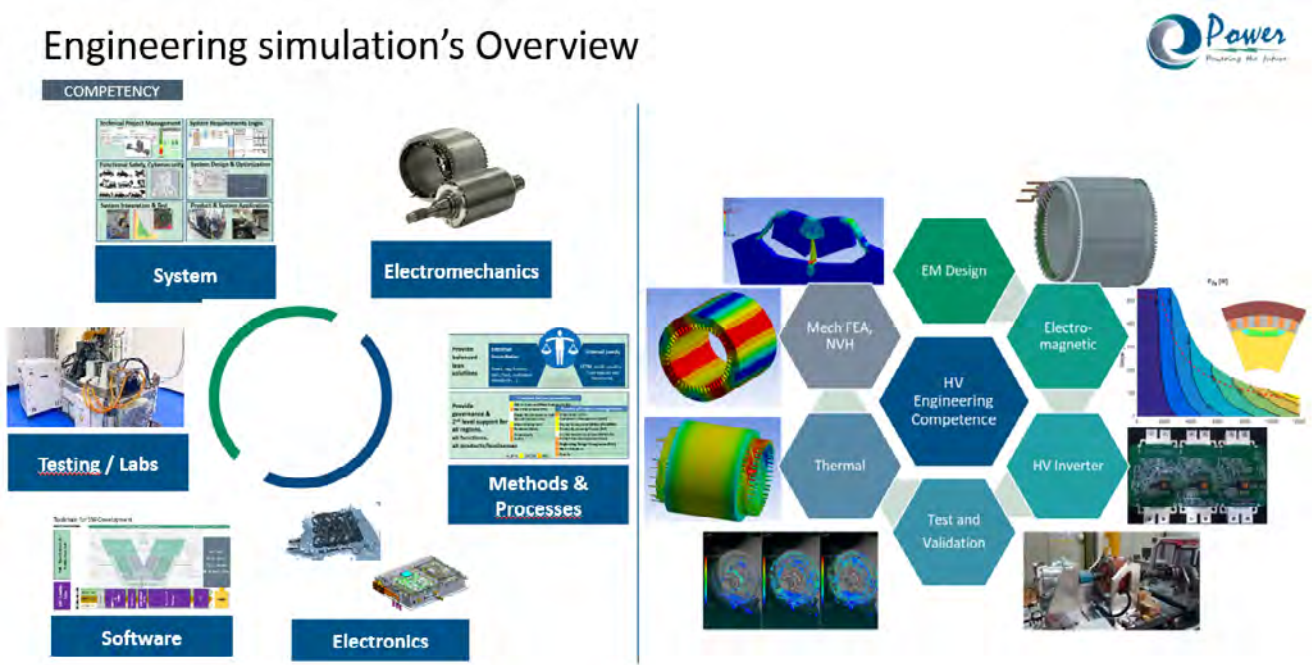
ELECTRIFICATION | PORTFOLIO

Motor	Controller	Enhanced experience - OE /end user
• PMSM motor with Resolver • Compact and Modular • High power to Weight Ratio • Low cogging Torque / Torque Ripple • Ingress Protection : IP67 • Low noise • Efficiency up to 95% • High efficiency at operating range • High thermal stability	• Customized Driving Profile's (ECO/Sport/Normal / Limp Home) • Higher controller efficiency • CAN interface • Regeneration capability, Cruise control • Modes : Forward/Neutral/Reverse • Driving assistance (Start hill / Down hill assist, Free wheeling)	• Higher Range • Low noise • Smooth drivability • Improved robustness and reliability – System Built for tough operating condition • Different modes of operation • Hill assist function • Localized Motor/Controller • Functional safety ASIL B/C[1] • Local system solution

In summary, SEG Automotive's innovation is characterized by a scalable and adaptable high voltage e-machine traction platform, coupled with ongoing developments in high-voltage inverter technology. These advancements not only cater to diverse electrification needs but also emphasize efficiency, reliability, and a commitment to staying at the forefront of the rapidly evolving automotive electrification landscape.

The Approach

SEG Automotive's innovation approach is marked by both short-term and long-term goals, overseen by the Breakthrough Management Team established in 2020. This team comprises experts from advanced research, global purchasing, manufacturing, and the supply chain. Through formal meetings, workshops, and reviews, the organization promotes innovation in product, process, and business realms. Leadership ensures the deployment and follow-up of measurable targets. Utilizing tools like the Onion Peel technique, benchmarking, and simulation, SEG Automotive is committed to continuous breakthroughs, reinforcing its position as a pioneering force in automotive electrification.



Benefits

- Customer:
    - Customers benefit from cutting-edge innovations tailored for both local and global markets.
    - One-Stop Solution as a System Provider: 2-in-1 and 3-in-1 systems.
    - Local Manufacturing and Maximum Localization: With over 90% localization of child parts, we contribute significantly to the local economy and enables OEMs to maximize benefits under FAME and PLI schemes.
- Improved Thermal & Gradient performance : SEG Motor has given improved Gradeability & Thermal performance (improvement in performance by ~ 100%)
- Improved range performance : With SEG's in depth Motor design expertise & system knowledge range was improved by ~ 12%
- Enhanced Safety Standards : SEG is able to offer superior system solutions with state of the art safety standards (ASIL B / C) against QM standard offered by competition.
- Improved reliability, NVH, Regenerative braking.
- Society:
    - Green Energy: The company's commitment to green energy aligns with societal sustainability goals, promoting environmentally friendly practices.
    - Designed and manufactured in India. Localized product with technical support, qualified for FAME.
- Business:
    - Market Leadership: By offering innovative solutions, SEG Automotive solidifies its position as a market leader, fostering business growth and sustainability

Future Focus:

- High voltage 3 in 1 solution for Indian passenger cars and e-LCVs.
- Newly developed domain control unit that combines the functions of a vehicle. control unit and motor control unit into one device. (In house controller for LEM & HV)
- Advance Engineering: Rare earth free magnets in motors.
- Expansion into new industries like maritime applications.
- Hub motors for heavy duty applications in the last mile logistics.

Serum Institute of India Pvt. Ltd (Cyrus Poonawalla Group)

SERUM INSTITUTE OF INDIA PVT. LTD.
CYRUS POONAWALLA GROUP

About the company

Founded in 1966 by visionary entrepreneur Dr. Cyrus S. Poonawalla, the Serum Institute of India Pvt. Ltd (SIIPL) stands as a global powerhouse in vaccine manufacturing with an unwavering commitment to public health. SIIPL has supplied billions of life-saving vaccines to over 170+ countries, including significant contributions to the healthcare systems of the United States, the United Kingdom and the European Union.

SIIPL takes pride in its position as the world's largest supplier of vaccines by the number of doses. This includes a diverse range of vaccines such as MMR, Polio, Hepatitis B, Rabies, BCG and innovative combination vaccines, all offered at affordable prices. Operating from state-of-the-art manufacturing facilities in Pune, SIIPL has an impressive production capacity capable of delivering a staggering 4 billion doses annually.

The institute plays a key role in addressing global health crises, making a substantial impact that transcends borders. During the COVID-19 and swine flu pandemics SIIPL played a pivotal role by ensuring timely supply of millions of vaccine doses thereby contributing significantly to the global fight against these infectious diseases.

SIIPL's commitment to quality is evident in the recognition of thirty of its vaccines with Prequalification by the World Health Organization, conforming to regulatory standards similar to those of the European Union. Recognizing the evolving global needs, SIIPL has strategically invested in capacity expansion beyond its Pune base. These strategic investments include Bilthoven Biologicals in The Netherlands, Serum Life Sciences in the UK, VPM in Germany, Oxford Biomedica in the UK, Codagenix in the USA and Aspen in South Africa.

SIIPL Innovations

With a foundation rooted in addressing India's post-independence healthcare needs, SIIPL initially focussed on the regulatory development and commercialization of Antisera and vaccines. In subsequent decades the scope expanded to include the commercialization and export of the DPT group of vaccines.

Over the last three decades, SIIPL has strategically aligned its research efforts with global and regulatory requirements. The institute's research laboratories have secured approval as research centres from the Department of Scientific and Industrial Research (DSIR), Government of India (GoI). Building on a commitment to cutting-edge technologies SIIPL has forged more than 50 tie-ups and collaborations with national and international organizations. These collaborations span various platforms, encompassing the manufacturing of viral and bacterial components, mammalian and recombinant technologies, bacterial conjugates, virus-like particles (VLP), mRNA and adenoviral based vaccines.

Addressing WHO's advocacy for vaccines that can be stored outside refrigerators, SIIPL's pioneering innovation in developing the world's first thermostable vaccine Rotasiil (Freeze-dried), has the potential to revolutionize global healthcare particularly in regions with limited access to refrigeration. This innovation earned SIIPL a prestigious 'Patent for Humanity Award' from the US Patent Office. Subsequently, a liquid formulation of Rotasiil has received Prequalification from WHO.

In response to a critical gap identified by the WHO in the availability of a vaccine against the Meningococcal 'X' serogroup, SIIPL's dedicated

research partially funded by PATH resulted in the commercialization of the world's first ACYWX conjugate vaccine, Menfive. This vaccine technology with 22 patents filed or granted has also been employed in the Pneumosiil vaccine, distributing over 80 million doses to date.

Breaking new ground in rabies treatment, SIIPL introduced Rabishield, the world's first anti-rabies monoclonal antibody manufactured using recombinant CHO cell lines (from MBL, Boston). Supplied to more than 25 countries, Rabishield has replaced the traditional rabies immunoglobulins derived from animal or human origins, aligning with WHO guidelines for category three dog bites.

Responding to the alarming spread of dengue infections, particularly affecting children, SIIPL, with a CHO clone from MIT (Boston), developed Dengue mAb. Successfully completing Phase 1 trials in Australia and demonstrating efficacy in neutralizing all four dengue virus infections in Phase 2 trials in India, Dengue mAb is now navigating the regulatory pathway for emergency use licensure. SIIPL's research findings in this area have been granted patents in multiple countries.

Highlighting SIIPL's resilience and capability to scale up production under adverse conditions, the institute played a pivotal role during the COVID-19 pandemic. Notwithstanding the significant logistical challenges amidst the COVID pandemic, SIIPL navigated through the disruptions with grit and adaptability, ensuring continued operational effectiveness. By supplying 90% of India's vaccine needs and a substantial portion of the global demand it underscored SIIPL's commitment to global health challenges.

The Approach

The global challenge of increased microbial resistance to antibiotics largely stemming from indiscriminate antibiotic use necessitates a shift towards vaccine development. SIIPL adopts a meticulous approach in selecting vaccine development projects considering both global and country specific epidemiology including the prevalence of currently circulating infective strains.

SIIPL engages in a consultative process with field experts and maintains a continuous review of vaccine development priorities as outlined by reputable health organizations such as WHO, US FDA, EMEA, and DCGI. Additionally, the institute factors in insights from its own market research. Before initiating a project, a comprehensive groundwork is laid encompassing the landscape of vaccine technology, target product profile and a thorough Freedom to Operate (FTO) analysis.

A critical consideration in project selection is the scalability of the manufacturing process. SIIPL aims to commercialize vaccine production on a large scale to ensure cost-effectiveness. A dedicated project development group is formed and regulatory approvals are diligently secured. The Design of Experiments (DOE) approach is employed for the fermentation and purification of vaccine antigens.

Internally extensive vaccine antigen characterization is conducted and the results are validated through independent laboratories predominantly located in the EU, UK and the USA. In adherence to our commitment to transparency and regulatory compliance consultative meetings are scheduled with regulatory agencies at every stage of the vaccine development process. These stages include preclinical, clinical and licensure phases. This iterative engagement not only incorporates valuable inputs but also ensures alignment with evolving regulatory standards.

To support the transition from clinical trials to commercial use, manufacturing facilities are established to produce the vaccine for phase 3 clinical trials. Importantly, this infrastructure is seamlessly extended for continued commercial production ensuring a smooth and efficient transition from development to widespread distribution. This robust and comprehensive approach underscores SIIPL's dedication to addressing global health challenges through cutting edge vaccine development and production.

Benefits

Serving as a cornerstone in global healthcare, SIIPL has made substantial contributions that reverberate across the world. As per some

estimates approximately 65% of the world's population has received at least one vaccine from SIIPL illustrating the institute's pivotal role in global immunization efforts. Through the decades of SIIPL existence it is estimated that 30 million infant lives have been saved by providing affordable vaccines to developing countries.

The impact of SIIPL extends beyond public health by significantly contributing to the global economy. The export of SIIPL vaccines on a global scale has become a major source of revenue for the company, reflecting its role as a key player in the international biopharmaceutical landscape.

The commitment to innovation is safeguarded through a robust intellectual property (IP) strategy with 110 patent families globally protecting the research findings from SIIPL's trailblazing innovations. This IP portfolio not only ensures the sustainability of SIIPL's business operations but also serves to reduce financial outflows in the form of royalties and milestones reinforcing the institute's financial stability.

The laudable efforts of SIIPL over five decades have not gone unnoticed. The institute's contributions have earned recognition and praise from global organizations and United Nations (UN) agencies. This acclaim reflects the enduring impact of SIIPL's dedication to advancing public health and underscores its pivotal role in the global healthcare landscape.

The Future

SIIPL is poised for a bright future with an array of new and next-generation products in various stages of development. The company's strategic vision encompasses the launch of vaccines targeting Yellow Fever, Human Papillomavirus (HPV), Malaria, and recombinant Bacillus Calmette-Guérin (rBCG). Each of these vaccines addresses critical health challenges showcasing SIIPL's commitment to global public health.

One notable development on the horizon is the imminent entry of the bivalent typhoid conjugate vaccine, incorporating the S. Paratyphi A antigen into licensure trials. This critical phase marks a significant step in ensuring the safety and efficacy of the vaccine before it reaches the wider public underscoring SIIPL's dedication to maintaining the highest standards in vaccine development.

SIIPL has already made strides in the global market with some of its vaccines successfully exported to developed nations. This achievement reflects the international recognition of SIIPL's products and the company's ability to meet rigorous standards for safety and efficacy.

At the helm of these ambitious initiatives is our CEO Dr. Adar Poonawalla, whose leadership is steering SIIPL towards even greater heights. Dr. Poonawalla is actively leading efforts to bring SIIPL developed vaccines into regulated markets. This strategic approach not only ensures compliance with stringent regulatory requirements but also demonstrates the company's commitment to making a substantial impact on global public health.

In conclusion, SIIPL's robust vaccine portfolio, ongoing developmental endeavours and global expansion initiatives spearheaded by the far-sighted leadership of Dr. Adar Poonawalla positions the company as a bellwether in the biopharmaceutical industry. As SIIPL continues to make strides in global health its impactful contributions are leaving indelible footprints on the sands of time.

Somany Ceramics Ltd

About the company

Somany Ceramics Limited (SCL) is among the top 15 global giants of the Ceramic Industry. Founded in 1968 and Established more than 50 years ago by Late Shri Hiralal Somany Ji, Brand SOMANY, under the capable leadership of Mr. Shreekant Somany, Chairman and Mr. Abhishek Somany, Managing Director & CEO, is a household name in India for tiles and bathware. Moreover, it exports its products to over 55 countries across six continents. The company is a complete solution provider in decor solutions with the widest product selection in all categories: ceramic (wall and floor tiles), polished vitrified tiles, glazed vitrified tiles, sanitary ware and bath fittings.

SOMANY's determined pursuit of excellence has placed the brand in an illustrious position. This wouldn't have been possible without the vision of the Late Shri H. L. Somany Ji, who laid the foundation for the company's long-lasting success. He believed in staying ahead of his time - creating trends instead of simply following them, constantly innovating rather than catching up. His wisdom and culture are an intrinsic part of the company's DNA and the following generations of leaders.

- 1st Indian company with a Govt. Recognised R&D centre
- 1st and only company to have a patented VC (Veil Craft) Shield Technology, patent applied for Slip Shield and Temp Shield tiles.
- Significant Presence in India, Africa, The Middle East, United Kingdom and Russia.
- Available across 18,000 customer touch points.

Corporate Philosophy

VISION

Most sought after tile and allied product in India and be the best employer in the tile industry".

MISSION

Achieving customer delight through business innovation and cost effectiveness while pursuing latest fashion trends in ceramics & allied products for creating stakeholders values

Awards and Accreditation

The Innovation

We at SCL always strive to innovate new products to stay ahead to competition.

Our focus is on value addition by introducing unique product which differentiate us from our competitors

We have strong technical competent team and also Govt. recognized R& D Lab.

We have very good industry institute Partnership with renowned institute like CGCRI and IIT Delhi for development of innovative process and product.

Our innovative advances, such as the VC Shield, Temp Shield, Slip Shield, Germ Shield and Hydrophobic technology, deliver supreme functionality with features that make your home evolve into a convenient space

Slip Shield

Slip Shield is a range of tiles designed to avoid slip and fall incidents in water-prone areas. Coated with a special coating for superior grip, these tiles are ideal for use in bathrooms and outdoor spaces.

Somany Slip Shield tiles are stain and blemish resistant, making them highly functional and easy to maintain while giving your design a sense of classic elegance. Even in utility areas, these tiles add a distinctive charm.

The co-efficient of friction range in dry conditions falls under 0.6-0.7 & in wet conditions fall under 0.5-0.6, allowing you to #WalkFearless, always.

VC Shield

VC Shield Technology provides a protective layer that safeguards tiles from wear and tear, scratches, stains, and weather damage. This remarkable achievement earned the company its first Indian Patent (No. 227692) in 2009, cementing its position as the first ceramic tile company in India to develop such an innovative technology.

Temp Shield

Continuing our tradition of innovation, SOMANY brings to you – Temp Shield. Setting new benchmarks in technology, Temp Shield is a unique curation of heat-resistant tiles that reflect up to 75% of sunlight, resulting in reduced temperatures.

Temp Shield tiles are ideal for roofs and sun-facing sides. These tiles reduce room temperature thus help you save on energy bills. Ideal for laying on roofs, pavements, courtyards, balconies, etc. The Temp Shield tile helps beat the heat inside your home. Furthermore, these heat-resistant tiles also help cut down on the Urban Heat Island Effect

Hydrophobic

Hydrophobic technology refers to a unique property of materials that repel water molecules. Hydrophobic technology is a process that applies a coating on the tile surface to prevent water absorption. This technology works by creating a barrier that prevents water from penetrating the surface of the tiles, thereby reducing the chances of water damage, staining, and growth of mold or mildew.

The benefits of hydrophobic technology include easier maintenance, longer lifespan, and improved aesthetics due to the prevention of water stains and discoloration.

Germ Shield

Make your house safe from germs, for your loved ones to enjoy healthy life

These Antibacterial Tiles have a nano chemical coating, which inhibits the growth of germs, bacteria, fungus etc. on its surface. thereby protecting you ,your family and your home from infection.

In recent pass during covid time we felt the need of developing Germ shield tile for health care industry.

So our technical team come up with germ free formulation after extensive research and also it was made cost effective.

For its wide application it was applied on our Patented VC shield product to give dual advantage of high abrasion resistance and germ protection.

As this nano coating is embedded in glaze so its life is also enhanced.

The Approach

We identify the necessity of this product in post pandemic global scenario.

We had series of discussions/Brainstorming session among our technical team to develop this product.

From brainstorming session we got 2-3 proposals and in the second round of brainstorming we involved our other unit technical team also.

So finally all agreed for developing Germ shield VC product by using Nano ceramic Material.

Because of its high specific surface area reduce the germ growth even with a small quantity of Nano material

After developing it on Lab scale, it was sent to external lab for testing and results were found good.

Hence, based on successful trial on lab scale,we have gone for bulk production and SOP's were made and circulated to team for its implementation.

The Benefits

The main benefit of innovative product is that it give us edge in the market over our competitors.

This product was developed with dual advantage germ free along with high abrasion resistance.

Hence its application is in wider area where high footfall is there such as Hospitals ,malls etc.

It can also be used in residential areas.

As this product is unique it has given us the edge in the market and hence improved our sales volume.

THE FUTURE

Due to its uniqueness this product have very good future, we can approach to tier 2 and tier 3 cities to gives its benefits to them

This product is recommended for high footfall areas ,where hygiene is required such hospitals ,schools etc. also due to high abrasion resistance property it can be used in malls as well.

TATA Chemicals Limited

About the company

A part of the US$ 128 billion Tata Group, Tata Chemicals Limited, is a leading supplier of choice to glass, detergent, industrial and chemical sectors. The company has a strong position in the crop protection business through its subsidiary company Rallis India Ltd. Tata Chemicals has world-class R&D facilities in Pune and Bangalore.

High Dispersible Silica:

Tata Chemicals' Specialty Silica products reflect our leadership in technology and innovation. We have innovated a novel method of synthesis and customisation of structure, morphology, particle size, surface area and particle porosity, which gives our silica greater advantage in industrial applications. Our products come with the assurance of consistent quality along with quick and assured supply.

The prebiotics and dietary fiber: FOSSENCE®

Fructo Oligosaccharide

FOSSENCE® is a 100% soluble, potent prebiotic and dietary fiber made from fermented cane sugar, clinically studied, for its impact on the gut microbiome. Healthy microbiome is known to improve immunity, nutrient absorption, lipid transport and overall digestive and bowel health.

Admixture for Precast Concrete

Our pre-cast cement admixture performs better than the standard cement in terms of high early strength (40% more day one strength), rapid hardening, high density and whiteness.

Aeroponics and Hydroponics for High Value Extracts

A sustainable process of growing plants in an air without the use of soil, reduces the water usage is leveraged to grow high value medicinal plants to increase the efficacy of bioactive compounds to address health and wellness areas has been implemented.

Tata Chemicals has developed the Biobased Surfactant which is a Replacement of dominant petroleum-based surfactant. Part of it's sustainability objectives Tata Chemicals has established UK's 1st Industrial scale Carbon Capture and utilization plant (liquid CO2) to manufacture Food and Pharma Bicarbonate to be exported to 80 countries worldwide. Tata Chemicals shall continue to develop sustainable technologies based on the principles of green chemistry.

TATA Consulting Engineers Limited

About the Company

Tata Consulting Engineers Limited (TCE) is India's largest private-sector engineering and project consultancy and is an emerging global leader in providing integrated engineering solutions. TCE has a presence in more than 60 countries and has completed over 11,000 projects.

The Company operates in three industry segments: Infrastructure (including Water, Wastewater & Sewage, Buildings & Facilities, Environment & Sustainable Infrastructure, Industrial & Manufacturing Facilities, Master Planning & Urban Development, Digital & Modelling, Ports & Harbours and Transportation), Resources (including Hydrocarbons and Chemicals, and Mining and Metallurgy), and Power (including Nuclear, Green Power (Solar, Wind, Hydro), Thermal and Transmission & Distribution).

TCE offers Design & Engineering, Sustainability Solutions, Digital & Advanced Technology and Project Management across all three industry verticals. The Company serves domestic and international markets and is known for several first-of-its-kind projects. TCE is a 100% subsidiary of Tata Sons Limited, part of Tata Group - India's most respected group.

The Innovation

As engineering consultants, our organisation is highly solution-oriented. We possess the ability to work on multiple alternate solutions. Planning, forecasting, and course correction are our standard ways of working. Regular reviews are conducted at every level, including top leadership, to help us remain focused and plan accordingly.

In the engineering services industry, we provide optimised designs that the customer did not originally envision. Based on first principles, our innovative solutions simplify the problem, reduce costs, improve quality and timelines, and comply with applicable statutory requirements and national and international standard design codes.

Each solution is unique to the given engineering problem for a specific project. Modern third-party and in-house developed tools for advanced analytics, intelligent modelling, use of 3D platforms, and several simulation programs are required and utilised.

Apart from cost savings (OPEX, CAPEX, Life Cycle Costs), our value addition portal tracks the following value addition metrics – Environment, Constructability, Operability, Maintainability, Space Utilization, Safety, Reliability, Productivity, Improved Design features, Elimination constraints, better product utilisation, and work process simplification.

Most of our innovations are unique to the customer and designed to solve specific issues. Hence, these innovations are novel, with no competition or existing solutions. These indigenous solutions have been built at a fraction of the cost and have eased production as the raw materials and parts used are locally available.

Ideas and best practices are collated across the various segments of work processes and evaluated for further detailing based on their relevance with respect to general industry-agnostic innovation, process or working methods innovation, sales or commercial innovation, repeatability, IP, patentability, and market relevance. Learning and reusable practices and processes termed project innovations from the executed projects are collated as potential ideas and innovations for further development.

The Approach

Projects are delivered by teams of functional experts, with industry experts and consultants often providing specialised inputs. The learnings and reusable practices, processes, and project innovations from the executed projects are collected as potential ideas and innovations for further development using the TCE innovation framework.

To promote a culture of value addition, the organisation encourages knowledge sharing and exchange of key project-related information through a central repository of lessons learned, regular in-house forums and competitions, and several internal platforms. Additionally, a mentoring framework is in place for employees to cross-learn at all levels.

Benefits

Our company aims to provide value-added differentiated services and innovative solutions in order to become a market leader and stay ahead of the competition. We believe in investing in the development of our people and providing them with opportunities to grow. We offer unique and interesting opportunities for engineers to work with cutting-edge technologies in fields such as defence, space, infrastructure, and plant engineering.

By implementing novel solutions, we promote the development of indigenous technologies and help our nation achieve self-reliance. Our goal is to promote growth and deliver end-to-end services that optimise customer satisfaction through innovative solutions.

The Future

The organisation's innovative mindset plays a crucial role in introducing new ideas to its services and processes, leading to higher market share, revenue, and customer satisfaction. We strive to improve the organisation's overall ability by leveraging an innovation-focused mindset and framework.

TATA Elxsi Limited

About the company

Tata Elxsi part of the multi-billion-dollar Tata Group, is a premium engineering service provider worldwide and amongst the leaders in the automotive, media, broadcast, communications, and healthcare industries. Tata Elxsi brings together the best technology and user-centric design expertise to help customers deliver innovative solutions and great consumer experiences. Our integrated Design and Technology teams help enterprises reimagine their products and services – from strategy, consumer research, and insights, to service and experience design, technology implementation, integration, launch, and beyond.

At Tata Elxsi we work closely with customers - right from advanced R&D in new technology and system architecture exploration to actual development, validation, and deployment. This includes emerging technologies such as IoT (Internet of Things), cloud, smart mobility, and artificial intelligence. Thereby creating new opportunities for businesses to improve operational efficiency, reduce costs and deliver new services to their consumers.

The Innovation

The details of innovations highlighted in the CII application are as below;

Microfibre filteration device for Washing Machines

In recent years, the question of plastic waste entering our water bodies like seas, and oceans has dominated headlines and has been one of the pressing environmental issues. Washing machines are one of the major contributors to this, as each wash cycle releases significant microplastic fibers. In line with these efforts, Tata Elxsi has designed an intuitive Washing Machine Filtration device aimed to trap microfibres that our clothes release. This can be integrated into any domestic washing machine during its manufacture and can capture over 99% of microplastics and over 80% of cellulosic microfibers.

Tether SMP

IIoT-based Industry 4.0 Smart Manufacturing Platform developed to facilitate Track and Trace of part from raw material to finished product, supported with Augmented Reality-based training phase. Compared to existing IOT Edge solutions, our TETHER Edge and the server component, called TETHER Smart Manufacturing Platform, improves by bringing in Unified user experience, Configurable HMI, Edge computing localized alerts and easier control on production process.

AI Hardware accelerator optimization

Deep neural networks demand exceptionally high memory and computing costs (power) that pose significant challenges to the hardware platforms executing them. Our innovation has led to powerful AI accelerators that run DNNs models for Autonomous driving/advanced driving assistance system)solutions with better latency, efficient memory transfers, and a lesser energy consumption ratio.

Robotic Tech: Next-Gen Med Device Industry

To ensure patients' safety and efficacy of medical devices, the regulations are getting more complex as government bodies change

laws, and regulations frequently. However, these regulations present challenges for medical industry. Robotic automation supports rule-based, high volume, repetitive manual tasks associated with regulatory processes. It Increases efficiency, reduces time to bring a medical device to market and reduce overall cost

The Approach

With a mission to be a preferred design, technology and innovation partner, creating differentiated products and services that delight customers and drive business growth, we continuously strive to innovate for our customers in all the industry segments of our choosing.

Tata Elxsi 'Innov@TE' framework (Innovation @ Tata Elxsi) is a holistic and inclusive approach towards creating a culture of innovation. This tool-based workflow strives to shape and mature an idea through a process of nudging, social proofing, hackathon, customer validation and constant mentoring into business-relevant products and services.

'Think big and be open to taking risks' is one of the key value statements that drives Tata Elxsi's 'way of living' and establishes Tata Elxsi as a home to a billion possibilities.

Benefits

Microfibre filteration device for Washing Machines

This can capture over 99% of microplastics and over 80% of cellulosic microfibers

TETHER SMP

60% control reduction in process deviations, 30% faster deduction of the genealogy of a part or assembly or product, 40% reduction in effort

AI Hardware accelerator optimization

40% Revenue Growth through product sales for V3U , V4H,

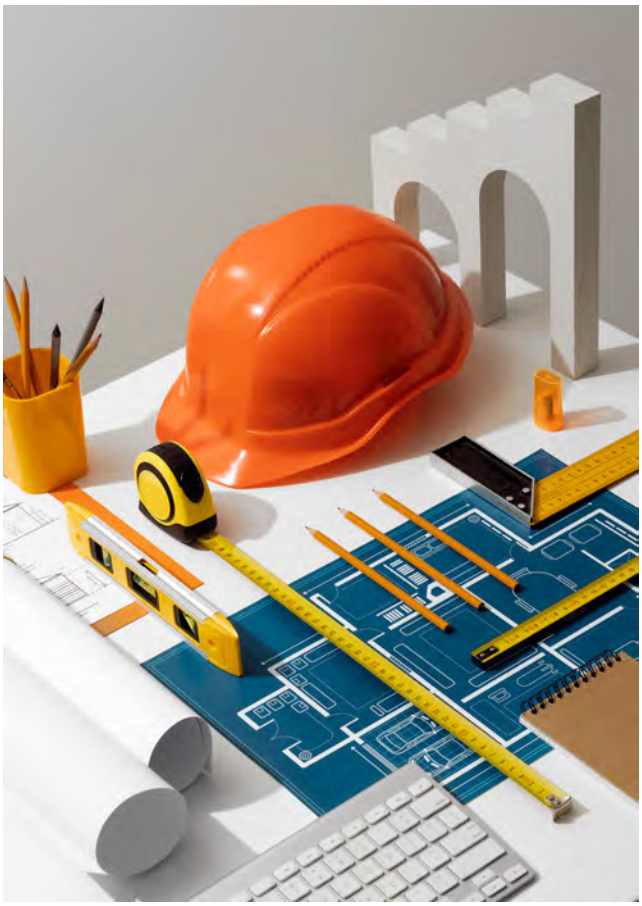
Robotic Tech: Next-Gen Med Device Industry

2% to 5% growth in revenue, Account Growth Rate in healthcare Industry grew by 10% up to 30% YoY. MDR labeling account productivity increased by 60% and cost reduced by 20%, productivity gain achieved in regulatory account is up to 80%.

The Future

Innovation will continue to be critical to the success of Tata Elxsi in serving its customers. With a focus on Patents and IP development, the company aims to double its revenue from IP lead business fostering customer-led innovation.

Tata Elxsi is enhancing its current collaboration with research and academic institutions and is building a multi-channel idea crowdsourcing platform to accelerate innovation to create a greater impact on business and society.



TATA Motors Limited

About the company

Tata Motors (TML) is a USD 42 billion organization. It is a leading global automobile manufacturing company. Its diverse portfolio includes an extensive range of cars, sports utility vehicles, trucks, buses, defence vehicles, and e-mobility solutions.

With 'Connecting Aspirations' at the core of its brand promise, TML is India's market leader in commercial vehicles and among the top three in the passenger vehicle market.

Innovation is deeply embedded in our DNA and is demonstrated through our innovative & pioneering solutions that help industries to become more efficient and effective in turn serving as catalysts for the progress of our nation.

The Innovation

- Design and development of India's first indigenous fuel cell bus.

  Hydrogen fuel cell-powered vehicles are an attractive option in our nation's search for cleaner and more sustainable automotive technologies because of their ease of maintenance and faster refuelling. The fuel cell bus innovation is a zero-emission solution that benefits the transportation sector as well as steady state power generation, it will also lead to reductions in fuel imports, savings in foreign exchange, and improved energy security for the country. The additional infrastructure created for hydrogen generation, storage, and dispensing can help generate new sustainable business and employment opportunities.

  Our first customer of Fuel Cell Bus is IOCL.

- Altroz - first premium hatchback to achieve the prestigious Global NCAP 5-star rating for adult occupant protection

  Road safety has been the top priority for both the Government and the industry, and TML is known for making elegant and safe cars. Through its approach of frugal engineering and democratizing safety, TML dedicated itself to the mission of 'Safe Bharat' by developing innovative mobility solutions for both personal and mass transportation. After the success of Nexon which became the country's first GNCAP 5-star rated car in 2018, the approach was extended to other products like Tiago & Tigor and newer models also.

- Countries first HCV (Prima 5530.S) with Advanced Driver Assistance ADAS features:

  Autonomous driving technologies have been experienced in the passenger vehicle segment in different parts of the world, but specific solutions were required for the commercial vehicle industry in India. ADAS creates an environment that is conducive to stress-free driving for active safety. With ADAS, TML attempted to enable and empower drivers and help transporters attract and retain skilled drivers. In addition to dealing with road safety, ADAS features also increase the Total Cost of Ownership and enhance ROI for fleet owners.

The Approach

- It all begins with strategic inputs that include environment scanning, disruption radar,

situational analysis, emerging regulations, consumer behaviour, and unstated needs of the nation. This is followed by robust processes supported by a culture that promotes experimentation. Some of the key steps in the processes include–

- Innovative validation methodology for ensuring robustness - testing beyond the regulatory mandate and simulating actual use cases for all ADAS features.
- Choosing innovation over high-cost technologies.
- Focus on digitalisation across the value chain in the organisation.

- Projects, even those that didn't succeed, are felicitated by senior leadership.

Benefits

TML takes pride in actively propelling the progress of our nation through its pioneering and innovative products, aiming to meet stakeholders' aspirations.

India's first Indigenised Fuel-Cell Bus is a cutting-edge design that ensures zero-emission and noiseless operations – a modern, practical, and state-of-the-art mass mobility solution tailored to the growing urban transport needs of India.

Our nation's infrastructure revolutions and the vision of 'Atmanirbhar Baharat' are reflected in the revolutionary Tata Prima 55T ADAS truck. India's road safety goal of reducing accident fatalities by 50% is greatly aided by the Altroz, a Global-NCAP-5 star product, and Tata Prima 55T ADAS truck.

The Future

TML will continue to contribute to nation-building through its innovative product portfolio with aggressive targets in customer-centricity, safety, and sustainability (with Net Zero targets in PV business by 2040 and in CV business by 2045 and Circular Economy).

The TATA Power Company Limited

About the company

TATA Power, a flagship company of the TATA Group, has emerged as a leading force in the energy sector with a distinctive focus on renewable energy sources. With a history dating back to 1915, the company has evolved into a comprehensive power player, engaging in the generation, transmission, distribution, and trading of electricity. It has successful public-private partnerships in Generation, Transmission and Distribution in India like:

- Tata Power Delhi Distribution Ltd. with Delhi Government for distribution in North Delhi,
- Powerlinks Transmission Ltd. with Power Grid Corporation of India Ltd. for evacuation of Power from Tala hydro plant in Bhutan to Delhi
- Maithon Power Ltd. with Damodar Valley Corporation at Jharkhand.

In solar energy, TATA Power has executed several large-scale projects, harnessing the power of sunlight to generate electricity. The company has also made substantial investments in wind energy, leveraging wind farms to tap into the potential of this eco-friendly power source. Additionally, TATA Power's involvement in hydroelectric projects underscores its dedication to harnessing diverse renewable resources for sustainable power generation

Tata Power is today one of the country's largest integrated power companies. With a bold aspiration to become the 'Most Preferred Green Energy Company', we are proactively investing in a greener portfolio, and innovating with smart technology for a future-ready business

The Innovation

Tata power has a purpose driven innovation ecosystem with focus on cutting edge technology, sustainability, and energy equity. It gets nurtured by Tata group's core value system of business for the larger benefit of society. The structured approach of building an innovation ecosystem is leading to serial innovations throughout the year.

Listed below are few of the latest innovations across TATA Power.

- Off Spec coal firing- Development of a solution to enable usage of different off-spec coal blends at competitive price for low cost power generation.
- Solar Axis Tracker - Development of Solar Axis Tracker (SAT) through precision tools resulting in lower tariffs and improved plant efficiency.
- Bottom Ash Concrete Tetra Pods: concrete structures made by using ash from the thermal power plants to preserve the coast from wave erosion.
- Distributed Acoustics Sensing (DAS) system implementation for Transmission lines reducing human intervention and faults due to external factors.
- Tata Power Renewable Microgrid business model for sustainable energy in rural areas, helping in reducing carbon footprint, supporting rural markets, electrifying villages
- Underground Submersible Substation-Zero Space Installation

The Approach

TATA Power follows a structured approach to generate, develop, and convert an idea to its final product/solution. There are multiple steps involved in the complete process like: participating in strategy formulation workshops, periodic meetings with cluster heads, business functions and all stakeholders across value chain for sourcing problem statements. Attending external forums like exhibitions, business events, startup meets, conferences etc. for sourcing problem statements as well as for mapping innovations happening in the Generation, T&D, EV, HA, ESCO and future clean technologies. The problem statements directs to areas of collaborations/ innovation opportunities with the relevant stakeholders. Basis, cost benefit analysis, detailed project plan is prepared and the proof of concept is developed. The progress of the projects is monitored through periodic reviews. The results from the pilots are analyzed and validated. The findings are presented to top management team for taking a decision on scaling up / commercialization or archiving the project. The archived project is subjected to further review for exploring any new application opportunity.

Benefits

The advantages of comprehensive innovation resonate throughout the entire value chain, delivering benefits to all stakeholders. These advantages manifest in cost reduction through process improvements, technology implementations, and increased employee engagement. Furthermore, they contribute to an elevated brand image and value, foster greater trust among stakeholders, and ultimately enhance profitability.

For example, Tata Power Renewable Microgrid is supplying power to rural areas and helping to create circular economy for local community. Similarly The Tetra Pods made from ashes helped to attain an ecofriendly solution for the coast lines. Underground substation installation adds value to customer by increasing space for various purposes etc.

The Future

The promising outcomes achieved through innovative solutions at TATA Power are establishing a robust foundation for tackling emerging global challenges. Simultaneously, they are charting a transformative course for strategic business expansion, marked by a commitment to environmental sustainability. Moving forward, these solutions will be pivotal for extensive scaling and horizontal integration. Additionally, a more thorough analysis will be undertaken to identify opportunities for refining existing solutions or leveraging insights to develop novel products and services.

TATA Power Delhi Distribution Limited

TATA POWER-DDL
Towards a Greener Tomorrow

About the Company

Tata Power Delhi Distribution Limited (Tata Power-DDL) (earlier North Delhi Power Limited) took over the license to distribute electricity to the North & North West part of Delhi through a competitive bidding process initiated to reform the distribution sector. The organization was incorporated in July 2002 as a JV of Tata Power (51%) and Delhi Government (49%) on the Public-Private Partnership (PPP) model. The company changed its name from North Delhi Power Limited to Tata Power Delhi Distribution Ltd. in November 2011, to signify the direct relationship with the Tata Power Company Limited, and thus to significantly leverage its Tata lineage for enhancing sustainability and growth of business. The company has achieved unprecedented reduction in AT&C losses since inception bringing it down from 53.1% in July 2002 (during takeover) to 6.33% at the end of FY 23. Tata Power-DDL is the first Indian utility to be a member of Global Intelligent Utility Network Coalition (GIUNC) which is a coalition of 14 power utilities worldwide and is working towards accelerating the development of common standards, technology solutions and processes for intelligent networks. Tata Power-DDL is focused and committed to the road ahead and is exploring new opportunities to replicate its experience of distribution reforms both in India and abroad. It is leveraging its unique learning and skillsets solely and in collaboration with leading utilities and technology providers like GE, IBM, Enel, Omron, 3M, Panasonic, AES, Mitsubishi etc. in the areas of communications & smart grid technology, change management, consumer service delivery and business process re-engineering. Tata Power-DDL has also collaborated with leading international and national Institutions to carry out research activities in energy space.

The Innovation

1. Integrated Distribution Transformer Health Management System through Smart Meters:

   Distribution transformers are crucial for power distribution, but premature failures can lead to long outages, customer dissatisfaction, and revenue losses. In Delhi, over 5000 higher capacity transformers are installed, and the failure rate has reached 0.93% in 2022. This issue is prevalent across India, with an average failure rate of 12%-17%. Tata Power DDL plans to use its existing smart metering infrastructure for remote monitoring of distribution transformers and safeguarding critical assets. In collaboration with Landis & Gear, smart meters have been designed with digital input and output ports, allowing for monitoring of critical parameters. A centralized web application has been developed to segregate alerts across different organizational circles, and data is captured in the centralized application. Since implementing this smart meter health management system, the DT failure rate in Tata Power DDL has reduced to 0.56 (30 MVA) in 2023, saving RS.3.63 Cr. in two years. The technology is being rolled out in phases and is being developed for other power utilities to ensure supply chain continuity.

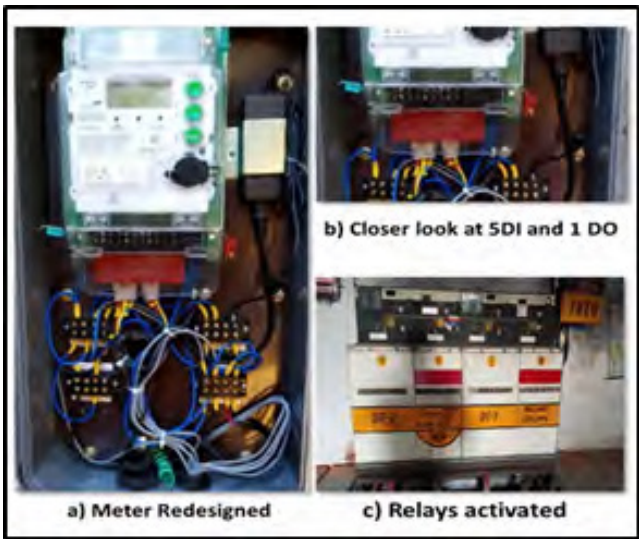


Fig 1: Smart Meters with Digitial input and out put port

Fig 2: Sesnsors installed in conservetor tank of distribution transformer

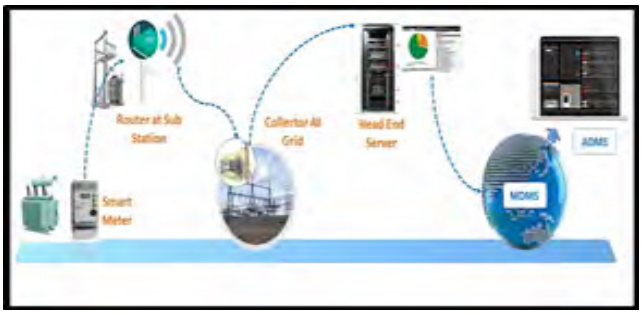


Fig 3: End to End integration of Smart meter with Head end system and MDM over RF canopy network

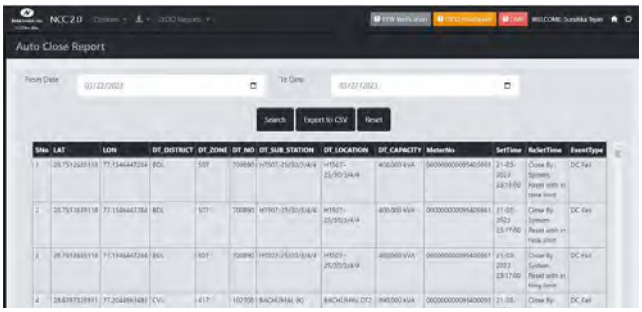


Fig 4: Centralized application to monitor crtical events regarding transformer health parameters

Effects

- Total Cost Saving of 2.09 Crs achieved in FY 23
- 37.4% reduction in DT Failure rate observed in FY 24 owing to the implementation of DT health monitoring by Smart Meters.
- Paper Publication at 9th edition of METERING India IEEEMA

2. A Quantum Leap in FRP Ladder Design:

IS 4571 for Aluminium Extension ladders is available, but there is no Indian standard for Dielectric Extension ladders. A project was developed to address this issue, reducing LWDC cases and resulting in cost savings of 42.51 lakhs for pulley replacement and 95.16 lakhs for leveller procurement. Four major issues were identified in existing FRP ladders, resulting in safer work conditions for linemen. This results in reduction of LWDC Cases, due to fall from ladder reduced to zero after implementation of project. The cost savings of replacing 1500 pulleys and 500 levellers in existing FRP ladders at Tata Power-DDL are 42.51 lakhs and 95.16 lakhs respectively. The cost savings are due to lower prices from ladder OEMs and in-house developers. Four major issues were identified and addressed.

Problems	Solution	Before	After
No provision of ladder leg adjustment for placing ladder stably at site with uneven ground, due to which there is chance of ladder unbalancing while working at height on site with uneven surface.	Inhouse ladder leveller design and prototype developed and tested at site. After which standardization and mass deployment in field after successful testing and getting favourable results. It helps lineman to work safely at height on site with uneven surface.		
Defective lock design in two-fold and three-fold FRP Ladder, leading to jerk while working at height on ladder.	Individually operated locking replaced by Gang operated locking, eliminating the chances of jerk while working at height on ladder.		
Poor Rung Design (One side crimped and round shape rungs) in FRP Ladder, leading to ladder twisting and slippage of rungs in FRP channel of ladder.	D-shape Rung with double crimping is introduced in FRP Ladder. Providing comfort to lineman while standing on ladder rung with more resting surface and eliminating chances of ladder twisting.		
Excessive frictional force required in in unfolding two-fold and three-fold FRP Ladder	Ball bearing pulley is introduced and replaced in all existing FRP Ladders, leading to reduction of force required in unfolding the ladder to 30kgf from 70kgf.		

Effects:

1. Total Cost Saving of ₹ 42.51 Lakhs achieved in FY '23.
2. No LWDC incident reported post implementation of FRP Ladder.
3. Tata Power –DDL has been conferred with the "Safety Innovation Award 2023" for implementing innovative Safety Management System

3. Robotic Process Automation (RPA) for New Connection Process:

The global economy is evolving, necessitating businesses to adapt to new technologies. Robotic process automation (RPA) is emerging as a disruptive solution that can replace employees in repetitive tasks. RPA is particularly useful in processing new connection requests, which involve verifying customer credentials

and outstanding dues. The current process is time-consuming and prone to human error, potentially leading to revenue loss. The team will monitor duplicate notifications generated by applicants, which are currently tracked through phone numbers and email IDs. The project will identify duplicate notifications using RPA based on address duplication, reducing workload and efficiency. In FY 2021-22, inflow increased by 10% due to multiple requests generated by customers due to suspensions.

Effects:

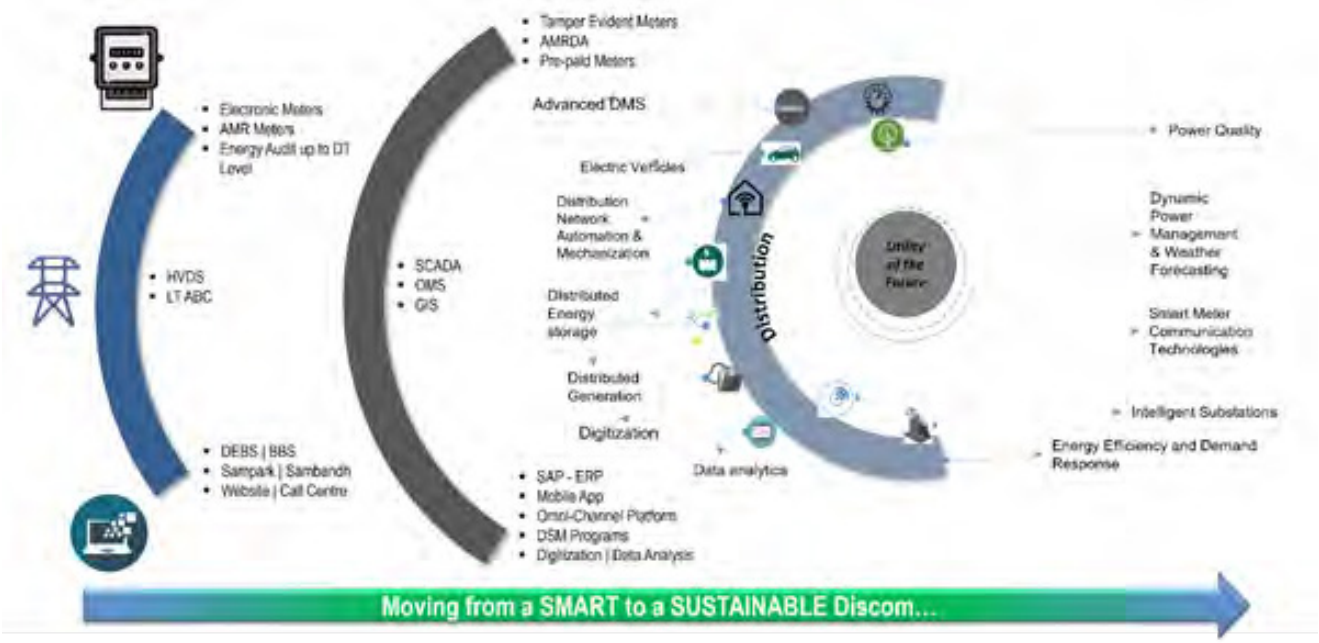
- 20% reduction in duplicate requests for new connection in FY '23.

The Approach

Tata Power-DDL is collaborating with National and International Technology Partners, Academy and Funding Partners to not only bring efficiencies in its Licensed Area but also working towards Sectoral sustenance and building a future proof Industry.

The Future

Tata Power-DDL, in its excellence journey, firmly believes in continuous improvement. Tata Power-DDL's change management experience, distributed leadership system, adoption of latest technology; robust competence development process and innovative & open work culture are the key strategic boosters which helps in building and sustaining competitive advantage in the changing business scenario. A journey which began a decade ago for empowering the consumers in Delhi now holds the potential to transform the distribution sector in India and similarly help utilities across the globe.

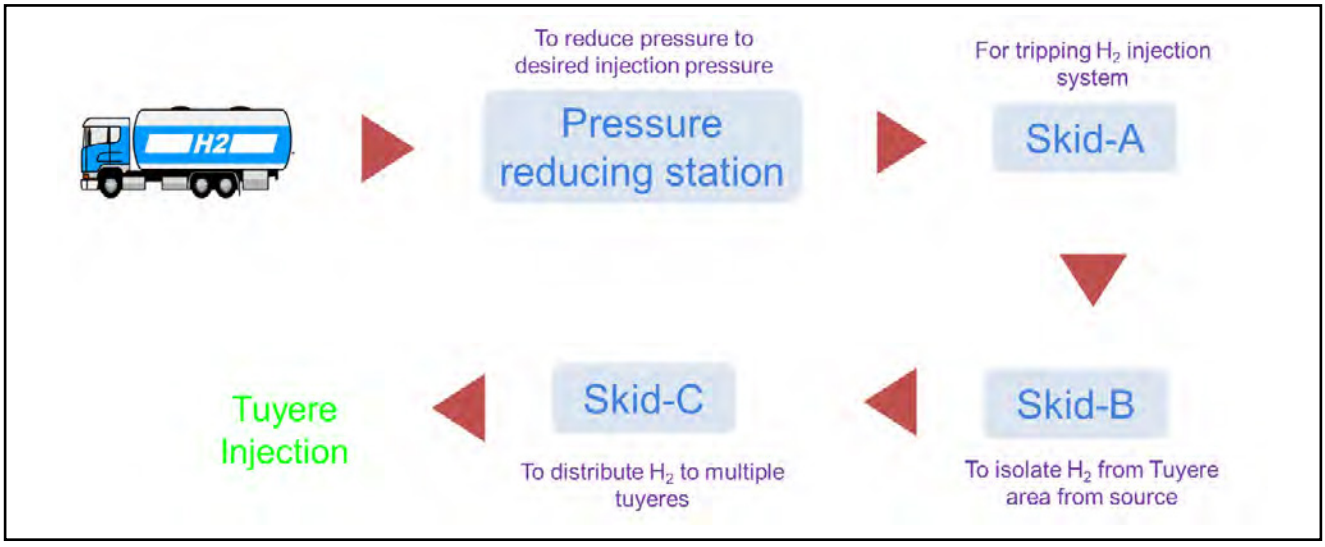

Electronic Meters
AMR Meters
Energy Audit up to DT Level
HVDS
LT ABC
DEBS | BBS
Sampark | Sambandh
Website | Call Centre
Tamper Evident Meters
AMRDA
Pre-paid Meters
SCADA
OMS
GIS
Advanced DMS
Electric Vehicles
Distribution Network Automation & Mechanization
Distributed Energy storage
Distributed Generation
Digitization
SAP - ERP
Mobile App
Omni-Channel Platform
DSM Programs
Digitization | Data Analysis
Distribution
Utility of the Future
Data analytics
Power Quality
Dynamic Power Management & Weather Forecasting
Smart Meter Communication Technologies
Intelligent Substations
Energy Efficiency and Demand Response
Moving from a SMART to a SUSTAINABLE Discom...

TATA Steel Limited

Hydrogen Injection in Blast Furnace Trial

The conversations around climate change have gained unprecedented momentum in the recent years. Given this imperative, steelmakers around the world start exploring sustainable options to mitigate its carbon footprint. Tata Steel has aimed for Net Zero emissions by 2045 to be an industry leader in sustainable development. Tata Steel is pursuing two-pronged approaches to achieve the target – Carbon Direct Avoidance (CDA) and Carbon Capture Utilization and Sequestration (CCUS). While CDA approach prevents fossil fuel usage in different units of steel making process, CCUS cover the aspect of capturing CO2 and convert it into value added products. Under CDA portfolio, Tata Steel has already demonstrated Coal Bed Methane (CBM) injection in early 2022 and the current trial of H2 injection in Blast furnace is a step towards decarbonization journey.

For a long time, hydrogen has been earmarked as an alternative to fossil fuels as an important reductant of iron ore in blast furnace. With growing need to make industrial processes greener, hydrogen fuel utilization is gaining a lot of traction. However, due to wide range of explosion limit, chances of high leakage (low molecular weight), H2 is a risky gas to handle and operate. Therefore, detailed design with due diligence, special grade pipes and instrumentation capable of handling H2 has been envisioned to develop the injection system. Multiple safety interlocks have been integrated into the system to mitigate risk of H2 handling and ensure safe operation. The schematic representation of the injection system is shown below



H2 has been supplied in cascades which has been de-pressurized to the desired injection pressure by two stages of pressure reduction arrangement. H2 flow has been then carefully controlled through different skids (valve stand) for injection through multiple tuyeres. These skids are purposefully setup at strategic locations based on the plant layout with required safety measures.

We have achieved highest ever continuous injection of H2 which realizes 10% fossil fuel reduction in the blast furnace. While last year's coal bed methane (CBM) injection trial enhanced Tata Steel's capability to safely handle, inject and run blast furnace with high volume of hydrogen bearing gases. This trial augments our technical capability to develop an injection system to utilize pure hydrogen as well and moves us further to our goal of Net Zero emissions. Before this trial, ThyssenKrupp steel had injected H2 through single tuyere for 24 hrs to check the feasibility of the injection system. The maximum injection attained during this trial was 0.5 kg/ton of hot metal whereas for our scenario, the maximum injection went up to 6 kg/ton of hot metal using 40% of injection arrangement. No single technology is available at a scale to meet the Hydrogen requirement required to abate CO2 emission in ironmaking process. Therefore, Tata Steel is exploring multiple avenues to get Hydrogen at works and piloting multiple technologies like alkaline electrolysis, PEM (Polymer Electrolyte Membrane electrolysis), utilizing steel mill off gas to produce H2. This will enable us to inject higher volume of Hydrogen to further reduce carbon emission. Hydrogen utilization in blast furnace can substitute 2.2-2.5 kg of fossil fuel usage per kg of Hydrogen which translates into 10-15% reduction of CO2 emissions in iron making process through blast furnace.

Taural India Private Limited

About the company

In 2016, Bharat Gite founded Taural India as a joint venture with Thoni Alutec group of companies, a market leader in aluminum casting technology based in Germany & Poland. Conceptualized and commissioned under the "Make in India" initiative, Taural India is a world-class integrated aluminum foundry based in Pune, India.

Taural India produces high-quality, made-to-order aluminum castings and provides end-to-end solutions to diverse industries, from design to assembly across Energy, Defence, Railways, Marine, Aerospace, Infrastructure, Mobility, and Healthcare sectors. It is serving clients across the country as well as globally with a mission to make India the global hub of aluminum sand-casting manufacturing. A few of their marquee clients include Ordnance factory (Defense), Indian Railways, Hitachi, GE, Siemens, and Hyosung, among others.

With its facility located on its own property of 240,000 sq. ft., the plant has a manufacturing capability of 10-1000 kg (casting weight) and 300-4200 mm (casting dimensions) having employment to 750+ employees. Its highly specialized aluminum components are already replacing those sourced from China & Europe.

The Innovation

Development of indigenous casting technology for cylinder block crankcase and transmission castings for heavy infantry combat vehicles that global leaders found challenging.

Insights:

- Complex casting design of >35 stackable sand cores to create intricate cavities
- Development of leakproof water jacket
- Long-length gun drill
- Sound, porosity free casting
- Successful rigorous field and endurance testing

The Approach

- Import Substitution :- Establishing a globally benchmarked manufacturing facility with a state-of-the-art casting technology process that adheres to the highest international standards thereby becoming an import substitute.
- Innovation :- Understanding customer problems/requirements and thus providing integrated solutions through our technological capabilities and experience.
- Quality Control Mastery :- Implementing best practices in quality control such as 4M, 5S, APQP/PPAP and securing global certifications such as ISO 9001-2015, and ASME thereby ensuring each component meets stringent quality benchmarks.
- Sustainability Focus :- Adopting a strong focus on sustainability and environmental responsibility by way of implementing ISO 14001-45001 along with IOT integration for digital data visualization in every stage of the manufacturing process.

Benefits

- Price :- Annual savings of 10.5 Crore.
- Quality :- Successful field and Endurance Testing with zero field Complaints.
- Skill :- Casting mastery to deliver intricate design.
- Opportunity :- Made in India, breaking a 34-year cycle of imports from Russia.
- Time :- Delivered in < 10 months from commissioning

The Future

Continued Innovation

Committed to ongoing innovation to stay at the forefront of critical Aluminum casting manufacturing and adapting to evolving technological and strategic landscapes.

Global Impact

We aspire to expand our global footprint, contributing to international Foundry industry collaborations and positioning Taural India as a trusted name in the global Aluminum Casting industry.

The Indian Hotels Company Limited

About the Company:

IHCL established in 1899, started operations with its flagship hotel, the Taj Mahal Hotel Mumbai in 1903. It has the honour of being one of the founding companies established by the founder of the Tata Group, Mr Jamsetji Tata.

IHCL's portfolio of hotels are spread across more than 100 locations in four continents. This portfolio comprises more than 21500 rooms in both city and leisure destinations, award winning restaurants, spas, salons, Qmin, multiple banqueting and conferencing venues across the world. Many of these have been recognized as amongst the best in the world at various reputed industry platforms in India and Internationally. Brand Finance, the world's leading brand valuation consultancy, has named "Taj" as the World's Strongest Hotel Brand in 2022 for the second successive year. Taj has also been recognised as the India's Strongest Brand in 2020, 2022 & 2023 across all sectors, making it the third time the brand has received this honour.

The Innovation:

Ginger was conceptualized in early 2000s and opened its first hotel 2004 pioneering the budget stay category with initial prime focus on Smart Basics. Over the years Ginger expanded geographically and evolved with incremental changes and additional service offerings. However, with rapidly changing industry dynamics and customer preferences, there was a dire need to completely reposition and rebrand Ginger's value proposition from being perceived as budget stay. Keeping the aspirational traveller in mind, Ginger re-imagined the budget accommodation segment to lean luxe providing an extraordinary guest experience at an affordable price targeted towards millennial mindset. The brand evolved from a room-centric model to an aspirational lifestyle.

Nearly 15 years later, keeping the aspirational young traveller in mind Ginger re-imagined the budget accommodation segment to lean luxe. From being a room-centric model to an aspirational lifestyle approach model, first-of-its-kind in India.

The Re-imagined Ginger is strategically positioned to appeal to the mindset of millennials who are interested in experiences over merely purchasing products and services and is anchored in the idea of seamlessness, facilitating the 'never stop' lifestyle of millennials. The innovation had facets around all three realms – product, brand and services.

The Lean Luxe design not only helped expand margins and penetrate markets for existing hotels, but it also helped the team sell and market the brand to new owners and investors which allowed us to grow our presence from ~50 hotels in portfolio in 2018 to 85+ today.

The Approach:

Completely changed the room design and the whole look-&-feel of interiors of the rooms and common areas of the hotels. Our approach brings together attractive public areas as well as spots designed for solitude, allowing the seamless transition from one to the other

Innovation in Brand:

Various aspects of brand rejig included a brand-new logo with vibrant colour schemes across communication channels, contemporary yet minimalist classy interiors.

Innovation in F&B:

Introduced the all-day dinner Café Et Cetera which offers a variety of Global and Local selections of comfort food and doubles up as a personal workstation. With the popularity it gained, we are currently in the process of rebranding the cafés to Qmin under our "Qminization of Ginger" strategy

Innovation in Services:

The lounge allows the switch between work and play seamlessly with elements like the foosball, a Guitar, gym or a library of books with egg-chairs for our guests to relax and unwind.

We realized that we were creating a "first" for the Indian market, as such design and experience led hotels in the economy segment did not exist at that time. The right design talent was therefore not available locally and we took a key decision to work with an international design firm

Another key challenge was this was the first-of-its-kind hotel in Lean-Luxe category in India. We had no precedents to benchmark Ginger with. This challenge was overcome by doing extensive market research, gathering insights from global marquee leaders (e.g. Moxy, Citizen M) in the segment of Lean-Luxe category of hotels.

In this VUCA world, another major challenge for us was to be agile and efficient to parallelly execute transformation of multiple Ginger hotels. We started off with a pilot of Ginger Goa and once that was successful, there was no looking back.

Benefits:

Metric	FY 2017/18	FY 2022/23	H1 FY 2023/24
Revenue (Rs. Cr)	183	363.67	202.49
EBITDA (Rs. Cr)	16	136.74	70.21
EBITDA Margin	9%	38%	35%
ARR (Rs./night)	~2000	3,100	2,981
TripAdvisor Ratings		94.63	95.28

The Future:

Financial Performance: Revenue expected to grow to 700 Cr by FY 2024-25 indicating a growth of 275%+ over FY 2017-18, EBITDA expected to grow to 250 Cr by FY 2024-25 indicating a growth of 1450% over FY 2017-18.

Drive same store growth through continuous product upgradation and lean luxe conversions which will result in enhancement of market share, higher rate premiums and thereby improved revenues. In addition, significant growth in the brand through new hotel openings will further enable business growth. Focus on operational excellence and profitability will ensure high margins for Ginger as a business.

TMS Technov M Systems Private Limited

About the Company:

TMS TECHNOV M SYSTEMS (P) LIMITED, Incorporated in 2007, is professionally managed, with its core objectives to innovate, commercialise technologies, and institutionalise the innovation.

We have focused our endeavours to sustain and to innovate, patent and manufacture affordable technologies, yielding quick payback, to mitigate greenhouse gas emissions, strategically managing the input costs and social costs, of manufacturing.

Our technology specific solutions save Hydrocarbons, by improving combustion efficiency of the plant utilities, reducing emissions, flavoured with customised software. We are currently working on our APP to determine and to analyse, the real time utility value for industrial and domestic users.

Our journey includes saving 6 Lacs tons of Carbon-di-oxide and generating awareness amongst our clients about significance of saving the environment. Having established our domestic model, we are in the process of replicating our model, in other countries in Europe, in Vietnam, & Japan.

The Innovation:

Philosophy of the innovation -Improving the efficiency of burn of Liquid and gaseous fuels such as HFO, LPG, Propane, NG, HSD etc. Improving combustion efficiency results to reducing the emissions of Carbon di oxide.

Value proposition: Providing affordable, easy to install, non-consumable, non-recurring cost driver, non-invasive, combustion improvement system for utilities such as Gas turbines, Boilers, Ovens and Furnaces fired by Gaseous and Liquid hydro carbon fuel,

Technology:

Improvisation of combustion process of the utilities forms the basis of the application of generic technology-Application of magnetic resonance for dynamic polarization of hydrocarbon fuel that will readily react with air, therefore, for same mass flow we have increased reaction rate.

The choice of both magnetic materials is patented 1. Neodymium ferrous alloys having high coercive strength and 2. strontium ferrite.

Polarization of fuel using Magnetic resonance is akin to excitation of fluid clusters from the loosely bonded intermolecular forces- (Van der Waals) that will improve the specific area of contact between the AIR and FUEL during combustion. Improved combustion efficiency improves specific fuel consumption and decreases the emissions.

Genesis of the Patented technology & Engineering: Computational fluid dynamic algorithm in conjunction with RF engineering using special rare earth metallurgy and strontium Ferrite, are used to polarize the fuel, improving the rate of combustion.

Numerous field experiments were undertaken in manufacturing plants to correlate the effect of Magnetic resonance and its correlation with flow velocity of Hydrocarbon fuels in the fuel conduits, An empirical algorithm was formulated by training data of Computed fluid dynamics inside conduit, correlated with determined configuration of Magnetic Resonators and the improvement

in utility efficiency. Mass customization was achieved by using the standard units of Magnetic resonators and number of units were varied to suit the requirements of Gas turbines, Boilers and Furnaces of varying capacities.

The Approach:

Savinginputcostsalongwithreductioninemissions is need of manufacturing sector. Hydrocarbon is major cost driver of manufacturing. Innovation is pivioted on improving combustion efficiency of utilities. Combustion efficiency improvement is the common platform, branched under different manufacturing sectors. Documentation, and reliability are key parameters, industry driven field test is set as norm.

The dominant factors are business driven research, documentation and peer reviewed publishing of performance of technology, pay back, replication to other similar systems, and improving client's learning curve. Build up and break thro strategy and referential campaign are used to scale up market in other countries.

Benefits:

Benefit is the brand determinant of innovation since it is published in the annual report and published technical journals after comprehensive audit.

Rigorous procedure is adopted by manufacturing companies recording production data. Manual or automatic recording process is adopted, and key performance parameter is the Specific energy consumption.

Example: CII National Award for Excellence in Energy Management-2023 – Hero MotoCorp Ltd. - Vadodara

Innovative Project: Energy Efficiency Improvement by Magnetic Resonators Installation in Paint Shop Oven gas burner for Natural Gas Consumption Reduction

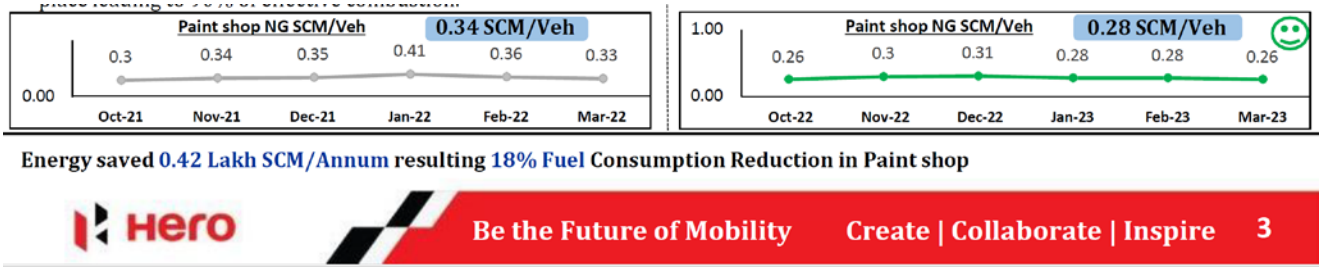
Investment: Rs.3 Lakhs

Benefits:

Energy Saving – 0.42 Lakhs SCM / Annum

Cost Saving – Rs.10.19 Lakhs / Annum

CO2 Reduction – 94 Tons / Annum



**Report fetched from CII Website

https://energy.greenbusinesscentre.com/energyawards/enepresent23/auto/Hero%20Moto,Vadodara.pdf

The Future:

TMS is poised to achieve its future business objectives thro exports. Institutionalizing technology has been our forte being achieved by publishing in peer reviewed papers in tech meets and journals.

Soon, TMS is focusing on new segment, which is providing solution for glass manufacturers, since it is highly energy intensive.

Manufacturing companies in India have global presence, we have started getting enquiries from Europe, Japan and others asking for offers. Our focus for the future involves replicating our established business paradigm in our exports to build a globally sustainable ecosystem.

Uno Minda Limited

About the company

Uno Minda Limited (formerly Minda Industries Limited) is a leading global supplier of proprietary automotive solutions and systems to OEMs as Tier-1. Incepted in 1958, It is one of the leading manufacturers of automotive switching systems, automotive lighting systems, automotive acoustics systems, automotive seating systems and alloy wheels in India. It manufactures and supplies over 20 categories of automotive components and systems to leading Indian and international OEMs based in India, Asia, South and North America and Europe. It has a leadership position in India in almost all the products it manufactures.

A humble beginning with a small manufacturing facility for an ammeter as its first product, the group has gradually transitioned into a global supplier with 73 plants across six continents. Over the years, the group has always considered technology and innovation to be its two strong pillars, on which it has continued to lead emerging trends in the automotive sector.

For over six decades, Uno Minda has relentlessly invested in R&D, engineering products epitomising efficiency, comfort, and precision. The company's triumph lies in its unwavering commitment to technology and innovation. With over 30 R&D and engineering centres, Uno Minda serves as a hub of creativity, crafting cutting-edge solutions that meet the emerging needs of the automotive industry. In 2017, a significant turning point arrived as Uno Minda unveiled its Centre for Research Engineering and Advanced Technologies (CREAT); adhering to its strategy of Personalization, Automation, Connected, and Electronic (PACE), the centre has ushered in a wave of unprecedented innovations. This wave brought forth an impressive tally of over 350 patents and design registrations, firmly establishing Uno Minda as a pioneer in the field.

Uno Minda understands that an organisation that embraces a responsible and sustainable way of working, while keeping up with rapidly changing technologies will thrive in the future. Their values imbibe this fundamental belief. Being responsive to their customers, innovating quality products that are more sustainable, implementing process improvements, and fostering a culture that is driven by respect and ethics are the values through which we conduct our business. Uno Minda is committed to serving its customers via technology so much that it is not only at the forefront of driving new innovations but is also driven by the tagline "Driving the New".

With underlying values of quality and customer supremacy, the group has not only nurtured quality as an attitude but is also committed to offering innovative and value-added solutions to their customers. The group also aims to continue working towards bringing innovative technologies and solutions that will drive the future, lead towards a green world, boost localization, and contribute its best towards "Atmanirbhar Bharat."

As the years progressed, Uno Minda expanded its global footprints, with manufacturing facilities stretching from Indonesia to Mexico and R&D centres strategically located in India, Germany, and Spain. The company formed vital JVs and entered into technical agreements with renowned manufacturers worldwide, embracing diversity and learning from different cultures and expertise. The journey into collaborations commenced early for Uno Minda, having

nurtured nearly 15 joint venture partnerships including leading technology partners from Japan, Germany, Korea, each a noteworthy achievement. Many of these partnerships have been flourishing for two-three decades, securing significant market share in India

The Innovation

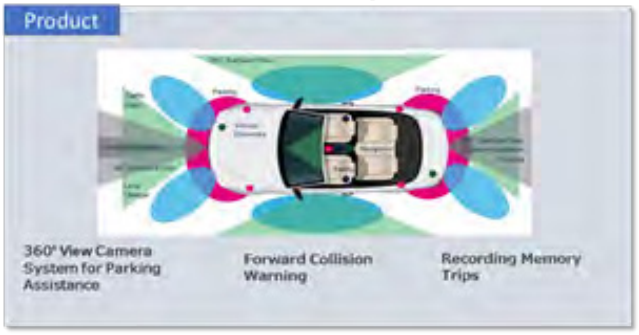
Automotive Camera

India faces a severe road safety crisis, with traffic accidents claiming numerous lives and causing countless injuries. The contributing factors are multifaceted, ranging from poor visibility and driver distractions to manoeuvring difficulties and collisions with pedestrians and other vehicles. Moreover, the lack of advanced safety features in some vehicles further exacerbates the situation.

Uno Minda's cutting-edge automotive camera innovation is a masterpiece of technological brilliance and safety ingenuity. Made in India, this camera harmoniously blends affordability with sophistication, offering a cost-effective advantage that transcends economic barriers. Beyond its economic value, the camera emerges as a guardian of safety. Its multifaceted capabilities span from a 360-degree surround-view system, simplifying complex maneuvers, to enabling affordable vehicle segments to embrace electronic mirrors, raising the standard for vehicular visibility. This versatile marvel prioritizes occupant safety with features like a driver monitoring system and also unfolds as a silent sentinel with park assist and moving object detection. This Innovation not only addresses the current needs of the automotive landscape but also casts a visionary shadow on the future. It stands as a testament to India's engineering prowess, a catalyst for global safety standards, and a glimpse into a connected, intelligent future where vehicles prioritize both affordability and advanced safety features. In the orchestra of automotive technology.

Uno Minda's camera stands out as a virtuoso, harmonizing innovation, affordability, and safety in a crescendo of driving excellence.

Surround View System



Driver Monitoring System

The Approach -

Uno Minda's automotive camera innovation is deeply rooted in indigenization. Understanding Indian Road dynamics and user needs, a camera that is affordable, sophisticated, and tailored for the Indian road environment. The company's indigenization strategy extends beyond economic considerations to encapsulate the very essence of safety on Indian roads. Commitment to evolving with the unique demands of Indian customers signifies a future where safety technologies are seamlessly integrated into the daily driving experience.

Benefits –

- Indigenization Advantage: Uno Minda's automotive camera solution is strategically designed with a focus on indigenization, ensuring that it is tailored to meet the specific needs and challenges of the Indian road environment.
    a) Cameras complying with Protection class IP 69K
    b) Operating temperate range -40 Degrees Celsius to +85 Degrees Celsius.

- Economic Accessibility: The indigenization approach aligns with affordability, making advanced safety features accessible across diverse economic segments of vehicles, a crucial factor in the Indian automotive landscape.
- 360-Degree Surround-View System: The camera's capability to provide a comprehensive 360-degree surround-view system addresses the complexity of Indian traffic, aiding drivers in navigating crowded city streets and diverse terrains.
- Enhanced Visibility: acknowledging the importance of clear sightlines amidst the varied mix of vehicles and pedestrians. The camera has an FOV of 190 degrees in a horizontal range and 135 degrees in a Vertical range.
- Future-Ready Adaptability: The indigenization approach positions Uno Minda to adapt and evolve with the evolving demands of Indian customers, making the solution future-ready in a rapidly changing automotive landscape

The Future-

- AI-Driven Safety Enhancements: The future may see the integration of artificial intelligence (AI) for more sophisticated safety features. Advanced algorithms could enhance output and response time from the camera's input
- Elevating Autonomous Driving: Collaborations with other industry players in the autonomous driving space is seeing camera becoming an integral part of the sensor suite for self-driving vehicles. This could contribute to the evolution of autonomous driving capabilities tailored for Indian roads. Playing a vital role in bringing ADAS Level 2 and above with sensor fusion of Radar, Lidar, Ultrasound sensor and Camera, equipping diverse segment vehicle with FCW, AEBS, LDW, DMS and Park assist.
- User-Centric Innovations: A greater emphasis on user-centric features, such as personalized safety settings and user interfaces. This could contribute to a more intuitive and user-friendly driving experience.
- Advanced Temperature Control: Smart seat features can provide advanced control capabilities, offering riders the ability to customize and fine-tune the seat temperature according to individual preferences. This could include smart, app-controlled features for personalized comfort.
- Integration with Smart Systems: The future may see integration with smart systems and IoT (Internet of Things) technology. Imagine a scenario where the seat adjusts its temperature automatically based on weather forecasts or the rider's body temperature, providing an anticipatory and proactive solution.
- Energy-Efficient Solutions: As sustainability gains prominence, exploration is underway for energy-efficient solutions for temperature control. This could involve leveraging renewable energy sources or optimizing power consumption to ensure eco-friendliness without compromising performance.
- Enhanced Gesture Controls: This could include a broader range of gestures for various functions, making the interaction between the rider and the bike more intuitive and seamless.
- Integration with Ride-Assist Technologies: The future may witness integration with ride-assist technologies, such as adaptive cruise control or collision avoidance systems. The temperature-controlled seats could play a role in enhancing overall rider comfort and safety, making it an integral part of the evolving landscape of smart and connected vehicles.

VE Commercial Vehicles Limited

VE COMMERCIAL VEHICLES
A VOLVO GROUP AND EICHER MOTORS JOINT VENTURE

About the company

VE Commercial Vehicles Limited (VECV), earlier known as Eicher Motors Limited (A 40+ years old company) is a leading manufacturer of commercial vehicles in India, established in 2008 as a joint venture between the Volvo Group and Eicher Motors Limited. With a strong focus on innovation and technology, VECV offers a comprehensive range of Eicher trucks and buses, Volvo buses, and exclusive distribution of Volvo trucks in India. The company also manufactures engines for Volvo Group and non-automotive applications and operates a component business. VECV's commitment to sustainable transportation has earned it numerous accolades, including recognition as a CV leader, good employer, and corporate citizen. With our extensive 8+ manufacturing facilities spread across India, robust dealership network of over 800+ outlets, and dedication to customer satisfaction, VECV is exporting to over 34 countries & continues its journey towards the aim of driving modernization in the commercial vehicle industry in India & the developing world.

The Innovation

VECV's commitment to innovation has led to significant benefits in product development, manufacturing, customer service, and employee engagement across all aspects of the company's operations.

At the heart of VECV's success lies its ability to consistently introduce groundbreaking products and services that address the evolving needs of its customers by organizing Customer clinics at various product maturity states & also collaborating with various bodies including industries, academic & research institutions. This customer-centric approach has resulted in a portfolio of technologically advanced commercial vehicles that are renowned for their best-in-class fuel efficiency, safety features, and environmental sustainability.

VECV's commitment to innovation extends beyond product development to encompass the entire value chain. The company has embraced Industry 4.0 principles, seamlessly integrating automation, robotics, and data analytics into its manufacturing processes, leading to significant improvements in productivity, quality control, and resource optimization, further enhancing VECV's competitive edge.

Sustainability is another cornerstone of VECV's innovation strategy. Recognizing the pressing need to reduce emissions and minimize the environmental impact of commercial transportation, the company has invested heavily in developing cleaner and more efficient power trains with conventional & alternate fuels. Our electric mobility initiatives, in particular, have positioned VECV at the forefront of sustainable transportation solutions.

VECV's innovation culture including, innovation portal, CFT & SPID (Supplier involvement in Product Development) approach, recognition of individual contribution, arranging required training & learning programs and empowering engagement approach from top management, not only boosts financial gains but also fosters employee engagement, motivation, and a positive work environment.

Some of the examples of innovations/patents filed by VECV:

1. Common chassis platform architecture for various vehicle variants in CNG/LNG/ Hydrogen/Diesel/EV.

2. 100% connected vehicles, AI-model based predictive maintenance, and faster online issue resolution support.

3. Unique virtual sensors: BS6 products introduced with less number of physical sensors, first in global industry.

4. 40% reduction in part variants: vehicle uptime increased by 25%.

5. 7-speed transmission, it has at least 4-5% more fuel efficiency.

The cumulative effect of VECV's innovation culture drives constant evolution and adaptation in the commercial vehicle industry, ensuring our position as a leader in sustainable mobility solutions and navigating the ever-changing transportation landscape.

The Approach

VECV's innovation approach majorly adheres to following steps:

1. Using standard ideation process to generate new ideas/solutions for a given problem:
    a. We have our own innovation portal.
    b. Submission of ideas into that portal (open for all).

2. Thoroughly analyzing the gaps/ needs put forth by a given problem/ challenge:
    a. Self-assessment of those ideas along with manager analyzing on how it will mitigate the challenges.
    b. Based on successful self-assessment, promoting that idea entry into submit state.
    c. Idea now gets registered in system and applicable for further assessment.

3. Assessing the benefits offered from each new idea:
    a. POC (proof of concept) is done.
    b. Short term & Long-term benefits to customers & organization are analyzed based on QDFC parameters.

4. Prioritizing those ideas based on their merit and relevance:
    a. Top entries having major impact are then monitored at Departmental & Steering committee.
    b. Development is done with CFT & SPID (Supplier involvement in Product Development) approach.
    c. Once development and trial get successful, it gets approved and eligible for production level development.

This ensures that VECV's innovation efforts are focused, effective, and aligned with the company's overarching goals.

Benefits

VECV's innovation culture has led to numerous benefits, including enhanced customer satisfaction(CSI India no.1) with all time high share in CV market, a competitive edge, improved productivity, reduced emissions, reduced manufacturing cost and increased profitability. As per our internal attitude survey, this culture has also attracted top talents, motivated employees, and fostered a spirit of creativity and problem-solving, enabling us to develop cutting-edge products and services that meet the evolving needs of our customers and society at large, further driving VECV's success as a leader in the commercial vehicle industry.

The Future

Driven by its innovation, technology, and sustainability focus, VECV is poised for a bright future. Continued innovation, Industry 5.0 adoption, a sustainability focus, a strong brand reputation, and a skilled workforce will shape VECV's success in full range CV market with electromobility & other alternate fuels. With the aim of 10x10Y growth (10 times in next 10 years), VECV is well-equipped to meet future challenges and opportunities, and will continue to lead in shaping the future of transportation.

Windcare India Private Limited

About the company

Windcare India Pvt Ltd, a pioneer in crane-less technology, "We won't speak ourselves, but our results speak to you," ushering in a wind of change. Founded by the visionary Mr. ANTONYRAJ.S in 1999, the organization stands as a testament to familial dedication and innovation. With an unrivalled technique, methodology, and technology, Windcare sets new industry benchmarks, excelling in projects and OEM comparisons. A dedicated architect of progress, we forge diverse pathways for the next generation, fostering innovation and sustainability.

Fearlessly tackling challenges, Achievements include a commitment to pollution-free carbon emissions, method studies for easy adoption, and seamless replacement of vital components, marking a silent yet impactful contribution to a cleaner, more ef□icient future. Having replaced over 8000 turbine components, developed tools from 250 kW to 2.8 MW turbines by our own crane-less technology.

Windcare's actions speak louder than words, deserving recognition for reshaping the wind industry's landscape.

The Innovation

The industry's unavoidable big challenge is wind turbine component exchange. major issues, very costly, availability of crane is very less, mobilization of the Heavy-Crane for exchange is more critical and takes too long. also it requires 300-800 heavy-cranes for the exchange of wind turbine components in this industry. By

addressing these critical factors Windcare □inds an innovation. Windcare's approach to analysis, study, testing, and trial before implementing sets a new standard for ef□icient, cost-effective, and universally applicable wind turbine maintenance. Following are the two novel innovations: the Soft-sling method for blade replacement and the Modular Structure method for rotor and gearbox replacement.

Blade & unbalanced blade replacement with Soft-sling concept:

The Soft-sling method represents a paradigm shift in the industry, revolutionizing the process of replacing faulty blades. By employing a belt system, electric winch, and pulley setup guided by ropes, Windcare has eliminated the need for heavy cranes, addressing the industry's critical cost and availability issues. This innovative approach, applicable to all blade types and accommodating weights from 8 to 28 tons, has earned global approval and patent recognition. The Soft-sling method, at the core of crane-less technology, is not only transformative but also versatile, with applications spanning tower heights from 32 to 140 meters.

Rotor & Gearbox replacement with Modular structure method:

Windcare's second major innovation, the Modular Structure method, targets the challenges associated with rotor and gearbox replacement. This novel solution features a movable-arm structure, eliminating the need to remove the nacelle during replacement. By allowing the separate extraction of the gearbox, Windcare has

signi□icantly reduced both time and costs associated with these hefty component replacements. The introduction of the "one

tool for all turbine" crane further demonstrates Windcare's commitment to universal solutions. This versatile crane, with a standardized base and minor adjustments for various turbine con□igurations, ensures safe and high-quality maintenance for diverse designs.

The Approach

Through an in-depth RAMS (Reliability, Availability, Maintainability, and Safety) analysis of existing technology in the market, we identi□ied signi□icant shortcomings, particularly in terms of cost, time, logistics, maintenance and environmental limitations also for the requirement of workspace, associated with heavy-duty cranes. Addressing these gaps, we developed an innovative, easy-handling, and cost-effective solution, comprising portable structures with lifting accessories.

Windcare's innovative strategy enhances wind turbine component replacement, leveraging tool upgrades for weight reduction, ensuring ease of handling. A sharp focus on minimizing operation time slashes turbine generation downtime.

Benefits

Windcare's crane-less technology is a revolutionary force in wind sector component replacement, delivering transformative results. we can accommodate for the feasibility of all terrains like hill station and a con□ined space with our crane-less technology. Experience a paradigm shift with our crane-less technology, slashing execution time from 20 to 15 days. With only 2 trucks and 2200 litres of fuel, carbon emissions plummet by 94%, reducing the carbon footprint to 2.68 kgs/km. Bene□it from a 92% cut in logistic costs, 80% increased accessibility, and a 75% reduction in execution costs, all while minimizing downtime by 25%. Our technology is easily accessible "Anywhere anytime".

The future

We are strategically positioned to execute wind turbine component replacements for 3MW-6MW gearless wind turbines. Our focus extends to pioneering offshore wind turbine component replacements. Concurrently, we are advancing global adoption of our crane-less technology for enhanced accessibility. Incorporating automation mitigates risks to human life, pioneering step towards ef□iciency and safety in the industry.

III

Category Awards Winners

TOP INNOVATIVE COMPANY 2023- GRAND AWARD

TATA Chemicals Limited

About the company

A part of the US$ 128 billion Tata Group, Tata Chemicals Limited, is a leading supplier of choice to glass, detergent, industrial and chemical sectors. The company has a strong position in the crop protection business through its subsidiary company Rallis India Ltd. Tata Chemicals has world-class R&D facilities in Pune and Bangalore.

High Dispersible Silica:

Tata Chemicals' Specialty Silica products reflect our leadership in technology and innovation. We have innovated a novel method of synthesis and customisation of structure, morphology, particle size, surface area and particle porosity, which gives our silica greater advantage in industrial applications. Our products come with the assurance of consistent quality along with quick and assured supply.

The prebiotics and dietary fiber: FOSSENCE®

Fructo Oligosaccharide

FOSSENCE® is a 100% soluble, potent prebiotic and dietary fiber made from fermented cane sugar, clinically studied, for its impact on the gut microbiome. Healthy microbiome is known to improve immunity, nutrient absorption, lipid transport and overall digestive and bowel health.

Admixture for Precast Concrete

Our pre-cast cement admixture performs better than the standard cement in terms of high early strength (40% more day one strength), rapid hardening, high density and whiteness.

Aeroponics and Hydroponics for High Value Extracts

A sustainable process of growing plants in an air without the use of soil, reduces the water usage is leveraged to grow high value medicinal plants to increase the efficacy of bioactive compounds to address health and wellness areas has been implemented.

Tata Chemicals has developed the Biobased Surfactant which is a Replacement of dominant petroleum-based surfactant. Part of it's sustainability objectives Tata Chemicals has established UK's 1st Industrial scale Carbon Capture and utilization plant (liquid CO2) to manufacture Food and Pharma Bicarbonate to be exported to 80 countries worldwide. Tata Chemicals shall continue to develop sustainable technologies based on the principles of green chemistry.

TOP INNOVATIVE COMPANY- MANUFACTURING (LARGE)

TATA Chemicals Limited

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TOP INNOVATIVE COMPANY- MANUFACTURING (MSME)

NeuroEquilibrium Diagnostic Systems Private Limited

About the company:

NeuroEquilibrium is a Deep-Tech Remote Diagnosis Platform for super-specialty healthcare. NeuroEquilibrium is the world's largest chain of clinics for Vertigo, Dizziness, and Balance disorders, with over 170 clinics in 7 countries and 54 cities in India. The super-specialty Dizziness clinics are based on patented proprietary technology developed in-house.

The Innovation

NeuroEquilibrium has developed a proprietary deep-tech remote diagnosis platform for super-specialty healthcare that integrates cloud technology, a clinical decision support system, a digital history-taking module, virtual reality & augmented reality, wearable devices, electroceuticals, AI, and computer vision. All these technologies have been developed in-house. The company has applied for eight patents, of which six patents have already been granted. We are doing cutting-edge research, collaborating with leading institutes worldwide, including Johns Hopkins, Harvard Medical School, Maastricht University Netherlands, and jointly publishing in top-rated international journals, including Frontiers in Neurology, European Journal of Neurology, etc. We have also developed the world's first digital twin for the disease BPPV.

The Approach

NeuroEquilibrium has set up super-specialty clinics with an asset-light, Clinic-in-Hospital revenue share business model leveraging its remote-diagnostic cloud platform and proprietary diagnostic lab. NeuroEquilibrium has clinics in top hospitals, including Apollo, Fortis, Max, Medanta, Manipal Hospitals, NH Hospital, Wockhardt Hospital, etc, and installations in prestigious government institutes like AIIMS Delhi, AIIMS Raipur, AIIMS Bhopal, AIIMS Kalyani, AIIMS Mangalgiri, RML hospital, AFMC Pune, etc.

Benefits

With innovative technology and the remote diagnostic platform, NeuroEquilibrium is able to differentially diagnose over 40 diseases of the ear & brain that cause Vertigo, Dizziness, and Balance disorders and thus provide permanent cure to chronic patients.

The Future

NeuroEquilibrium plans to expand to 500 clinics in India and 1000 clinics globally to treat a million patients by 2025

TOP INNOVATIVE COMPANY-SERVICES (LARGE)

TATA Consulting Engineers Limited

TATA CONSULTING ENGINEERS

About the Company

Tata Consulting Engineers Limited (TCE) is India's largest private-sector engineering and project consultancy and is an emerging global leader in providing integrated engineering solutions. TCE has a presence in more than 60 countries and has completed over 11,000 projects.

The Company operates in three industry segments: Infrastructure (including Water, Wastewater & Sewage, Buildings & Facilities, Environment & Sustainable Infrastructure, Industrial & Manufacturing Facilities, Master Planning & Urban Development, Digital & Modelling, Ports & Harbours and Transportation), Resources (including Hydrocarbons and Chemicals, and Mining and Metallurgy), and Power (including Nuclear, Green Power (Solar, Wind, Hydro), Thermal and Transmission & Distribution).

TCE offers Design & Engineering, Sustainability Solutions, Digital & Advanced Technology and Project Management across all three industry verticals. The Company serves domestic and international markets and is known for several first-of-its-kind projects. TCE is a 100% subsidiary of Tata Sons Limited, part of Tata Group - India's most respected group.

The Innovation

As engineering consultants, our organisation is highly solution-oriented. We possess the ability to work on multiple alternate solutions. Planning, forecasting, and course correction are our standard ways of working. Regular reviews are conducted at every level, including top leadership, to help us remain focused and plan accordingly.

In the engineering services industry, we provide optimised designs that the customer did not originally envision. Based on first principles, our innovative solutions simplify the problem, reduce costs, improve quality and timelines, and comply with applicable statutory requirements and national and international standard design codes.

Each solution is unique to the given engineering problem for a specific project. Modern third-party and in-house developed tools for advanced analytics, intelligent modelling, use of 3D platforms, and several simulation programs are required and utilised.

Apart from cost savings (OPEX, CAPEX, Life Cycle Costs), our value addition portal tracks the following value addition metrics – Environment, Constructability, Operability, Maintainability, Space Utilization, Safety, Reliability, Productivity, Improved Design features, Elimination constraints, better product utilisation, and work process simplification.

Most of our innovations are unique to the customer and designed to solve specific issues. Hence, these innovations are novel, with no competition or existing solutions. These indigenous solutions have been built at a fraction of the cost and have eased production as the raw materials and parts used are locally available.

Ideas and best practices are collated across the various segments of work processes and evaluated for further detailing based on their relevance with respect to general industry-agnostic innovation, process or working methods

innovation, sales or commercial innovation, repeatability, IP, patentability, and market relevance. Learning and reusable practices and processes termed project innovations from the executed projects are collated as potential ideas and innovations for further development.

The Approach

Projects are delivered by teams of functional experts, with industry experts and consultants often providing specialised inputs. The learnings and reusable practices, processes, and project innovations from the executed projects are collected as potential ideas and innovations for further development using the TCE innovation framework.

To promote a culture of value addition, the organisation encourages knowledge sharing and exchange of key project-related information through a central repository of lessons learned, regular in-house forums and competitions, and several internal platforms. Additionally, a mentoring framework is in place for employees to cross-learn at all levels.

Benefits

Our company aims to provide value-added differentiated services and innovative solutions in order to become a market leader and stay ahead of the competition. We believe in investing in the development of our people and providing them with opportunities to grow. We offer unique and interesting opportunities for engineers to work with cutting-edge technologies in fields such as defence, space, infrastructure, and plant engineering.

By implementing novel solutions, we promote the development of indigenous technologies and help our nation achieve self-reliance. Our goal is to promote growth and deliver end-to-end services that optimise customer satisfaction through innovative solutions.

The Future

The organisation's innovative mindset plays a crucial role in introducing new ideas to its services and processes, leading to higher market share, revenue, and customer satisfaction. We strive to improve the organisation's overall ability by leveraging an innovation-focused mindset and framework.

Windcare India Private Limited

About the company

Windcare India Pvt Ltd, a pioneer in crane-less technology, "We won't speak ourselves, but our results speak to you," ushering in a wind of change. Founded by the visionary Mr. ANTONYRAJ.S in 1999, the organization stands as a testament to familial dedication and innovation. With an unrivalled technique, methodology, and technology, Windcare sets new industry benchmarks, excelling in projects and OEM comparisons. A dedicated architect of progress, we forge diverse pathways for the next generation, fostering innovation and sustainability.

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The Innovation

The industry's unavoidable big challenge is wind turbine component exchange. major issues, very costly, availability of crane is very less, mobilization of the Heavy-Crane for exchange is more critical and takes too long. also it requires 300-800 heavy-cranes for the exchange of wind turbine components in this industry. By

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The Future

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IV

Top 5 Innovative Research Institutions 2023

Chitkara University, Punjab

About the Institution

Chitkara University is a state-private university accredited at grade "A+" by NAAC - UGC. Its Management, Engineering, Pharmacy and Architecture programs have consistently been ranked amongst top 100 of the county by National institute Ranking Framework (NIRF) of MoE. The University is well known for education based on values and ethics, its dynamic National and International collaborations, its entrepreneurial spirit, its beautiful – clean - green infrastructure, and illustrious alumni.

The University has established itself as a multidisciplinary campus and is a pioneer in establishing the first business incubator of the region. In less than a decade, it has mentored more than 200 startups has adopted an IP policy, enabling more than 3000 innovators filing 2500 patents. The University has 100+ collaborations across the globe and has bagged funded projects worth multimillion dollars. Its research is world class and has been recognised by international ranking agencies QS and Times Higher Education.

The Innovation

The University has taken very innovative approach to manage innovation eco system. It has been the front runner and leader in the region in launching it first 'Easy Patent Policy' and issuing - adopting start-up policy in 2015. It also established an incubator and nurtured early-stage start-ups as early as 2007. These initiatives let the university establish itself as a pioneer and it soon became a beacon and icon for innovation and entrepreneurship. Realising the huge industry academia gap, many CoE's and Research labs were established in forthcoming years, so that industry – oriented research can be carried out. At the same time, CURIN (Chitkara University Research and Innovation Network) was established with five offices - namely, Office of Research publications, Technology Enabling Centre, Central Instrumentation Facility, Office of PhD Programs and Technology Business Incubator – all these, when there were very few such initiatives across the country – especially in private education providers. The focus always remained on applied research. The University announced a very proactive incentive policy to promote research and innovation. Young researchers were provided seed money for starting their research and advanced ones were given scale up grants. Complete Patent filing fee was borne by the University, while 90% commercial rights rested with the innovators. Similarly, see money was given to students and faculty alike for starting their start-ups. There were no strings attached to the whole process. The start-up policy had the provision for given a semester off to students and up to three months sabbatical to faculty members. All the above provisions continue to this date and give continued and renewed thrust to the research and innovation eco system.

The Approach

The approach to building an unparalleled eco system was based on three pillars – 1) recognise the true potential of the team within; 2) be the first one to initiate; 3) be liberal in incentivising those who perform. Policies framed should be flexible enough to recognise all kinds of performers and they should be sustainable in long run. One of many initiatives under the policy was to carve out two tracks for faculty members – research and academic, wherein a faculty member focuses on one at a time, performing to his/her/their fullest

capacity, rather than being overburdened by too many areas to perform.

Benefits

The strategic planning has resulted in more than 3200 patents filed, 1712 published and 676 granted. There have been 126 technologies / products developed 71 technology transfers, 219 start- ups incubated. The start-ups have together raised 1.07 Cr. funds so far. 21 COE's and Research Labs have been established in collaboration with research institutes, industries and other HEIs. The research eco system is benefitting more than 100 researchers and more than 5000 students as direct beneficiaries.

The Future

In future, the University would focus on commercialising more technologies and impact the society in more sustainable way(s). The benefits of research eco system would now be also extended to other education institutes in the region, to benefit more young researchers, innovators and entrepreneurs.

Defence Research & Development Establishment (DRDE), DRDO, Ministry of Defence, Gwalior

About the Institution

Defence Research & Development Establishment (DRDE), Gwalior, a premier lab under Defence Research & Development Organization (DRDO), Ministry of Defence and the only laboratory in India working on the various aspects of Chem-Bio threat mitigation technologies for more than 30 years which involved in path breaking research and product development activities in the area of detection, protection and decontamination of Chemical and Biological Agents. DRDE, Gwalior is also involved in various national emergency situation for detection, testing, validation of chem-bio agents.

The Innovation

a. NBC Suit Permeable Mk-V: New generation of Nuclear, Biological and Chemical (NBC) protective permeable suit Mk-V has been indigenously developed by DRDE, Gwalior. The NBC permeable suit is based on state-of-the-art technology of activated spherical carbon spheres (ACS) sandwiched between the fabric layers. The outer layer of the suit is aramid-based multifunctional fabric having flame retardancy, water and oil repellency properties. The design of suit is confected under strict quality control in a single coverall pattern and same was tested as DSTL, UK and TNO, The Netherlands. The developed suit is light weight having less than 2.75 Kg (XL size). It has been found that DRDE developed NBC Suit Permeable Mk-V, is at par to the internationally available suit.

b. Air Cleaning Filters for Industrial Gases: Air cleaning filters were developed and bulk produced removing the contaminated air in range of naval platforms. The contaminants/pollutants are produced from human activity, machinery and materials etc. Total 14 types of filters were indigenously developed which comprise of filter bodies and filter cartridges. The role of DRDE, Gwalior was to develop impregnated activated carbon and impregnated silica gel (adsorbent material) that can remove nearly 26 toxic industrial gases including radioactive Iodine.

Advanced Bio-protective facemask

DRDE, Gwalior towards preparedness against Chemical and Biological agents has developed a poly amide nano web-based filter media in collaboration with Indian industries for respiratory protection through development of advance face mask much before COVID 19. This unique nanoweb filter media is first of its kind made in India and has got more than 99.00 % Particulate filtration efficiency (PFE) which is equivalent to N-99 face mask material in terms of the filtration efficiency. These developed masks are flat & fold type, cost effective, light weight.

The Approach

To develop state of the art technologies and products for NBC defence, involves a systematic and multifaceted approach due to the critical and life saving nature of the products. For the development, there was a clear-cut objective and requirements, thorough research and analysis, risk assessment, technology conceptualization, interactive development and testing, and continuous improvement. This was attributed by interdisciplinary collaboration among scientists, engineers, researchers, and policymakers. It also involves staying up-to-date with emerging technologies and scientific advancements to continually improve the effectiveness of NBC products. DRDE also collaborate with Indian industries and academia on need basis for

finalization of product specification and minimize the time.

Benefits

All the indigenous developed products are bulk produced and supplied to Tri-Services, paramilitary forces and civil population. The technological knowhow of DRDE developed products are also transferred to large number of Indian industries. This indigenous development saved lot of foreign exchange to the exchequer and provided job opportunities to our people. The developing countries are looking for India developed products as it is cost effective and quality is at par to the internationally available products which justifies the huge export potential of indigenously developed products. During pandemic, we educated industries for the development of facemask which provided business opportunities under the umbrella of "Aatmanirbhar Bharat".

The Future

As per Ministry of Defence, GoI policies, we have plan for 2047 to celebrate 100 years of independence along with technology roadmap based on the user requirement and futuristic technological improvements in terms of material innovation, design, functionalities and artificial intelligence-based NBC defence technologies for the betterment of our nation.

IIT Roorkee

About the Institution

Indian Institute of Technology - Roorkee is among the foremost institutes of national importance in higher technological education and in Engineering, Basic and Applied Science Research. Institute also has 23 dedicated departments and 9 academic centers catering to high quality research and education in management, architecture and planning and, humanities and social sciences. Since its establishment, the Institute has played a vital role in providing the technical manpower and know-how to the country and in pursuit of research. The Institute ranks amongst the best technological institutions in the world and has contributed to the development of all technological domains. IIT Roorkee has completed 176 glorious years since its foundation in 1847. The institute has a strong innovation and incubation system consisting of IPR Cell, Technology Innovation Hub, Technology Incubation and Entrepreneurship Development Society to translate the outcomes of research into products and technologies useful to society. Institute provides research and consultancy services to industries and provides educational training to working professionals through its E-learning and continuing education centers.

1. **A water-soluble acrylic–styrene co-resin formulation, its method of synthesis and repulpability properties:**

The present invention aims to provide the method of synthesis of water-soluble acrylic-styrene copolymer resin for the development of coating on paper and paper board. In addition, It provides the water-soluble and recyclable resin for paper and paper boards coating applications in order to improve the recyclability and repulpability. The formulation and development of water-soluble and barrier resistant resin coating promote environmental sustainability and cost-effective solution.

Benefits

Disposable cups comprise 90-95% paper with an approx 5% thin coating of polyethylene. Very few disposed plastics get recycled and consequently, they are littering our landscape, waterways, and oceans, compromising the health of humans and animals etc. In many countries, including India, there is a movement to ban such “Single Use Plastics” items. The law has been formalized and implemented. This present development of water-soluble coating will contribute significantly towards a Clean India and Make in India concept and will be the game-changer. This technology will be the milestone for reducing solid municipal waste and converting disposable paper and paperboard materials into recyclable, which is currently very challenging.

The Future

This technology would promote the recyclability of disposable items and will provide market potential for repulpability of paper stocks. Present innovation will also support government initiatives like Atmanirbhar Bharat, Swatch Bharat and the Waste to Wealth concept. This technology will also reduce the carbon footprint and will be environmentally friendly, and promote a better world for tomorrow. The present technology not only resolves environmental issues but also solves the recycling problems of disposable paper product waste into value-added products.

2. **A water based ink formulation for rotogravure printing ink medium and pigmented ink:**

The present invention relates to water based ink

formulation for rotogravure printing ink medium and pigmented ink. The invention provides printing solution that was very cost-effective, environmentally friendly, and sustainable. The present water-based solution to address the issue of lowering carbon footprint and VOCs to promote green solutions, which will serve as the standard for green manufacturing systems in printing applications and lead to an environment-friendly solution and a sustainable society.

Benefits

The cost of printing one kg of polyethylene terephthalate film with water-based ink was reduced by 1.85US$, and volatile organic compounds emissions were reduced from 3373 ppm to 2478 ppm compared to solvent-based ink. The use of water-based ink also reduced the carbon footprint by 3.04 kg. The current study shows that strict implementation of water-based ink has a high potential for saving the cost and reducing the emission of volatile organic compounds, which are very dangerous to the ambient environment, humans, and society.

Followings are the conclusive benefits of using water based inks:

- A better-smelling and safer workplace
- Use of low-flashpoint inks and chemicals reduces fire risk
- No compliance or reporting costs when VOC emission becomes regulated
- Shorter make-ready times and therefore less paper waste because ink/water balance can be achieved quicker with more stable vegetable-oil inks.
- Quality and consistency improvements, happier customers.

The Future

Outcomes of this technology will be impacting the new trends for ink manufacturer, rotogravure cylinder manufacturer and converters of flexible packaging. Present developed technology will be also emphasized on environmental conditions, hazard free packaging solution for end consumer, improved work condition as well as easy machine operating process. By this innovation, industries can kick start a completely new segment of business opportunity and growth. This technology will promote 'Make in India' concept and lot of profit (atleast 30%) draining to outside country can be reduced.

3. E3Biocleantech Private Limited:

E3Biocleantech Private Limited is revolutionizing wastewater treatment domain by offering ecofriendly and affordable technology. The startup is harnessing potential of microalgae and plants and utilizes its patented (published; Application no. 202011028602, Dated Oct 10, 2021, Indian Office) photobioreactor and constructed wetland bed for treatment of various wastewater including sewage and industrial effluent. By developing the innovative nature-based ecologically engineered technology the startup not only offering a lucrative way to obtain clean water, sanitation and public health but also turning the post-treatment algal biomass into sustainable products, viz., biodiesel, biofertilizer and foliar spray. Pilot-scale demonstration of 50 liters per day capacity has already been provided to a MSME in Uttarakhand. Further, start-up is focusing establishing full-scale commercial plant of 50 KLD capacity.

The Approach

Microalgae and Plants are key component for wastewater treatment. The start-up has scientifically developed a robust microalgal polyculture by isolating microalgae strains from different environmental habitats. The developed microalgal polyculture is grown in the in-house designed photobioreactor (Patent published). After successful growth of microalgal cells, the wastewater is fed into the photobioreactor. At this first stage of treatment, the microalgal cells removes nutrients such as nitrogen and phosphorous from wastewater, reduces BOD (Biochemical Oxygen Demand) and COD (Chemical Oxygen Demand) load and removes pathogen to some extent. Further, the partially treated water flows into constructed wetland planted with selected macrophytes. The second stage removes the remaining nutrient, pollutant and pathogen load and provides a clean water which can be utilized for irrigation,

horticulture, and other recreational purposes. The photobioreactor is equipped with an algal biomass harvesting tool which continuously scarps out excessive microalgal biomass.

Benefits

Scientifically developed and sophistically designed photobioreactor and constructed wetlands can be adopted well by municipalities, societies, and industries for sewage and effluent treatment. The innovative nature-based technology provides way to industrialist not only for wastewater treatment but also to follow the Government and Pollution Control Board regulations without putting financial burden on their main business stream. Another benefit is zero sludge generation and opportunity to generate additional revenue by converting the post-treatment algal biomass into value-added sustainable products. Zero operational cost, low maintenance cost, synergistic development of green belt in the industry / society premises while treating the effluent are added advantages.

The Future

It is estimated that India will exhibit a 50% water deficit by 2030. Moreover, to date across the nation, the installed treatment capacity is 44% of the total sewage generation and only 28% gets treated. Thus, the affordable technology holds potential to paly a pivotal role in bridging the gap between wastewater generation and treatment capacity. Further, the utilization of the obtained algal biomass for biodiesel production can cut down the overall production cost and can strengthen the nation's energy security. In addition, by adopting the green technologies for wastewater treatment, the users can earn green credits and carbon credits that would undoubtedly enhance their business value.

Kumaraguru College of Technology

About the Institution

Kumaraguru College of Technology Kumaraguru College of Technology (KCT), Coimbatore is a private Engineering College started in 1984 under the auspices of Ramanandha Adigalar Foundation, a charitable educational trust of Sakthi Group. Situated in a sprawling 156-acre campus in the IT corridor of Coimbatore, KCT is an autonomous institution affiliated to the Anna University, Chennai and approved by All India Council for Technical Education (AICTE). Commemorating 40 years of educational excellence, KCT has been accredited by National Assessment and Accreditation Council (NAAC) with Grade 'A++' of CGPA 3.62 on a 4 - point scale. 13 UG programmes and 3 PG programmes have been accredited by National Board of Accreditation (NBA) under Tier -I. Kumaraguru has been rated as " Platinum Grade" by Indian Green Building Council, New Delhi.

The able guidance and patronage of Arutselvar Dr. N. Mahalingam, Founder, Sakthi Group along with the efficient administration of Dr. B. K. Krishnaraj Vanavarayar, Chairman, the resourcefulness of Sri. M. Balasubramaniam, Correspondent and the foresightedness of Sri. Shankar Vanavarayar, Joint Correspondent have equipped the College with excellent facilities - spacious classrooms, excellent seminar halls, well-equipped laboratories, sporting amenities, dedicated high-speed internet connectivity (broadband) and well-qualified faculty.

CASTING UNBURNT, AMBIENT CURED, SUSTAINABLE RED MUD BRICKS

The innovation

Sustainable red mud bricks (SRMB) are made exclusively from industrial waste by- products such as red mud (RM) from alumina refineries, quarry derived sludge (QDS) from local quarries, ground granulated blast furnace slag (GGBS) from steel industry, and quarry dust (QD). The SRMB is made with no soil, no cement, no sintering, and no water curing. Topsoil cover, a depleting natural resource is preserved by using industrial by-products to produce the bricks. SRMB is an eco-friendly product cast by encapsulating the industrial by-products into a useful building material. SRMB is a completely dust free product with sharp edges and corners, with an appealing appearance and deep red in colour.

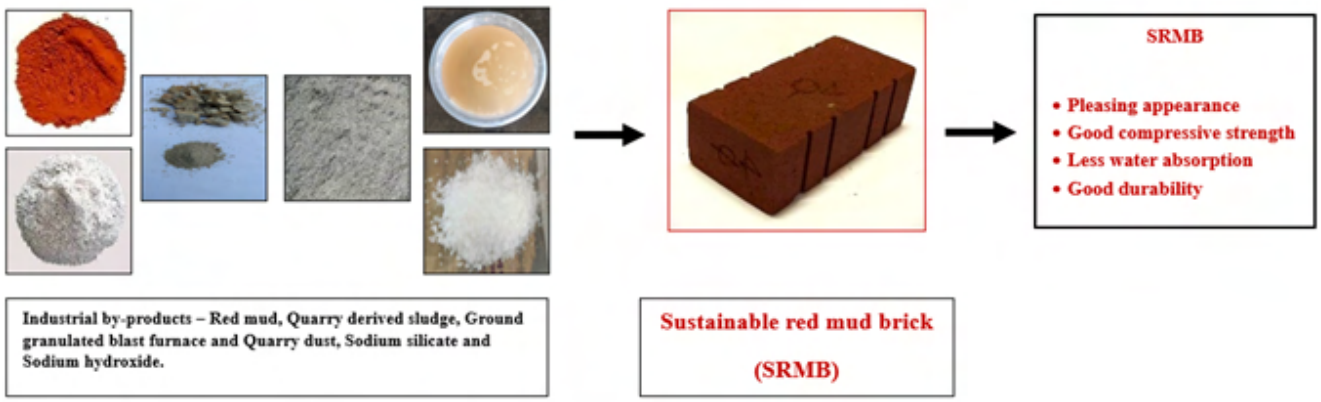

Figure 1. Sustainable red mud brick-The innovation

Figure 2. Sustainable red mud brick (228 mm x 108 mm x 80 mm)

The approach

- The ingredients such as RM, QDS, GGBS and QD along alkali-activated solution (sodium silicate and sodium hydroxide) were proportioned for an optimized mix ratio by design mix proportion using an analytical software.
- The ingredients are mixed with in the alkali activated solution to produce the reactive precursors needed for geopolymerization.
- Using a pan mixer, all the ingredients are mixed thoroughly and transported through a conveyer belt. From the conveyer belt, a hydraulic press is used to compress the mixture inside a mould, allowing the brick to be cast and removed. These bricks are cured for 24 hours at room temperature, and they are ready for use on the third day.

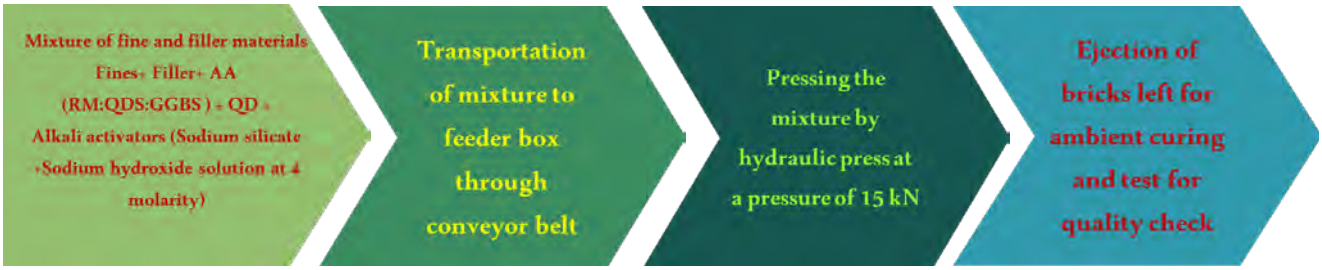

Figure 3. The approach

Benefits

- The industrial by-products are transformed into a useful eco-friendly green product.
- SRMB is produced exclusively using industrial by-products.
- SRMB saves the very valuable natural resource, “The Soil”.
- SRMB is an ambient cured product, utilizes the natural energy for curing thus, saving the energy bills, and reducing carbon footprint.
- SRMB has sharp edges with pleasing appearance suitable for a quick and compact construction.
- In total, SRMB is a value-added product in the Civil Engineering construction field.

Figure. 4. The benefits

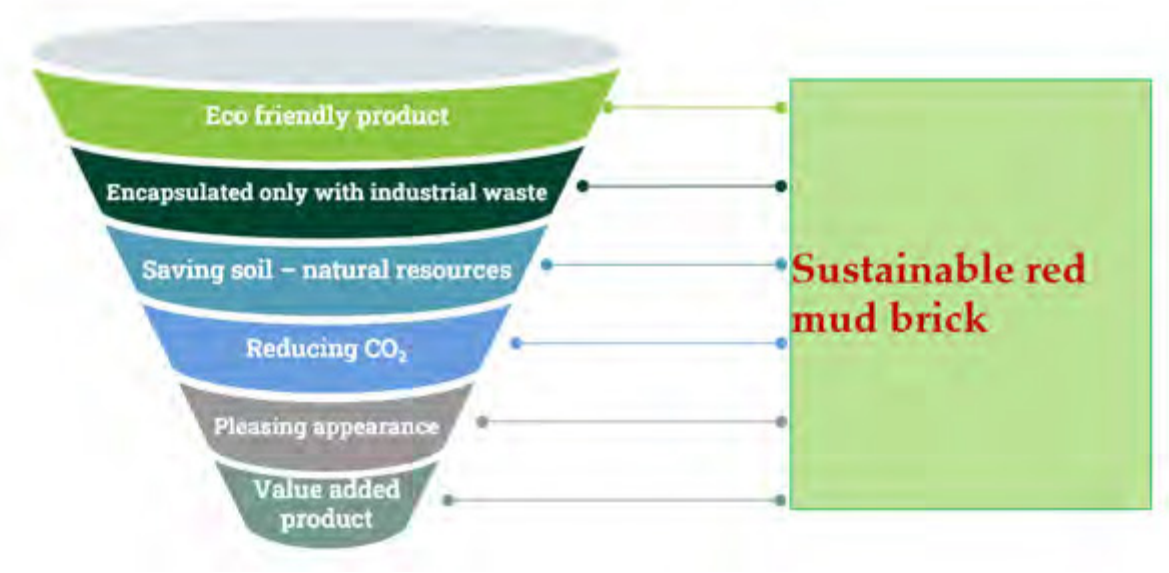

Figure 5. Sustainable red mud brick

The future

- SRMB is an environmentally friendly product that is beneficial to the Civil Engineering industry. It resembles conventional clay burnt bricks, as it is red in colour and has sharp corners and edges.
- Red mud may be consumed to create high value eco products using green technology without harming the environment. This will help to reduce the amount of waste that ends up in landfills and create a clean environment that is in line with the government of India's "Swachh Bharat Abhiyan" policy.
- Growing this product will be very advantageous to achieve the sustainable development goal set by United Nations (SDG No. 9).
- Received a start-up grant of INR 5 lakhs from the Tamil Nadu Agricultural University, Technology Business Incubation Centre, Coimbatore through Ministry of RKVY Division, New Delhi based on the patented product SRMB.
- Overall, this promising ecofriendly product could be produced in large scale and utilised in the construction sector by replacing the conventional clay burnt bricks. Thus, creating an awareness among the general public about sustainable construction material deriving a great environmental benefit.

KCT GARAGE WITH MOFU E DRIVE

The Innovation

KCT GARAGE with Mofu E Drives addresses a critical concern – the 15% contribution of road transport to global carbon dioxide emissions. Our electric two-wheeler emerges as a sustainable solution, actively working to reduce this environmental impact. By transitioning to clean energy, we aim to play a pivotal role in the global effort to cut carbon footprints, fostering a cleaner and healthier future for urban commuting and business deliveries. As we mark this milestone, we reaffirm our commitment to a more sustainable and responsible approach in urban mobility.

Approach

1. Concept Development
2. Sketching and Digital Design
3. Prototype Development
4. Manufacturing Planning
5. Product Manufacturing
6. PRODUCT TESTING
7. PRODUCT OPTIMIZATION
8. PRODUCT LAUNCH

Benefits

Innovation and Learning: Encouraging innovation in sustainable mobility solutions and advancing knowledge in the electric vehicle industry.

Market Accessibility: Making sustainable transportation more accessible to a broader range of consumers and businesses.

Urban Mobility: Alleviating congestion in cities and promoting sustainability by introducing innovative transportation solutions that prioritize environmental consciousness and efficiency.

The Future:

To make a sustainable transportation that would reduce the traffic congestion in cities and be safe at have a cheap running cost. Eco-Friendly Commuting: For daily work, school, and personal travel.

- Geen Deliveries: Efficient and eco-friendly for business deliveries.
- Tourism and Rentals: Sustainable exploration for tourists.
- Urban Mobility: Reducing congestion and promoting sustainability.
- Environmental Impact: Lowering air pollution and greenhouse gas emissions.
- Innovation and Education: Advancing electric vehicle technology knowledge.

Northern India Textile Research Association, Ghaziabad

About the Institution

Northern India Textile Research Association (NITRA) is one of the prime and only ISO 9001 ceertified textile research institutes in the country. The textile industry and Ministry of Textiles, GoI jointly established NITRA in 1974 for conducting research and providing support services to Indian textiles industry. NITRA's prime activities include R&D, technical consultancy, quality evaluation of materials, manpower training and technical publications. NITRA has a clientele of about 1200 textiles and allied sector units. The portfolio also includes overseas clients from U.K., Spain, Indonesia, Thailand, Ethiopia, Sudan, Bangladesh and Nepal.

NITRA's infrastructure facilities for quality evaluation includes seven NABL accredited (ISO/ IEC 17025) laboratories. Its third party inspection activities are also accredited by NABCB (ISO/ IEC 17020. With support from MoT, a Centre of Excellence (Protech) for protective textiles is established at NITRA.

The Innovation

- A process for preparation of regenerated bamboo fibre from indigenous bamboo
- A process for fiber extraction from Pine Needles
- Development of Multi Layered Flame & Thermal Resistance Fabric for Fire Fighter Clothing
- Development of air cleaner home textiles to reduce indoor air pollution
- Development of Work wear for Cement Porters
- New Approaches to Reduce Water Consumption in Textile Wet Processing
- An apparatus to determine Air Pollutant Gas Adsorption Capability of Fabric
- A process for preparing water repellant milkweed floss/fibre for preserving

thermo-regulatory property thereof

- A water saving hank dyeing machine for dyeing textile yarns
- Development of Improved version of body protector for riots control
- Development of Flash resistance hood for Indian Navy
- Development of improved stab and impact resistant material for anti riots body protector
- Development of Synthetic blood penetration tester
- Development of Coat combat disruptive
- Development of Reusable sanitary pads and diapers

The Approach

The approach is to interact and collaborate with the Industry and plan innovations to fulfill their requirements. Research Advisory Committee consisting of experts from Industry and academia meets every year at NITRA with a view to assess the progress of NITRA's ongoing R&D projects and to make necessary modification on those, if required. The committee also suggests areas to be considered for NITRA's future R&D activities.

Benefits

- Research outcomes are utilized in providing the consultancy services to the industry. These have resulted in energy savings, manpower rationalization, quality & productivity improvement, reduction in waste etc.
- Research outcomes are presented in Technical Seminars/ Workshops where industry personnel participate and discuss about the findings. Many of Research outcomes have been implemented by the textile units.
- Research activities are also published in national/ international journals/ on-line publications to benefits the industry and associated stake holders.
- Research outcomes are also circulated through social media.
- Once industry is benefitted society in general is also benefitted

The Future

- DEVELOP New Processes and IMPROVE Existing Processes for productivity improvement and cost reduction.
- R&D initiatives on Use of unconventional long natural fibres into technical Textiles
- Development of eco-friendly & sustainable processes/products
- Indigenous development of specialized fibre
- INNOVATION for new products using latest technologies

Northern India Textile Research Association

Best innovation's impact filed in your application:

1. Development of regenerated cellulosic fibres from Indian bamboo

This technology is not available in India. NITRA has extracted silica free dissolvable fibre grade pulp from Indigenous bamboo and developed eco-friendly NMMO process (known as Lyocell process) to convert it into fibre. Regenerated bamboo fibres produced from Indian bamboo by NITRA's developed technology is ecofriendly and NMMO used is recoverable to the extent of 99.9%. Bamboo is considered as grass so problem of deforestation will not be there. Re-generated Bamboo fibre is imported to meet out the demands in India.

2. **Extraction of fibre from pine needle waste :**

NITRA has extracted textile grade fibre from pine-needles waste of Indian Himalayan region. The extracted pine needle fibres can be blended with other fibres to develop yarns and fabrics. Pine needles prevent germination of other vegetations and cause forest fires. Patent granted.

3. **Flash fire resistance hood:**

NITRA has developed a flash fire resistance hood of 100% cotton for Indian Navy. The fire-retardant property of this hood remains intact even after washing in boiling water. The technology of this development has already transferred. Patent filed.

4. **Development of Multilayered Flame and Thermal Resistance Fabric for the Fire Fighting Clothing**

Firefighters not only play a pivotal role to rescue human lives during fire accidents but also save properties from extensive damage by extinguishing hazardous fires. It is one of the life-threatening occupations that require intensive physical work in a hazardous environment. No significant work was done to develop firefighter suits for firefighters indigenously. NITRA has developed an indigenous lightweight firefighter suitas per the standard IS 16890 and EN 469.

5. **Development of Air Cleaner Home Textile to reduce Indoor Air Pollution:**

People are living in environment where level of air quality index (AQI) reaches to category of very poor (301-400) and severe (401-500). The indoor air pollution which may be more than 2 to 5 times of outdoor air pollution. Many gadgets and devices are available to reduce indoor air pollution like HEPA Purifiers, Electrostatic Purifiers, Ozone Generators etc. But most of the devices are either expensive, energy intensive, short operational life. Even some of the devices are contributing in other form of contaminants.

Looking to these problems, under this project, invention of Air Cleaner Home Textiles was done which will help people to reduce indoor air pollution where they live and stay. This does not consume electricity.

6. NITRA has developed four New Approaches to Reduce Water Consumption in Textile Wet Processing where water consumption has been drastically which is one of the major works in today's sustainability initiatives. It was found that the newly developed approaches not only helps in reduction of water consumption but also reduce consumption of energy, chemicals & time.

V

Top Innovative Research Institution 2023

IIT Roorkee

About the Institution

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Defence Research & Development Establishment (DRDE), DRDO, Ministry of Defence, Gwalior

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DRDE, Gwalior towards preparedness against Chemical and Biological agents has developed a poly amide nano web-based filter media in collaboration with Indian industries for respiratory protection through development of advance face mask much before COVID 19. This unique nanoweb filter media is first of its kind made in India and has got more than 99.00 % Particulate filtration efficiency (PFE) which is equivalent to N-99 face mask material in terms of the filtration efficiency. These developed masks are flat & fold type, cost effective, light weight.

The Approach

To develop state of the art technologies and products for NBC defence, involves a systematic and multifaceted approach due to the critical and life saving nature of the products. For the development, there was a clear-cut objective and requirements, thorough research and analysis, risk assessment, technology conceptualization, interactive development and testing, and continuous improvement. This was attributed by interdisciplinary collaboration among scientists,

engineers, researchers, and policymakers. It also involves staying up-to-date with emerging technologies and scientific advancements to continually improve the effectiveness of NBC products. DRDE also collaborate with Indian industries and academia on need basis for finalization of product specification and minimize the time.

Benefits

All the indigenous developed products are bulk produced and supplied to Tri-Services, paramilitary forces and civil population. The technological knowhow of DRDE developed products are also transferred to large number of Indian industries. This indigenous development saved lot of foreign exchange to the exchequer and provided job opportunities to our people. The developing countries are looking for India developed products as it is cost effective and quality is at par to the internationally available products which justifies the huge export potential of indigenously developed products. During pandemic, we educated industries for the development of facemask which provided business opportunities under the umbrella of "Aatmanirbhar Bharat".

The future

As per Ministry of Defence, GoI policies, we have plan for 2047 to celebrate 100 years of independence along with technology roadmap based on the user requirement and futuristic technological improvements in terms of material innovation, design, functionalities and artificial intelligence-based NBC defence technologies for the betterment of our nation.

VI

Best Industry-Academia Collaboration 2023

INNOVATION AWARD FOR BEST INDUSTRY-ACADEMIA COLLABORATION

Forbes Marshall Private Limited

About the company

Forbes Marshall helps build and sustain highly efficient plants by reducing waste, optimizing process and energy efficiency and by complying with regulatory requirements.

We are a leading provider of energy and process automation solutions worldwide through innovative and differentiated offerings. Our distinctive sales approach delivers customer benefits. We have always taken pride in the way we offer solutions, exceeding customer expectations on quality and delivery. Over the decades, we have built a great place to work; one that thrives on diversity and benefits communities around the areas we operate in.

Forbes Marshall offers a wide range of products, solutions and services to help bring down the cost of steam throughout the process. With our instrumentation solutions we help Industry achieve better throughput, and reduced process time, resulting in better productivity and reduced cost of operation. Our range of water quality analysers and emission monitoring equipment help Industry comply with norms and regulations and reduce environmental impact.

The Innovation

Forbes Marshall places a high emphasis on Research and Development (R&D) as a driving force for continuous improvement and future-ready products. We define innovation as something unique that creates a commercial advantage.

To that end, the R&D approach encompasses both quantum and incremental innovations, with a strong emphasis on good design to enhance product quality. Entrepreneurship is central to new product development, incorporating ideas from various disciplines like mechanical, electrical, software, and instrumentation to consistently deliver value across industries.

We also believe that design should extend beyond consumer goods to industrial applications as well- recognizing the impact in demanding work conditions. Our dedicated industrial design team ensures that all new product developments at Forbes Marshall not only meet technical specifications, but also serve their intended purpose in a simple, convenient and aesthetically pleasing manner.

Beyond the inhouse innovation efforts, Forbes Marshall also collaborates extensively with emerging start-ups as well as leading research and academic organizations globally, fostering innovation in new product development.

Noteworthy collaborations include the Forbes Marshall Fellowship at DESE, IIT Bombay, and a satellite R&D team at IIT Madras Research Park. The company engages in long-term collaborations with prestigious academic institutes, such as many of the IITs in India, Stanford in the US, SIT & NTU in Singapore, PSU in Thailand and University of Peradeniya in Sri Lanka to stay abreast of core research trends.

Beyond just internships & project sponsorship, our unique collaborations include centers of excellence, expert talks, Outstanding Project

Awards, faculty development programs, sabbaticals and annual Thermodynamics Day celebration with students & faculty members across multiple institutes.

Forbes Marshall's commitment to collaboration and innovation is exemplified by its active involvement with institutes globally, fostering a dynamic R&D environment and contributing to the collaborative advancement of industrial technologies and practices.

The Approach

When it comes to innovation, our R&D, sales & service engineer team begins with a strong customer interaction to understand their unmet needs- considering function, safety & features with a multidisciplinary approach to achieve the target specifications.

With the same philosophy, we begin our academic collaborations by understanding the needs, priorities & expertise of our academic partners, evolving & expanding over time.

Beginning with short duration, high impact initiatives like Expert Talks, FDPs; our collaborations steadily evolve to Internships, Sabbaticals & Outstanding Project Awards. Subsequently, we proceed to collaborations on Centers of Excellence, Certification Programmes, Research Collaborations etc. with our close academic partners.

Benefits

Forbes Marshall's product range focuses on energy savings & sustainable solutions, aiming to lower fossil fuel consumption and a cleaner and greener environment; where our engagements regularly achieve reduced carbon footprints by 10-25%.

While our research collaborations with academia help us innovate & develop cutting edge technologies that help achieve such results; our collaborative training programmes ensure knowledge dissemination to the end users across the plants to ensure that these results are achieved consistently.

Our flexible & layered approach ensures that our academic collaborations focus on specific targets leading to improvements in Knowledge Dissemination and Collaborations on Innovation and R&D, sustaining for years, and hopefully decades.

The Future

For us at Forbes Marshall, innovation will continue to play a vital role. With Digital Technology improving on top of our existing products & services, our aim is to increase the global reach for our collaborations- leading to improved products, services & the know-how in collaboration with our growing academic partners worldwide.

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Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, with around 9,000 members from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from 286 national and regional sectoral industry bodies.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, livelihoods, diversity management, skill development, empowerment of women, and sustainable development, to name a few.

As India strategizes for the next 25 years to India@100, Indian industry must scale the competitiveness ladder to drive growth. It must also internalize the tenets of sustainability and climate action and accelerate its globalisation journey for leadership in a changing world. The role played by Indian industry will be central to the country's progress and success as a nation. CII, with the Theme for 2023-24 as 'Towards a Competitive and Sustainable India@100: Growth, Inclusiveness, Globalisation, Building Trust' has prioritized 6 action themes that will catalyze the journey of the country towards the vision of India@100.

With 65 offices, including 10 Centres of Excellence, in India, and 8 overseas offices in Australia, Egypt, Germany, Indonesia, Singapore, UAE, UK, and USA, as well as institutional partnerships with 350 counterpart organizations in 133 countries, CII serves as a reference point for Indian industry and the international business community.

Confederation of Indian Industry
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