
Industry Outlook
RAILWAY INFRASTRUCTURE SERVICES
THEINDUSTRYOUTLOOK.COM
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Kazim Raza Khan
CEO
Adding Value to Railway Infrastructure with Latest Technology Innovations
IL&FS
ENGINEERING & CONSTRUCTION
₹150

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EDITOR'S NOTE

Driving India's Railway Infrastructure Revolution

The railway infrastructure services market in India is showing high growth, driven by on-going modernization efforts, the growing demand for efficient transportation and the increased government investment. India has one of the world's largest railway networks, and due to its huge population and its economy expanding, its infrastructure needs constant upgrades. The National Infrastructure Pipeline (NIP) of the Indian government has been actively prioritizing railway infrastructure as it envisions building high speed rail corridors, station redevelopment projects and electrification of rail lines. Much of the investment in the railway infrastructure sector has been on this focus, attracting both domestic and foreign investment, opening up opportunity for companies that are in the construction, engineering and technology solutions.

Modernization of railway stations and new freight corridors are major trends. Indian Railways is investing aggressively in the redevelopment of key stations, an effort to modernise and improve passenger experience and efficiency. The Dedicated Freight Corridor (DFC) project also plans to improve freight transportation, with faster, cheaper delivery of goods. Reducing congestion and improving logistics efficiency are key to India's economic growth. Additionally, the bullet train project is indicative of long term transformation in India railway landscape. However, these projects are also expected to take the pressure off existing railway infrastructure and open up new doors for innovation in rail technology.

In this special issue, we introduce you to the top companies in this segment. Industry Outlook has identified the select few companies that have done particularly well with a high level of dedication. We have found that they have gone the extra mile in proving their commitment to excellence in an integrated manner.

We welcome your feedbacks and suggestion that you may have concerning this special issue.

Sudhakar Singh
Managing Editor
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PANORAMA

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INDIA & EU FINALISE GREEN HYDROGEN INFRASTRUCTURE EXECUTION PLAN

India and the European Union (EU) have finalised an extensive roadmap for the green hydrogen sector that includes development of infrastructure, technology cooperation and boosting supply chains. The two sides deliberated on ways to enhance cooperation in the sector at the 10th meeting of the India-EU Energy Panel held on Thursday in Brussels.

At the meeting, a "work plan" was adopted for the third phase of the India-EU Clean Energy and Climate Partnership 2025-28, which will focus on deeper cooperation in five priority areas, according to the Ministry of External Affairs (MEA).

"The two sides have set out an extensive agenda for green hydrogen cooperation, which includes assessing infrastructure development feasibility, regulatory and technology cooperation, and strengthening of supply chains," the MEA said on Saturday.

It said the energy panel focused on the energy transition priorities of the two sides and took stock of the achievements of the second phase of the India-EU Clean Energy and Climate Partnership 2021-2024.

The two sides undertook and completed joint initiatives involving technical cooperation in 51 activities divided into nine sectors, it added.

"The two sides have also charted out the framework for green hydrogen cooperation, which includes cooperation on green hydrogen policies of India and the EU," the MEA said.

The EU and EU member states participated in the international conference on green hydrogen this year in India.

TRAI MANDATES TELECOM COMPANIES TO PUBLISH THEIR COVERAGE ZONES

The Telecom Regulatory Authority of India (TRAI) has called on mobile carriers to publish on their company websites the geospatial coverage maps of the geographical areas where they offer wireless voice and broadband services.

The directive is a key element of the sector regulator's quality of services (QoS) rules for telcos. It is also aimed at empowering mobile users to take informed decisions when choosing a telecom carrier.

"Information on mobile network coverage is important from the perspective of QoS. One cannot expect good QoS in a non-coverage area, and availability of a service-wise geospatial coverage map on a service provider's website will help consumers make informed decisions," Trai said in an accompanying annexure to its directive to operators, issued Friday.

The regulator has issued a directive, calling on carriers offering wireless access services to publish on their websites "the service-wise (2G/ 3G/ 4G/ 5G) geospatial coverage maps" for geographical areas where wireless voice or wireless broadband service is available for subscription by consumers.

It added that telcos may extend availability of their coverage maps on their mobile apps, both for Android or iOS devices.

AIR INDIA TO LAUNCH AIRCRAFT MAINTENANCE TRAINING HUB IN BENGALURU

Air India is establishing an aircraft maintenance training institute in Bengaluru to provide a 2+2 year aircraft maintenance engineering (AME) program certified by DGCA. Air India announced that the purpose-built basic maintenance training organization (BMTO) will be operational at Bengaluru Airport City by mid-2026, spanning 86,000 square feet.

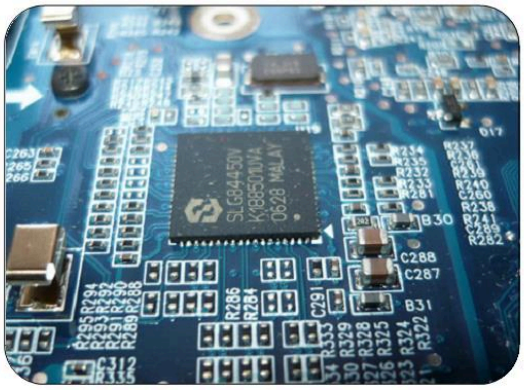
The country's leading airline group has signed a pact with Bengaluru Airport City Ltd to develop a dedicated facility for the AME program complete with state-of-the-art classrooms and quality labs along with the right training professionals for the job.

"The Air India BMTO is a step towards building a robust, future-ready aviation ecosystem in India," stated Air India. "It will serve the ambitions of the airline as it moves ahead in its transformation journey, strengthening the availability of aircraft maintenance engineers as Air India expands its fleet, making it self-reliant."

Until the new BMTO facility starts operating, Air India will launch a cadet AME program in collaboration with reputable institutions in Bengaluru and Hyderabad to maintain its dedication to AME education and workforce development, and to meet its needs for aircraft maintenance engineers, according to the statement.

This facility and program, combined with proximity to Kempegowda international airport, will enable our AME cadets to gain hands-on, real-world experience as part of their training, supporting their future as industry-ready professionals aligned with Air India's ongoing fleet expansion needs," Air India's Aviation Academy Director, Sunil Bhaskaran, commented.

DOMESTIC ELECTRONICS MAKERS TO GAIN INCENTIVES TO COUNTER CHINESE RIVALS



India is set to launch a $5 billion incentive program to boost local production of electronic components, such as printed circuit boards, for gadgets ranging from mobile phones to laptops. The initiative aims to reduce reliance on imports, particularly from China, and strengthen domestic supply chains for the growing electronics manufacturing sector.

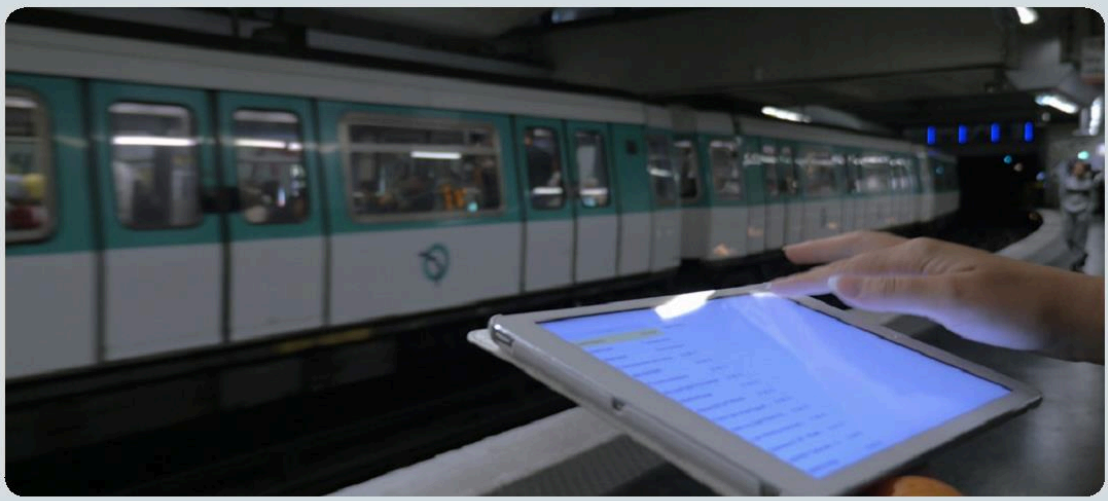
India's electronics production has more than doubled in the past six years, reaching $115 billion in 2024, driven by smartphone manufacturing giants like Apple and Samsung. The country is now the fourth-largest smartphone supplier globally, but the sector faces criticism for its dependency on imported components.

India aims to expand its electronics manufacturing to $500 billion by FY 2030, with $150 billion dedicated to component production, according to the government's policy think tank Niti Aayog. In FY 2024, the country imported electronics and telecom equipment worth $89.8 billion, with over half of these imports sourced from China and Hong Kong, as per a report by private think tank GTRI.

Industry leaders have welcomed the move. Pankaj Mohindroo, head of India's Cellular and Electronics Association, remarked, "This scheme comes at a critical time to promote component manufacturing and support the scaling of electronics production to global levels."

The incentive program reflects India's growing ambition to become a global electronics manufacturing hub while reducing dependence on foreign imports to ensure economic resilience.

IMPLEMENTING IOT INTEGRATION IN RAILWAY INFRASTRUCTURE



In response to the ongoing technical and infrastructural challenges, Germany has launched a large-scale project called 'Digital Railways of Germany' (DSD), aimed at leveraging advanced digital technologies to radically enhance railway transport. Digitalization includes installing new digital signals, monitoring and management systems, and upgrading stations and other infrastructure. This involves using sensors and Internet of Things (IoT) for real-time monitoring of track and rolling stock conditions, and implementing intelligent traffic management systems. The integration of IoT in railway infrastructure has marked a transformative leap in the transportation industry. This technology is being considered to contain the very potential which has the ability to transform railway operations by improving safety, efficiency, and passenger experience.

Official data states that a 48 railway incidents have been reported in 2022-23 in India and 13 in 2023-24. The most recent Kanchanjunga Express accident have been eye opening for the whole country and perhaps it is now time to bring about a digital transformation in the Indian railways as well. It can help the authorities in better signal controls, interlocking and level crossing controls.

"India is a country with extensive railway networks. But it lacks basic safety mechanisms and public awareness. Maybe that's why; today it's no surprise to see news of death due to a rail line crossing. However, with the installation of IoT sensors like smart line crossing sensors, the station authority will get real-time information to make decisions regarding train signals", mentioned Vidushi Gupta, CEO, PsiBorg.

Let us now delve a little deeper and look at how the implementation of IoT integration can bring about a change in overall railway operations.

Safety Enhancement

By using IoT technologies, railway systems and operations can be handled with an increased level of safety. Several kinds of IoT devices such as cameras and sensors are being installed along the railway tracks for the purpose of real-time monitoring. For example, sensors are able to spot issues with the tracks, like cracks or obstacles, and quickly notify maintenance teams who are nearby to avoid potential accidents. In the same way, installation of smart cameras is helping boost security by detection of unauthorized access or suspicious behavior, keeping passengers safe.

In this regard, the Deutsche Bahn AG in Germany uses IoT sensors to monitor track conditions, significantly reducing the risk of derailments.

"The safety of our passengers is paramount, and IoT technology allows us to proactively address potential

hazards," mentioned Dr. Richard Lutz, CEO of Deutsche Bahn.

Predictive Maintenance

IoT technology integration in railways is also providing benefits regarding predictive maintenance. Performing scheduled inspections have proved to be cost incurring and at the same time inefficient which is why the installation of IoT sensors are being instrumental in this regard. They can predict when maintenance is needed, reducing downtime and costs. This method also helps extend the life of railway assets by fixing issues before they become serious problems.

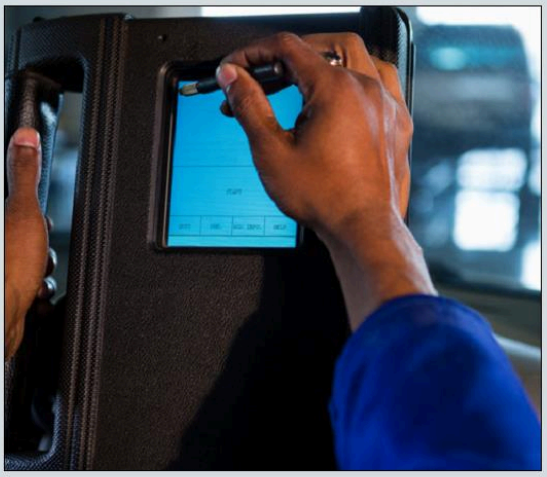
> **IoT technology integration in railways is also providing benefits regarding predictive maintenance**

To give an example, The Indian Railways has implemented a similar system, where IoT sensors on locomotives predict maintenance needs, leading to a 20 percent reduction in maintenance costs. Through this, detection of faults and hazards in railway can be done in time and prevent any kinds of accidents from occurring.

"Predictive maintenance is a game-changer for us, ensuring higher efficiency and reliability," mentioned Piyush Goyal, former Minister of Railways, India.

Increased Operational Efficiency

Integration of IoT technology has been seen to significantly boost the efficiency of railways. By using real-time data retrieved from IoT devices, the schedules for trains are being optimized, traffic flows are being managed better and delays are also getting minimized. Smart signaling systems are able to adjust train speeds based on current track conditions and traffic, ensuring smooth and timely operations. Additionally, IoT can help manage energy use more effectively by monitoring and optimizing power consumption, making railway operations more sustainable.



In this regard, The London Underground has adopted IoT technology to manage train frequencies and reduce energy usage, resulting in significant cost savings and improved service reliability.

"IoT is the backbone of our modernized operations, making our system more efficient and responsive," said Andy Lord, Commissioner of Transport, London.

We can see that the integration of IoT technologies in the railway infrastructure is certainly providing numerous benefits but there are also challenges to this usage which should also be a matter for concern. First is the initial cost involved with IoT implementation which is very high considering the overall transformation of systems all through the process. Secondly, the installation of IoT devices provides retrieval of data from various sources that require security. In case crucial data is compromised, it can make the entire railway system vulnerable to all kinds of potential threats. This is exactly why robust cybersecurity systems must also be in place to maintain the operational integrity of all systems.

Integrating IoT into railway systems offers many benefits for safety, efficiency, and passenger comfort. Using real-time data and smart technology, railway operators can perform predictive maintenance, streamline operations, and ensure a more reliable and pleasant travel experience. Although there are challenges, the long-term advantages of IoT make it a valuable investment for the future of railways.

INDUSTRY INSIGHTS

ASSESSING THE LANDSCAPE OF WIND INDUSTRY IN INDIA

● **By Pandu Chillakuru,** *Head - Winergy India*

Pandu is a seasoned finance professional with close to three decades of experience in the industry. He joined Flender in 2022, prior to which he worked across diverse capacities with ZF Group and Cavinkare. In a recent interaction with Thiruamuthan (Correspondent, Industry Outlook), Pandu shared his insights on the current wind energy landscape in India and many other related aspects.

Share your thoughts on the current wind energy landscape in India.

Currently, there are around 44 GW of wind installations in India, with 10 GW being added in the last five years. Although this is not a big number, I consider this a significant achievement considering the wide variety of challenges that we have witnessed lately. Firstly, since wind power per se is intermittent in nature, integrating this intermittent power into a stable grid is very challenging. The second is balancing supply and demand, which is a key aspect of any industry. Also, the cost of wind power as compared to traditional fossil fuels like coal and natural gas is relatively expensive. As a result, every player in the industry is actively involved in coming up with ways to reduce the cost of producing wind energy to the maximum extent possible.

“Wind energy will no doubt be the enabler in meeting the additional power demand that will arise in the near future”

What are the major factors that will drive the growth of wind energy in India over the next five years?

The disposable income of India today is around $2.6 trillion and is expected to hit the $4 trillion mark by the next five years. This indicates that people will have more money and will start spending more on comforts and luxuries such as an air conditioner, which demand more power consumption.

Pandu Chillakuru
Head - Winergy India

Today, the per capita power consumption in India is around 1200 kWh, and this is expected to grow up to 2000 kWh in the near future. Another key aspect that is driving the demand for electric power in India is the EV segment, wherein the number of electric vehicles that are commuting on Indian roads is increasing with each passing day. With the help of government initiatives such as Make in India, industrialization is expected to happen on an even larger scale in the coming years, thus further increasing the demand for power. Given the fact that we can no longer rely on fossil fuels for power generation,

wind energy will no doubt be an enabler for meeting the additional power demand that will arise in the near future.

Briefly explain the role of the government and policymakers in supporting and nourishing the wind energy sector in the country.

Previously, the government had promoted wind energy on a large scale through accelerated depreciation, generation-based incentives, and many others. These initiatives by the government have helped the industry immensely and played a significant role in enabling our industry to be in this position today. Additionally, the government has also announced its Renewable Energy Purchase Obligations trajectory going forward, wherein it will be increased from the current 0.81 percent to 5.81 percent by 2027–28. The government is also very serious about its goal to achieve net zero emissions, and this will also help the wind energy sector to a great extent.

Tell us about the major challenges that are hindering the expansion of wind energy capacity in India.

The foremost challenge that is causing a major setback for the expansion of wind energy capacity in our country is land availability and acquisition. The government can play a pivotal role in this regard by identifying suitable locations, streamlining the land acquisition process, and incentivizing land owners who agree to lease out their land for wind energy installations. The second challenge is grid integration and infrastructure, wherein we need to invest heavily in upgrading the grid infrastructure to efficiently handle fluctuations in power generation. Furthermore, grid balancing equipment and energy storage facilities will help us store and counter the intermittent use of wind energy.

> **Today, the per capita power consumption in India is around 1200 kWh, and this is expected to grow up to 2000 kWh in the near future**

How does India's wind industry compare to the global wind energy market, and what opportunities exist for Indian companies to expand internationally?

Currently ranking 4th next to China, the US, and Germany in terms of onshore wind installations, India has the potential to reach up to 210 GW of onshore and 700 GW of offshore wind generation. Many Indian wind energy companies and manufacturers are already exporting wind turbines, components, and expertise to American and European markets. Exploring opportunities in the Asia-Pacific region presents another avenue for expansion.

COVER FEATURE

Industry Outlook TOP 10

RAILWAY INFRASTRUCTURE SERVICE PROVIDERS - 2024

IL&FS ENGINEERING & CONSTRUCTION

Adding Value to Railway Infrastructure with Latest Technology Innovations

The Indian railway infrastructure market is poised for significant growth, driven by substantial investments and a strategic focus on modernization, sustainability, and efficiency. The government has allocated a record capital expenditure of ₹2,62,200 crores for the Railways in the Union Budget 2024-25, reflecting a strong commitment to transforming the sector.

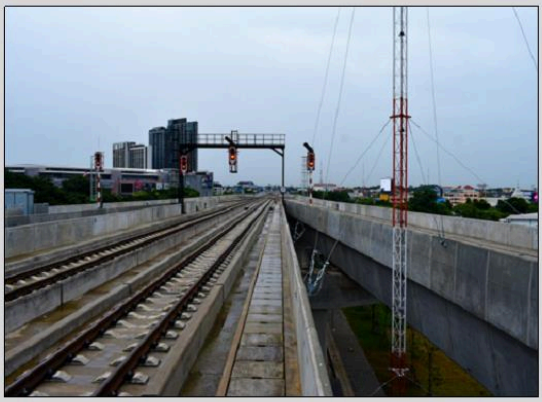
Recently, the media reported several mishaps on the Indian Railways, which made the authorities rethink all safety measures using modern technologies. This is where AI systems for predictive maintenance have been game-changing. Although a large-scale infrastructure can be built with resources and time, an accurate services provider is needed to see to the fact that all the safety protocols are being followed.

This is exactly what IL&FS Engineering & Construction understands and provides advanced technology in construction that can help mitigate risks, manage protocols, and reduce maintenance over large-scale railway infrastructures. The company conducts thorough risk assessments at the planning stage to identify potential risks related to cost, schedule, quality, safety, and environmental impact. It uses tools like SWOT analysis, risk matrices, and scenario planning to evaluate the likelihood and impact of identified risks. It engages with all stakeholders, including government agencies, local communities, contractors, and suppliers, to understand their concerns and expectations. "We clearly define risk allocation in contracts to ensure that risks are managed by the parties best equipped to handle them, use performance-based contracts and include clauses for penalties and incentives to align contractor performance with project goals", mentioned Kazim Raza Khan, CEO, IL&FS Engineering & Construction.

> IL&FS Engineering & Construction provides regular training to employees on the requirements of ISO 9001, ISO 14001, and ISO 45001

Engineering Excellence

IL&FS Engineering & Construction Company Ltd has been certified under ISO 9001:2015 (Quality Management Systems), ISO 14001:2015 (Environmental Management Systems), and ISO 45001:2018 (Occupational Health and Safety Management Systems) and ensuring their adherence throughout the lifecycles of railway infrastructure projects it executed by a structured and integrated approach. The company has an Integrated Management System (IMS) that combines the requirements of ISO 9001 (Quality Management), ISO 14001 (Environmental Management), and ISO 45001 (Occupational Health and Safety Management). This helps streamline processes, reduce redundancies, and ensure a holistic approach to quality, environmental, and safety management. "Internal and external audits are conducted to ensure compliance with the standards. Regular management review sessions help in assessing the effectiveness of the IMS and identifying areas for improvement", stated the CEO.



The company provides regular training to employees on the requirements of ISO 9001, ISO 14001, and ISO 45001. It ensures awareness among the personnel of their roles and responsibilities in maintaining compliance with these standards. The company maintains records of employee competencies and ensures that all staff involved in the project and the organization have the necessary skills and qualifications. The company has strategically implemented a wide range of advanced technologies and software applications to enhance efficiency, safety, and overall project management effectiveness. These innovations are pivotal in maintaining its competitive edge in the infrastructure development industry.

Future Endeavours

IL&FS Engineering & Construction Company stays competitive in the infrastructure development industry by adopting a forward-thinking approach and having over 3 decades of rich experience that leverages innovation, sustainability, and strategic partnerships. The company plans on forming strategic partnerships and alliances with other companies and technology providers to leverage complementary strengths and drive innovation. "We plan on enhancing our competitiveness and position us for sustainable growth in the infrastructure development industry", concluded the CEO.

INDUSTRY INSIGHTS

TECHNOLOGICAL ADVANCEMENT IN THE INDIAN RAILWAY SECTOR

● **By Lalit Tejwani,** *Chief Marketing Officer, Hind Rectifiers*

In an interaction with Industry Outlook, Lalit Tejwani, Chief Marketing Officer, Hind Rectifiers shares his insights on the recent trends and developments in the Indian Railway sector. He also talks about the challenges and advancements in the growth of the Railway equipment market in India.Lalit is a skilled professional with over three decades of experience in engineered solutions for infrastructure and heavy industries such as railways, power, steel, mining, cement, including senior management positions with SIEMENS, ABB, ALSTOM, responsible for railroad business in South Asia, Middle East, and Africa.

What are the key trends in the railway sector in India?

Indian Railways(IR) has formulated the National Rail Plan 2030, which gives a long term vision and sets the trends for the following areas of enhancement:

Rail Network: To increase traffic throughput the railway network is being augmented by constructing new lines, doubling existing tracks, and upgrading infrastructure to accommodate more goods and passengers.

Electrification and energy efficiency: Electrification of entire railway network has been made a priority to reduce dependence on fossil fuels and promote environmental sustainability. This includes the conversion of existing diesel locomotives to electric ones, and the development of energy-efficient technologies. IR is also adopting solar, wind, and other green initiatives.

Freight Capacity: Creation of dedicated freight corridors to facilitate the seamless movement of goods across the country, & replenish freight wagon holding. IR targets to considerably increase the modal share of freight traffic by rail by reducing transit time, new rolling stock, and improving logistics support. Once freight traffic gradually shifts to new dedicated freight routes, the exiting rail network will be freed up for more passenger trains.

Modernizing rolling stock: In the last year of so we have seen a radical change shift in IR's rolling stock procurement strategy. Mega tenders running in thousands of crores each have been floated and awarded In order to introduce of advanced, new-generation of rolling stock, including high-speed trains, improved locomotives, and modern coaches, to provide faster and better travel experience for passengers.

Technology integration: IR is adopting advanced signaling, train controls, digitization for better real-time data access, and automated infrastructure inspection systems. These measures will enhance operations, safety, maintenance, and headway.

Lalit Tejwani
Chief Marketing Officer

How are technological advancements affecting the demand for railway equipment in India?

Apart from the existing locomotives, and passenger stock which IR themselves manufacture, IR is now introducing more Electrical Multiple Units (EMU) type trainsets for both suburban and long-distance passenger transport. In a locomotive hauled train, the traction power is provided by

only the locomotive at the head of the train, and the remaining coaches, sometimes up to 24 coaches, are trailing. Whereas in EMU trainsets the tractive effort is shared by several motor coaches spread over length of the train, hence making them better for acceleration and energy management.

Creation of dedicated freight corridors to facilitate the seamless movement of goods across the country, & replenish freight wagon holding

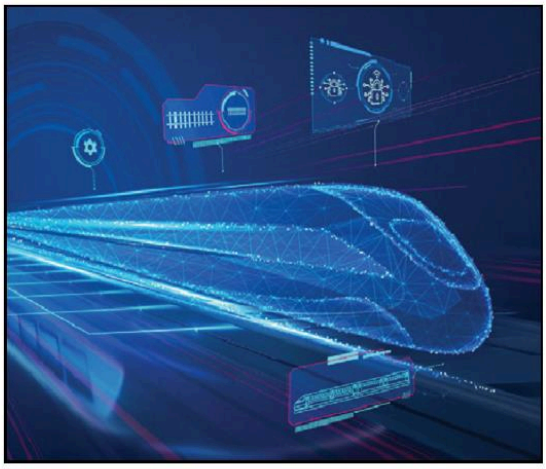
Such new generation of Trainsets are being introduced like VandeBharat (up to 160Kmph for long distance, chair car & sleeper), VandeMetro (up to 100Km, chair car), and even a plan for VandeBharat-Freight, for high-value time-sensitive cargo. These new generation of trains are being built both by IR as well as private companies who have been awarded turnkey contracts including design, manufacture, supply, and maintenance of up to 35 years.

Our company, Hind Rectifiers Ltd (www.hirect.com) has been in the business of designing and manufacturing electronics, electrical, electro-mechanical power conversion products for the last 65 years, and have been exporting to more than 25 countries globally. In the rail sector, we have been supplying and maintaining Class A equipment like state-of-the-art IGBT based converters, transformers, traction motors, electrical panels, HVAC, etc for all types of railway rolling stock. For companies like HIRECT, it is both a challenge and an opportunity to design and develop at a faster pace sub-systems for these new generation of rolling stock in India.

What are the primary obstacles facing the growth of the railway equipment market in India?

IR has been traditionally procuring complete wagons for freight, and manufacturing all locomotives, coaches at seven production units owned by it. There is an equipment wise approval / enlistment of vendors, and sub-systems are procured from enlisted vendors via a tendering process. Since there thousands of parts and enlisted vendors, IR's relation with vendors has been transactional.

Once a vendor meets the specifications, he is entitled to get orders based on lowest quoted prices, which are subject to further downward pressure using reverse auctioning. Since the vendors obligation is limited to meeting the specifications which are often not revised for several years, there is no motivation for vendors to innovate, and invest in new technology. Introduction of new vendors and technologies takes several years due to the bureaucratic process involved. There have been instances where vendors have invested in developing solutions to meet IR's new requirements however these concepts have not fructified due moving goalposts and changing policies.



How are sustainability concerns changing the dynamics of the railway equipment market in India?

IR has is close to achieving 100 percent electrification of its network with a focus on reducing its carbon footprint and contribute to sustainable development. The railways are adopting various measures, such as the deploying energy efficient and braking energy recovery from modern rolling stock. Renewable energy is being implement in productions units, stations, and even on roofs of rolling stock.

Since Diesel based rolling stock has been phased out, demand for electrical train aggregates has surged. Moreover with increasing population of energy efficient EMU trainsets, equipment suppliers are now aligning themselves to cater to this new design of aggregates. IR is also introducing hydrogen

fuel cell powered rolling stock instead of diesel which will lead to development of new technology & solutions.

Since most of the IR rolling stock uses steel or stainless steel based carbody construction which is a heavier metal, IR is now in the process of introducing aluminum carbody for their modern rolling stock. This will help to reduce the overall weight of rolling stock, leading to energy efficient operation.

How can Indian railway equipment manufacturers improve their production capacity and product innovation to stay competitive in the global market?

Until now railway equipment suppliers in India were mainly focused on catering to aggregates and components required for rolling stock built by IR's production units. Now as more and more private rolling stock manufacturers are setting up huge production capacities in India, it presents both challenges and opportunities to the railway equipment industry. Private manufacturing companies operate on a global level and expect international standards. Also they have their own vendor assessment criteria for the products and processes, through which the equipment manufacturers have to pass. Since many of the contracts being awarded both for mainline and metro rolling stock include maintenance, sometimes for the lifetime, the design thinking has to be adapted accordingly. Private manufacturers seek to incorporate various product life-cycle values into the early stages of design considering "Life-cycle" engineering. These values include functional performance, manufacturability, serviceability, and environmental impact.

> **The railways are adopting various measures, such as the deploying energy efficient and braking energy recovery from modern rolling stock**

The above presents equipment manufacturers with a challenge to continuously innovate and upgrade their products for the demanding market situation, and an opportunity to then be competent to bravely present themselves in the global arena with state-of -the-art railway solutions.

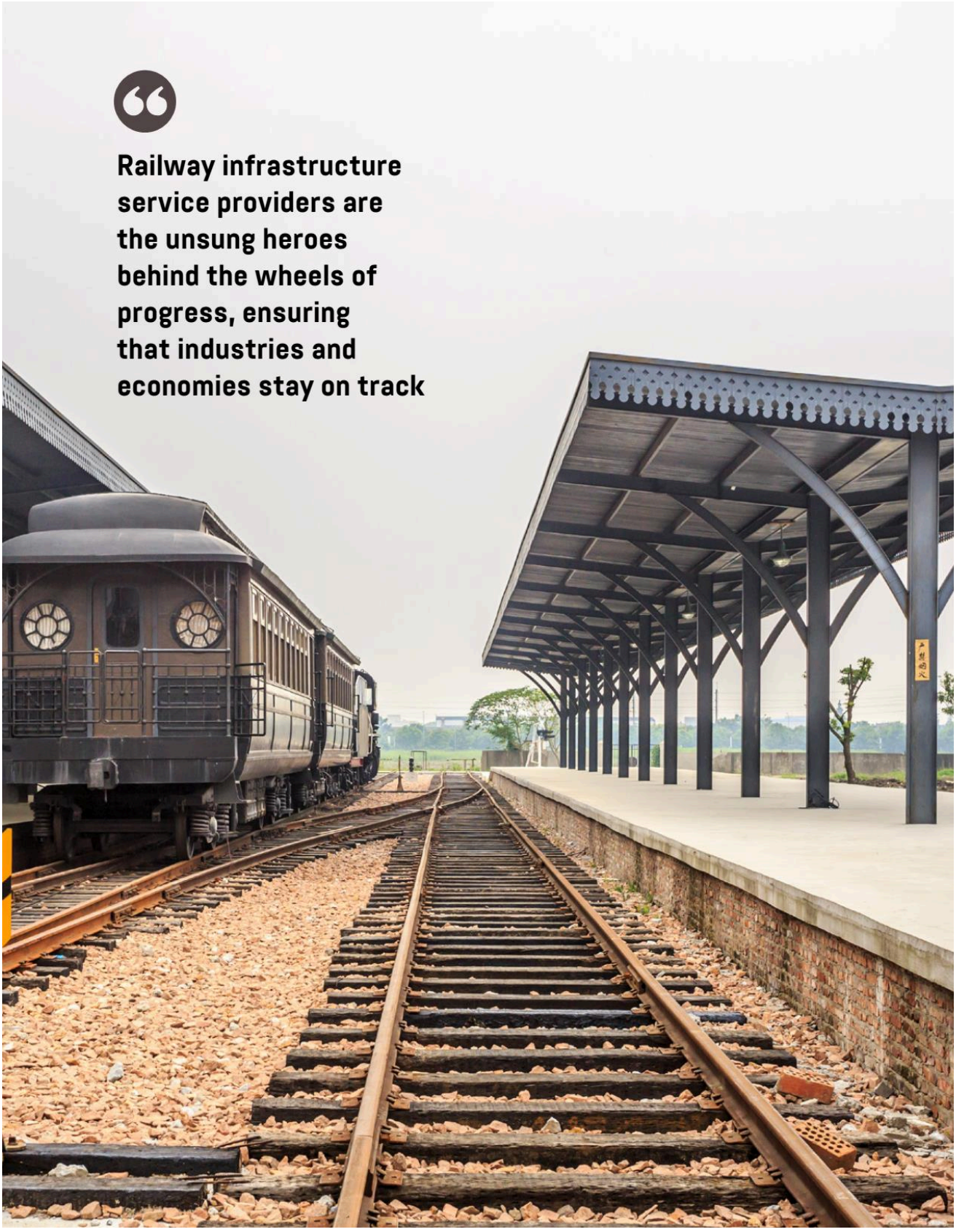
Industry Outlook TOP 10

RAILWAY INFRASTRUCTURE SERVICE PROVIDERS - 2024

Railway infrastructure service providers form an integral part of the transportation ecosystem in a country, which plays a crucial role in the overall economic landscape. They add tremendous value to market efficiency by developing, maintaining, and upgrading railway systems that would enable the flow of goods and people. These service providers play a crucial role in enhancing connectivity, conserving transportation costs, and providing an efficient alternative, reliable in nature as well as less energy-intensive compared to road and air transport. Beyond transport, railway infrastructure service providers play a major role in various sectors, such as logistics, manufacturing, and retail. Through the smooth flow of rail networks, they enable businesses to move raw materials, finished products, and people at lower costs, thus boosting trade and commerce. It directly affects the mining, agriculture, and manufacturing industries whose operations are often contingent upon the timely delivery of inputs or the products they produce.

Furthermore, the entities contribute to sustainable development. The railway transport is less polluting and energy-efficient compared to road and air transport and aids in carbon-emission reduction that serves green initiatives and climate change goals. Railway infrastructure also stimulates local economies through increasing job opportunities, promoting regional development, and tourism. Regions with improved rail connectivity are generally more economically active due to improved access that attracts investments and facilitates growth in real estate and services. On a general note, railway infrastructure service providers play a central role in maintaining market competitiveness, driving economic growth, and ensuring environmental sustainability, making them key participants in modern economies.

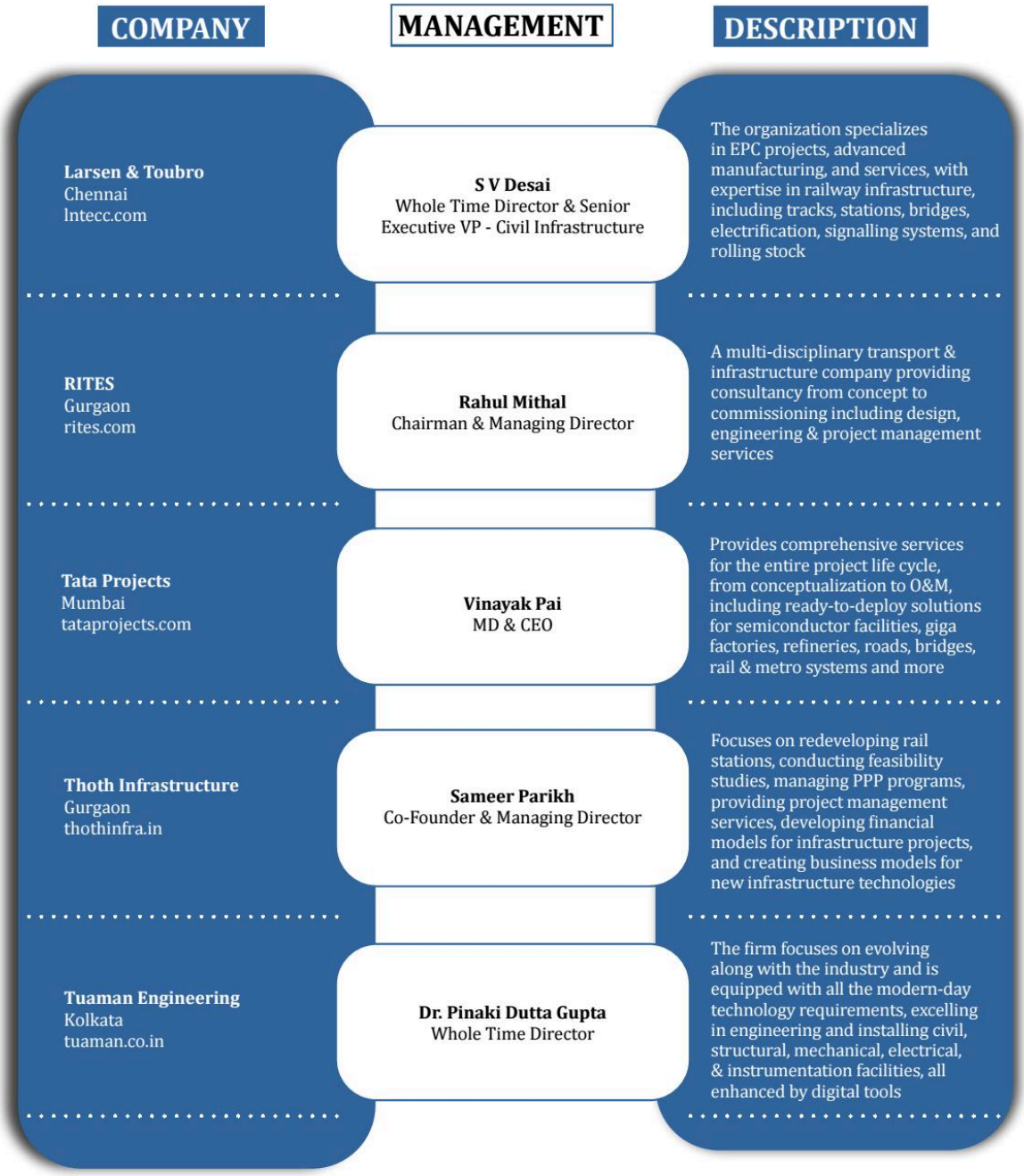
Industry Outlook in this issue presents a list of **'Top 10 Railway Infrastructure Service Providers - 2024'** who have leveraged their extensive industry expertise and experience in offering high quality products in the industry. The following list has been prepared after being closely scrutinized by a distinguished panel of judges including CXOs, analysts, and our editorial board. We recognize their valuable contribution to the ever expanding and competitive market and their ability to sustain themselves and emerge as top contestants through their reliable products.


Railway infrastructure service providers are the unsung heroes behind the wheels of progress, ensuring that industries and economies stay on track

Industry Outlook TOP 10

RAILWAY INFRASTRUCTURE SERVICE PROVIDERS - 2024

COMPANY	MANAGEMENT	DESCRIPTION
Afcons Infrastructure Mumbai afcons.com	**Paramasivan Srinivasan** Managing Director	An engineering and construction company boasts a robust history of success across various sectors, such as marine and industrial, surface transportation, rail and metro, oil and gas, as well as hydro and underground projects
Fabtech Engineering Nagpur ssfmgroup.com	**Ankit Chokhani** Managing Director **Deepesh Bhartiya** Executive Director	A heavy engineering & manufacturing company focused on energy, oil & gas, infrastructure, power, water resources & irrigation and railway sectors, focusing on girder fabrication for railways, metros, and over bridges
IL & FS Engineering & Construction Hyderabad ilfsengg.com	**Kazim Raza Khan** CEO	The company provides advanced technology in construction that can help mitigate risks, manage protocols, and reduce maintenance over large-scale railway infrastructures
Ircon International New Delhi ircon.org	**Yogesh Kumar Misra** Executive Director - Infrastructure	The company's specialization is in railways, railway electrification, signal & telecommunication, construction of roads, highways, commercial, industrial and residential complexes, leasing of locomotives, and many more
KEC International Mumbai kecrpg.com	**Vimal Kejriwal** Managing Director & CEO	The firm has over 7 decades of expertise in EPC services, specializing in the design, manufacturing, supply, and construction of turnkey projects in power transmission, OPGW installations, railway infrastructure, civil initiatives, and renewable energy


COMPANY
MANAGEMENT
DESCRIPTION
Larsen & Toubro
Chennai
lntecc.com
S V Desai
Whole Time Director & Senior Executive VP - Civil Infrastructure
The organization specializes in EPC projects, advanced manufacturing, and services, with expertise in railway infrastructure, including tracks, stations, bridges, electrification, signalling systems, and rolling stock
RITES
Gurgaon
rites.com
Rahul Mithal
Chairman & Managing Director
A multi-disciplinary transport & infrastructure company providing consultancy from concept to commissioning including design, engineering & project management services
Tata Projects
Mumbai
tataprojects.com
Vinayak Pai
MD & CEO
Provides comprehensive services for the entire project life cycle, from conceptualization to O&M, including ready-to-deploy solutions for semiconductor facilities, giga factories, refineries, roads, bridges, rail & metro systems and more
Thoth Infrastructure
Gurgaon
thothinfra.in
Sameer Parikh
Co-Founder & Managing Director
Focuses on redeveloping rail stations, conducting feasibility studies, managing PPP programs, providing project management services, developing financial models for infrastructure projects, and creating business models for new infrastructure technologies
Tuaman Engineering
Kolkata
tuaman.co.in
Dr. Pinaki Dutta Gupta
Whole Time Director
The firm focuses on evolving along with the industry and is equipped with all the modern-day technology requirements, excelling in engineering and installing civil, structural, mechanical, electrical, & instrumentation facilities, all enhanced by digital tools

FABTECH ENGINEERING

A PART OF SSFM GROUP, CONTRIBUTING TO THE GROWTH OF INDIA'S RAILWAY SECTOR WITH COMPLETE EPC SOLUTIONS

Ankit Chokhani
Managing Director

India's railway sector has undergone tremendous development driven by governmental focus on upgrading the railways, and the supporting investments. The demand for upgradation is happening in all corners of railways. This, in turn, is raising the demand for quality EPC service providers with expertise in railway infrastructure capable of addressing challenges pertaining to unreliable turnaround times, quality inconsistencies, and sourcing the right raw materials like steel.

With long-standing experience in the domain, the SSFM Group has emerged as a preferred partner, providing quality assured solutions through rigorous implementation of checks at various points. A prominent heavy engineering and manufacturing company focused on diverse sectors including energy, oil and gas, infrastructure, power, water resources & irrigation, and the railways, SSFM Group has established a distinguished position as a leading provider of cutting-edge comprehensive solutions.

Diversified Expertise

The SSFM Group of companies has developed total strength and capabilities in the domain of heavy fabrication and medium fabrication works, building specialization in girders manufacturing, which is refined by incorporation of automation by leveraging world-class CNC machines that have been sourced from globally renowned suppliers. A part of the SSFM Group of companies isFabtech Engineering, which was established in 2019.

Today, Fabtech Engineering, and other SSFM group of companies, ensure total quality control at every checkpoint, starting from RM sourcing to finished goods dispatch, thus avoiding the majority of rework and rejections. This saves a lot of time and money. Secondly, use of modern CNC machines and work automation has resulted in a considerable reduction in production time. Lastly arranging centralized steel purchase for steel sourcing, The company operates three units that are having expansions planned and underway to further boost capabilities. To add to it, the company has zero quality deviation policy.

Journey and Future Roadmap

A part of the SSFM Group of companies, Fabtech Engineering, was established in 2019, and in a short span of five years, has established itself as a leading industry player and a ₹100 crore company with a robust ogre book position. Building on the group's collective legacy spanning over two decades, the company is leveraging the expansive industrial expertise and network to expand rapidly, as a trusted enterprise. This commitment to excellence has put the company, and the group in a trailblazing position in the

Deepesh Bhartiya
Executive Director

Maharashtra region. As it plans for the future, SSFM Group remains steadfast in its foundational principles which drive the firm's initiatives and approach.

"Team, trust, and action with speed is our policy and good collaborations is the key to our success. We always believe that 'The purpose of the business is to create a customer who creates customers'. This has been our mantra, and guided us to forge long-term partnerships with our customers, resulting in our success", adds Deepesh Bhartiya, Executive Director (Business Development), SSFM Group.

While Fabtech Engineering's future plans are focused on doubling its capacities, the SSFM Group as a whole has more comprehensive plans of expansion and growth planned for the next two years, which include multiple new ventures, exploring growth in all directions, and establishing a Pan India presence. With these multifaceted plans, the company aims to lead the infrastructure EPC solutions sector in India, becoming the gold standard for service and product quality.

INDUSTRY INSIGHTS

NAVIGATING THE FUTURE OF RAIL MANUFACTURING IN INDIA

● **By Sujatha Narayan,** *Senior Vice President & Region Leader, Wabtec Corporation*

Sujatha Narayan, Senior Vice President & Region Leader, Wabtec Corporation in a recent interaction with Industry Outlook shared her views on the key competitive challenges, such as technological disruption and infrastructure development, in the railway sector and how industry players are addressing these challenges and more. Sujatha is a seasoned Business Leader with over 17 years of experience across prominent organizations, including Wabtec Corporation, 3M India, Rogers Corporation in the US. She excels in Business transformation & Leadership and driving innovation and profitable growth.

Sujatha Narayan
Senior Vice President & Region Leader

Please provide us an overview of the current rail manufacturing landscape in India, considering the latest technological advancements and ongoing sector expansion.

Both in the mainline as well as urban transportation, India's rail landscape is undergoing a significant transformation. The rail sector is poised for significant progress with multiple metro & regional transport projects receiving approvals, with a USD 31 Billion budget for the Indian Railways.

As one of the largest entities, the Indian Railways has a clear as well as articulated strategy that is focused on 3 key areas. It includes 100 per cent electrification with its target completion by March 2025 that is aimed at decreasing costs, improving sustainability as well as lowering dependence on imported fuel. Secondly, it aims to increase freight share from current 27 per cent to 45 per cent by 2030, decreasing logistics costs & driving economic growth, ultimately. Lastly, they are focused on enhancing passenger experience for the 8.5 billion travellers every year by improving speed, cleanliness, safety, comfort as well as punctuality.

Indian Railways is bringing better rolling stock with modern locomotives as well as enhanced wagons for increasing freight capacity as well as speed. Rendering high-speed, self-propelled trains with high-quality interiors

coupled with the introduction of sleeper coaches, the Vande Bharat platform has revolutionized passenger travel, imminently. Furthermore, discussions are underway for high-speed trains reaching 250 kilometers/hr and the development of the bullet train system at 350 km/hr.

Prioritizing safety and this is highlighted by the Kavach automatic train protection system which is aimed at avoiding accidents. The additional technological advancements comprise condition-based monitoring for rolling stock, tracks as well as infrastructure leveraging tools such as ultrasonic fracture detection for enhancing maintenance & prevent failures.

The focus on modernizing locomotives, tracks as well as safety systems positions the Indian Railways at the forefront of rail innovation as well as growth in the years to come.

Centered around three key pillars which include sustainability, safety & efficiency the global rail industry is undergoing a significant transformation

Please highlight key competitive challenges, such as technological disruption and infrastructure development, in the railway sector and how industry players are addressing these challenges.

This can be addressed in two parts. Firstly, in terms of technological disruption, while advancements such as semi-high-speed trains, the Kavach platform as well as the high-horsepower locomotives are significant. And these represent incremental improvements. The most transformative innovation Kavach – the Train Collision Avoidance System is set to revolutionize the signalling infrastructure. This system is attracting numerous market players. This has been developed by RDSO with support from local vendors.

Secondly, sustainability presents both an opportunity as well as a challenge. The greenest form of transportation – the Rail is under increasing pressure from government regulations for becoming even more sustainable. However, as greener technologies often come with high initial costs, financial constraints are making operators hesitate. Enterprises which can provide innovative, cost-effective solutions with long-term benefits will flourish in the evolving segment. There exists immense potential for frugal innovation specifically in addressing the lifecycle costs of rail operations.

Furthermore, the shift toward localized manufacturing that is driven by the country's Make in India policies will need enterprises to move away from centralized manufacturing models. Although, establishing numerous factories in several countries can be capital-intensive, the ones who navigate this challenge smartly & efficiently will stand out as leaders in the global market.

In the global rail industry context, what cutting-edge technologies are currently shaping the engineering and technology landscape?

Centered around three key pillars which include sustainability, safety & efficiency the global rail industry is undergoing a significant transformation. The industry is driving innovations that are focused on decarbonization, with freight shifting from fossil fuels to alternative energy sources such as electrification, LNG, battery-powered locomotives, renewable diesel and hydrogen. In Europe, the "Shift to Green" initiative is pushing the development of green materials, low-carbon solutions as well as advancements in charging systems, braking systems, digital couplers as well as maintenance technologies.

Both freight as well as transit are embracing artificial intelligence & data analytics for autonomous operations on the efficiency front. Furthermore, railways can predict system health and take preventative measures even before a failure occurs by integrating ML with historical data. Also, virtual coupling of trains combined with advanced signaling are increasing train capacity without any additional infrastructure, decreasing costs as well as boosting network throughput.

since safety remains one of the top priorities with the ongoing advancements in signalling systems around the world, Europe is implementing Europe Rail Traffic Management System (ERTMS) & European Train Control System (ETCS), while the USA has adopted Positive Train Control (PTC). In India, the Kavach system will improve safety & emerging technologies such as moving block signalling are being explored and all of these solutions are driven by robust cybersecurity measures. At Wabtec, we are happy to be at the forefront of these innovations, helping in shaping the future of the rail industry & addressing the key challenges that are faced by our clients.

TUAMAN ENGINEERING (TEL)

REIMAGINING EPC PROJECTS WITH EXPERIENCE & ADVANCED TECHNOLOGY

The Indian Construction Market size is predicted to reach $2134.43 billion by 2030, growing at a CAGR of 12.6 percent from 2024 to 2030 according to Next Move Strategic Consulting. This development is driven by several factors, among which technology innovations have been vital. It can be said that the EPC sector of the country has undergone an evolution in engineering and today, technologies like AI are being combined with manufacturing and construction machinery for providing better outcomes promptly.

However, there are very typical challenges clients face while availing the turnkey EPC solutions and services from providers. It would seem that despite being strong on the civil and mechanical front, a provider would lack expertise in electrical and instrumentation or very few who can cater to all disciplines under a single umbrella. What clients require in this regard is a multi-disciplinary solutions and service provider like Tuaman Engineering (TEL), which is equally equipped in all the areas of requirement. A combination of different kinds of engineering expertise makes this company stand apart in the market.

> TEL's core competencies encompass Engineering, Supply Chain Management, and Installation of Civil & Structural, Mechanical, Electrical, and Instrumentation facilities

Being a part of the Indian business ecosystem for 19 years, the company has grown strategically keeping in mind its core competencies. It has successfully delivered many impactful EPC projects of varied magnitude and criticality. "TEL operates in various industry segments and sectors like Oil & Gas, Railways & Metro, Power and Energy, Chemical, Ferrous & Non-Ferrous, Buildings with HVAC & MEP, Substations, and others", mentioned Dr Pinaki Duttagupta, Whole Time Director, Tuaman Engineering.

Technological Excellence

With an in-house strong engineering background, the company has tie-ups with global leaders in several fields including a recent Memorandum of Understanding (MoU) with The Indian Institute of Technology (Indian School of Mines), Dhanbad to collaborate on technological advancements and R&D activities. This helps TEL to take a successful part of many unique projects in different sectors and few are for the first time in our country.

The company focuses on evolving along with the industry and is equipped with all the modern-day technology requirements. TEL's core competencies encompass Engineering, Supply Chain Management, Installation of Civil & Structural, Mechanical, Electrical, and Instrumentation facilities and the company has integrated digital technologies for all these processes. "Since the pandemic, we learned how processes can be efficiently handled remotely and started taking steps to become digitally enabled. We were able to execute many projects using digital tools and technologies through proper collaboration and communication among all departments", stated Dr Duttagupta.

TEL prioritizes ritual compliance to safety and quality standards as the bedrock of its operations. Safety

Dr Pinaki Duttagupta
Whole Time Director

is embedded in every facet of the company's work, with rigorous procedures and constant vigilance to protect all team members, partners, and the communities it serves. The company's unwavering commitment to quality is not just a practice but a ritual. "We are ISO 45001:2018, ISO 9001:2015 and ISO 14001:2015 certified and environmentally compliant organization", he added.

Future Projections

Since its inception, TEL has achieved significant growth and established a strong presence in the Indian market with a stellar reputation. TEL's exceptional leadership team has played a pivotal role in this enviable success within just a few years. "Our mission has always been to add value to our client projects and we wish to do the same and emerge as one of the trusted, reliable, responsive, and responsible EPC companies in India where all stakeholders will be happy to be associated with us for long term basis, which gives us strength to build a better tomorrow together", concluded Dr Duttagupta.

INDUSTRY INSIGHTS

BUILDING TOMORROW'S COMMUNITIES WITH SUSTAINABLE LIVING AT THE CORE

By Rakesh Reddy, *Director, Aparna Constructions*

In an exclusive interview with Industry Outlook Magazine, Rakesh Reddy, Director of Aparna Constructions, shares how the future of construction is sustainable and enumerates how the industry can execute it without compromising integrity and innovation. He is a leading real estate player in South India. With 14 years of experience, he has been instrumental in establishing and stimulating the growth of ACEPL in India. He has completed his Masters in Solence from Nanyang Technology University, Singapore. He is a recipient of 'The Minister's Innovation Award 2010 by the Ministry of Transportation, Singapore and was nominated for Microsoft's Innovation Award in 2008.

Rakesh Reddy
Director

Sustainable building materials such as recycled or low-carbon options are often hard to source, or lack scalability. How can the construction industry overcome the challenges of sourcing and scaling sustainable building materials?

Overcoming the challenges of sourcing and scaling sustainable building materials in the construction industry requires a multi-faceted approach, combining innovation, collaboration, and policy interventions. As sustainable building materials gain traction, their economies of scale will improve, helping them become more accessible and mainstream.

There is a need for ongoing research and development to discover new sustainable materials that are cost-effective, scalable, and high-performance. Bio-based materials, recycled plastics, and carbon-sequestering concrete alternatives are promising, but they need further innovation to compete with traditional materials.

Digital platforms can track and monitor the availability, demand, and sourcing of sustainable materials in real time. Technologies like blockchain can provide transparency in material provenance, ensuring they meet sustainability criteria. New construction technology like 3D printing allows for the creation of customized, resource-efficient materials on demand. Prefabrication reduces material waste and can be optimized for sustainability.

Creating local production facilities for sustainable materials reduces transport emissions and makes sourcing easier and more cost-effective. It also creates local jobs and encourages regional supply chains. Moreover, encouraging the

development of circular supply chains, where materials are reused, recycled, and repurposed, helps to create an ongoing supply of sustainable materials. For example, developers can use reclaimed wood, recycled steel, or recycled aggregates from demolition sites.

Governments can offer tax incentives, subsidies, or grants to encourage the adoption and production of sustainable materials. Carbon pricing mechanisms, where companies pay for emissions, can drive the demand for low-carbon alternatives. Governments can also introduce stricter environmental regulations that push companies to adopt sustainable practices

Integrating energy-efficient designs and renewable energy systems in real estate projects can lead to higher upfront costs. How can developers incorporate sustainable energy solutions into real estate projects without significantly increasing initial costs?

Integrating energy-efficient designs and renewable energy systems into real estate projects without significantly increasing initial costs requires strategic planning, innovative financing, and design optimization. Long-term cost savings, along with potential increases in property value, make sustainable energy investments more financially attractive over time, mitigating the impact of higher upfront costs.

Incorporating sustainable energy solutions from the beginning of the design process avoids the costs of retrofitting or adjusting late-stage designs. Early collaboration between architects, engineers, and sustainability consultants ensures that energy-efficient systems are seamlessly integrated into the overall project.

Developers can prioritize the installation of cost-effective, high-efficiency appliances such as LED lighting, energy-efficient HVAC systems, and low-flow water fixtures. These relatively low-cost measures offer significant energy savings and reduce long-term operating expenses. Additionally, developers can minimize the need for active heating, cooling, and lighting by optimizing building orientation, insulation, natural ventilation, and daylighting. Passive solar design and high-performance building envelopes reduce the energy load, cutting operational energy costs without requiring expensive upfront investments.

In multi-unit residential or commercial projects, developers can install renewable energy systems that serve common areas or multiple units. This reduces the cost per unit while delivering the benefits of renewable energy across the entire building. Installing energy management systems that monitor and optimize energy use in common areas, such as lobbies, corridors, and parking lots, helps cut operational costs without adding substantial upfront costs. These systems can automatically adjust lighting, heating, and cooling based on occupancy and weather conditions.

Prefabrication allows for energy-efficient building components to be mass-produced and installed with greater precision, reducing waste and labor costs. These methods can lower construction timelines and overall expenses while improving energy performance. Developers can source prefabricated energy-efficient components or modules, which are designed to optimize energy usage. This method reduces both upfront construction costs and long-term energy expenses.

Existing building codes and regulations may not fully support or incentivize sustainable construction practices. What changes are needed in regulatory and policy frameworks to facilitate more sustainable construction practices?

To facilitate more sustainable construction practices, building codes and regulatory frameworks need to be updated and aligned with environmental goals. These changes should incentivize the adoption of sustainable technologies, materials, and designs, while also ensuring that sustainability becomes a key consideration in the construction industry. As consumer preferences increasingly gravitate towards health and wellness, the trend towards sustainable buildings is poised to persist and grow.

Traditional building codes often focus on prescriptive requirements, such as specifying material types or construction methods. Shifting to performance-based codes would allow for greater flexibility by focusing on outcomes like energy efficiency, emissions reductions, and resource use. Accordingly, buildings would be required to meet specific energy performance targets rather than rigid material specifications.

Furthermore, mandating regular energy performance benchmarking and audits for all buildings, both new and existing, can help track progress and identify areas for improvement. Developers should conduct Life-Cycle Assessments of materials and designs, ensuring that the total environmental impact of a project is considered. These benchmarks can be tied to penalties or incentives, pushing developers and property owners to prioritize energy efficiency.

Construction processes can be resource-intensive, consuming significant energy and water resources. How can construction firms reduce the environmental impact of their processes and operations?

To reduce environmental impact, real estate developers must consider all stages of a building's lifecycle. This includes minimizing environmental impact and optimizing value across the stages of design, construction, operation, maintenance, renovation, and ultimately, demolition.

Installing renewable energy systems, such as solar panels or portable wind turbines, on construction sites can help power tools and equipment using clean energy. This reduces reliance on diesel generators or grid electricity from non-renewable sources.

Construction firms can set up systems to collect and reuse water on-site. Installing rainwater collection systems can provide a sustainable water source for non-potable uses such as site cleaning, dust control, and irrigation of landscape areas. Using water-efficient equipment, such as high-pressure, low-volume washers, can reduce water usage during construction activities.

> **Smart building technology plays a crucial role in enhancing sustainability and operational efficiency**

Employing design strategies that minimize material waste is crucial. This includes optimizing the design to reduce off-cuts and excess materials, adopting modular designs, and using 3D modeling to ensure accurate material requirements. On-site waste management systems can ensure that materials such as wood, metal, concrete, and plastics are sorted and sent for recycling rather than going to landfills. Construction firms can collaborate with local recycling facilities to recycle construction waste efficiently.

The industry must expedite the integration of advanced technologies to ensure the effective management of green buildings across their entire lifecycle. Embracing automation, artificial intelligence, and big data analytics is essential for enhancing operational efficiency and reducing associated risks. By leveraging these innovative tools, developers can optimize standard procedures, lower maintenance costs throughout the lifecycle, and boost workforce productivity.

Sustainable real estate developments may carry higher initial costs, but they also offer potential long-term benefits such as energy savings. How can the long-term financial benefits be effectively communicated?

Although the upfront investment may be higher, integrating sustainable features into a property significantly increases its long-term value. The demand for environmentally-friendly features in buildings is on the rise, primarily due to the resulting reduction in maintenance costs. This characteristic is particularly attractive to potential homebuyers. Moreover, projections indicate that within five to seven years of purchase, the savings on utility and energy bills will likely compensate for the initial acquisition costs.

Sustainable and energy-efficient real estate projects yield significant cost benefits for residents. Enhanced insulation materials significantly minimize heat transfer into the building. The installation of solar panels can lead to substantial monthly energy cost reductions. Substituting conventional light bulbs with LED and CFL options, along with the incorporation of energy-efficient fixtures, contributes to lower electricity expenses. Leveraging natural light and solar energy systems effectively decreases carbon emissions associated with residential properties. By treating and re-using on-site wastewater for landscaping and other purposes, potable water consumption is reduced, thereby saving additional costs.

While smart building technologies can improve resource efficiency, they can also introduce complexities in maintenance and higher initial costs for installation. How can smart building technologies be integrated into construction projects to promote sustainability?

The impact of smart building technology on the future of real estate is significant. Projections indicate that the global count of Internet of Things (IoT) devices will increase from 15 billion in 2020 to around 30 billion by 2030. This surge in IoT-driven automation is poised to enhance both comfort and convenience while also promoting sustainability and cost savings.

Smart building technology plays a crucial role in enhancing sustainability and operational efficiency. By leveraging an IoT framework, these systems enable real-time problem identification and resolution through advanced sensor technology. IoT sensors not only contribute to improved living conditions but also streamline routine maintenance tasks. Features such as intelligent temperature management, energy-efficient devices, and remote control of lighting and other property elements are now readily accessible. Furthermore, customizable settings in areas like kitchens, bathrooms, and gardens allow for greater control and personalization. Additionally, connected appliances can be effectively monitored for any malfunctions or maintenance needs, ensuring optimal performance and longevity.

Technology-enabled buildings have the potential to address and resolve issues in real-time through the utilization of sensor technology. These projects can gather data from maintenance facilities, including sewage treatment plants, water treatment facilities, and rainwater harvesting systems directly on-site. By monitoring resource consumption and waste generation, these initiatives can continuously refine their designs and operational procedures, leading to cost savings while simultaneously conserving natural resources.

AFTERWORD

HOW CFOs CAN TRANSFORM COST MANAGEMENT & ENHANCE EFFICIENCY

● *Om Prakash, CFO, RAK Ceramics (India)*


Om Prakash
CFO

Om Prakash, CFO, RAK Ceramics (India), in an exclusive interview with Industry Outlook shares his views on the steady growth in the ceramics industry, the impact of technology adoption on cost management, and the role of CFOs in leveraging financial data and analytics and more. He has over 20 years of experience managing business strategy, financial operations and accounting functions at RAK Ceramics.

Given the steady growth in the ceramics industry driven by urbanization, infrastructure development, and increased construction activities, alongside the expanding use of ceramics, how do you, as a CFO, perceive the current industry landscape?

The ceramics industry has been growing 8 to 10 percent over the last few years. As per several reports, the industry is anticipated to grow continuously for eight to ten years with an average rate of eight to ten percent. Moreover, there are reasons for continuous growth as the industry is into construction, wherein the kind of population and urbanization is taking place with the support of government policy in terms of infrastructure development and initiatives, which includes focusing on housing. Hence, there are many opportunities for the industry to thrive, driven by technological advancement and the growth in disposable income of the middle class, which contribute to development and sustainability in the long run.

Moreover, though the ceramic industry is capital intensive, there are not many entry barriers; the market is very dynamic and competitive, with approximately 800 players in Morbi, where they have cost-effective production. Success lies on innovation and producing quality products to differentiate in the market, providing better service, and creating a better consumer pool.

What impact does technology adoption, such as automation and digital tools, have on cost management and efficiency in the ceramics industry, and how are CFOs leading these initiatives?

By utilizing advanced technology and latest equipment and stringent quality norms, quality products can be produced in the production processes with less wastage than by using manual intervention. Technology has advantages such as waste reduction, data monitoring, and appropriate extensions. Technology can be utilized for the preventive maintenance of the machines, wherein planning and scheduling can be initiated with reminders for several sections of the plant. Besides, technology has significantly improved the production process as the latest technology has a good insulation system and heat recovery system, reducing fuel costs.

Looking ahead, what future trends and developments do you foresee in cost management and efficiency within the ceramics industry, and what strategic roles will CFOs play in shaping these trends?

First and foremost, we should invest in innovation, which is only possible with technology. Thus, it is essential to adopt technology swiftly wherever possible, for example, on the shop floor or in the maintenance space associated with data analytics and data review. In addition, there needs to be a significant focus on sustainability as every member of society is responsible for nature, and it is imperative to work on sustainability initiatives. Some technologies help to reprocess the broken tiles so that the organization can save in terms of raw materials and reduce power consumption, contributing to sustainability goals. Furthermore, the water treatment plan can be used in the polishing department so that water can be recycled and used again.