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ATMANIRBHAR BHARAT

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THE WHISTLING INDIAN RAIL

ARTICLE

UNLOCKING THE POTENTIAL OF STAINLESS STEEL IN METRO SECTOR

EXCLUSIVE INTERVIEW

MR. RISHI AGGARWAL
MANAGING DIRECTOR
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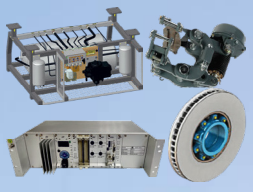
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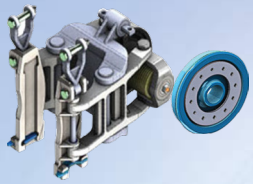
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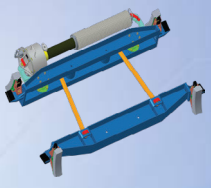
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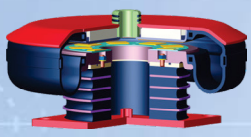
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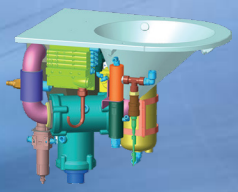
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A PERIOD OF DEDICATED EFFORTS FOR A DEVELOPED NATION STATUS

THE EDITOR'S NOTE

NARENDRA SHAH
MANAGING EDITOR

In the last few years, the government has made extraordinary expenditures in modern infrastructure, propelling the country to new heights. The quality of a country's infrastructure is a major factor in determining its economic trajectory. The government has prioritised infrastructure development in its development strategy. In recent years, the country has seen rapid infrastructural development in all areas. Through the Pradhan Mantri Gram Sadak Yojana, about 53000 km of national highways have been added, with rural road connection growing to over 95% coverage.

The highway is being developed at a rate of 37 kilometres per day. The Vande Bharat, India's first domestic Semi-High-Speed train, is a key 'Make in India' success story. Vande Bharat trains are already in service, and 400 more are scheduled to be built over the next three years. Metro rail initiatives have reached 20 cities in the past years.

Through the Udan project, steps have been taken in the aviation section to make it more inexpensive and accessible for the common man. In the last ten years, 74 new airports have been developed and opened. A total of 111 waterways have been designated as National Waterways. During this time, the country also witnessed major constructions, such as the world's highest railway bridge (the Chenab Bridge) and the world's longest highway tunnel (the Atal Tunnel) as well as the completion of many long-pending projects, such as the Saryu Nahar Irrigation Canal, Eastern and Western Peripheral expressway and others.

The PM Gati Shakti National Master Plan (NMP) has also been unveiled by Prime Minister Narendra Modi, with the aim of expediting development operations in the country, institutionalizing holistic planning, and inter-departmental cooperation through a single integrated platform. Recent infrastructure development projects are helping to accelerate the country's progress toward becoming a developed nation by 2047.

Further, given the context of the last many years, it is necessary to state that the rate of progress, both in terms of project approval and execution, has been impressive, as opposed to the situation in which projects were just passed on paper with little execution on the ground. Better infrastructure is one of the most fundamental criteria for a healthy economy since it facilitates the establishment of new firms and simplifies commutes and logistics. Today, the country witnesses improved infrastructure in most of the sectors, including national highways, trains, and new airports. The Indian road network has virtually doubled in size. It has helped transform the impression of the country's road network from potholes between roads to high-speed national highways. Roads have been built in places where there were none previously. Two lanes have been converted to four lanes, and the existing four lanes have been converted into highways and expressways.

Another stated government ambition is to seamlessly connect India's north to eastern states such as Assam, Arunachal Pradesh, Tripura, among others. Last-mile connectivity, such as new lines in Jammu and Kashmir, bringing new luxurious trains such as Vande Bharat, vista-dome coaches, improving existing train facilities, increasing the number of trains, doubling and electrifying tracks, facilities at railway stations with improved security, have all been prioritized by the government over time. Many projects have been completed, while others are nearing completion. The Rishikesh-Karnaprayag Rail Line Project is going steadily. Despite the topographical limitations of Uttarakhand's difficult terrain, the project is gaining traction. It will promote socioeconomic, economic, and cultural growth in the region, as well as last-mile connection.

The government is focussing not only on the national railway but also on regional connectivity with faster speeds and improved facilities to simplify travel between cities. The Regional Rapid Rail Transport System (RRTS) is one such initiative. Trains that are faster than metro and have better stations would allow for a faster and more secure transit between cities. Several RRTS projects have been approved, and the first line between Delhi and Meerut is more than halfway built, with the priority segment expected to be operational this month. Once completed, this project will relieve traffic congestion between Delhi and Meerut and benefit daily commuters. In addition, metro lines in many other cities are being constructed to improve connections and ease of travel.

Expressing the ecstatic joys of the 77th Independence Day, we, with our indebted hearts to all the supreme souls who lost their lives in making this great nation free from the clutches of foreign invasion and rule, present you our Independence Day special edition. We have tried to summarise the glorious heritage of the nation in this special issue, especially focussed on metro and railways along with other regular contents. We feel no fear to iterate that as a nation, we are incomparable. Every sector we see, there is no need to state that we had been the forerunners, and so we shall be. This pious land has been a mother of humanity, civilisation, art, culture, democracy, science and technology. United, we stand and continue believing in ourselves; we shall definitely help make the nation, the country of our dreams by its 100th year of Independence in 2047.

Wishing you a very happy Independence Day once again, we submit our magazine for your perusal. We wish you a happy reading.

Narendra Shah
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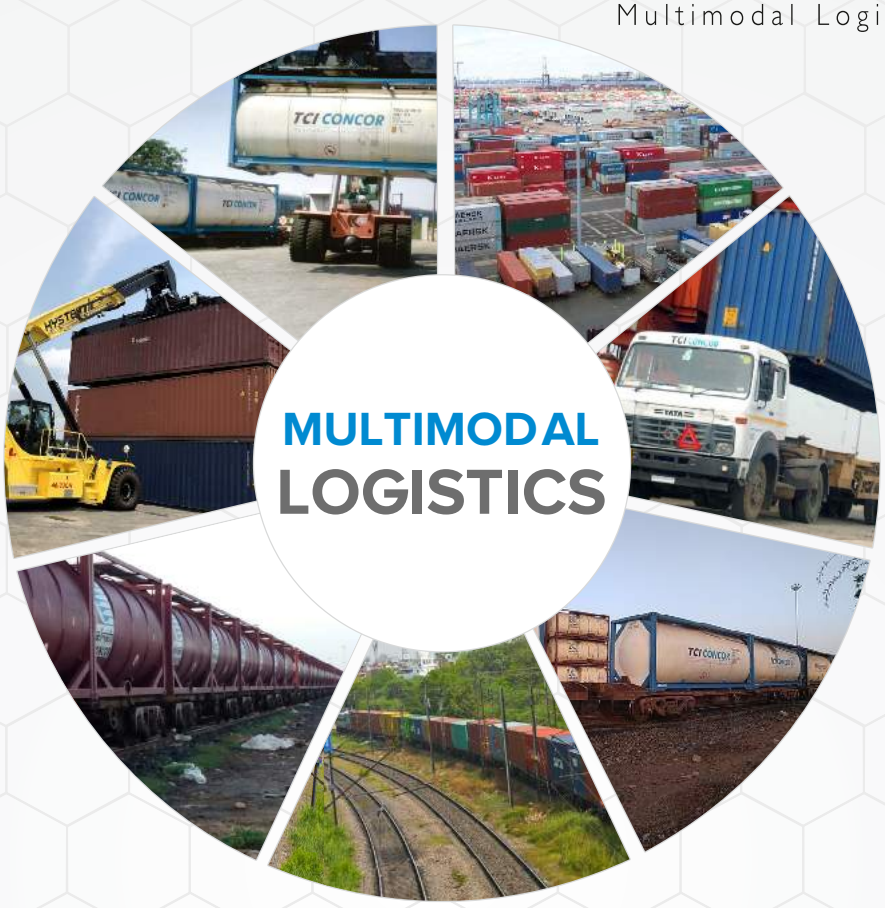

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NEWS HIGHLIGHTS

METRO

Chennai Metro Rail Partners with NLC India for Green Power Solutions

Chennai Metro Rail Ltd (CMRL) has partnered with NLC India Limited (CAT1 Licensee) to tap into power through open access. The agreement aims to optimize power procurement costs and ensure access to green energy sources, supporting CMRL's commitment to sustainable and cost-effective solutions. The power will be sourced from the Indian Power Exchange, providing CMRL with a reliable and sustainable solution. The contract was officially signed in the presence of esteemed officials from both organizations, marking a significant step towards greener transportation in Chennai.

Kochi Metro: General Consultant Appointment for Phase 2 Construction

The Kochi metro rail project's second phase progresses with the appointment of Systra and Systra MVA Consulting India Private Limited as the general consultant. They will supervise construction, assess proposals, and ensure high standards of quality and safety. Civil works for the 11.2 km stretch, connecting Jawaharlal Nehru International Stadium to Infopark, are expected to begin before Onam.

PMC Likely to Approve Khadakwasla to Hadapsar Metro DPR

Pune may soon get a new metro route from Khadakwasla to Hadapsar, as the Pune Municipal Corporation (PMC) is likely to approve the detailed project report (DPR) in the next general body meeting. Pune Unified Metropolitan Transport Authority has already given its approval. Both Tata Group and Maha Metro are interested in developing the route. The Centre will share the financial burden with the Maharashtra government and the PMC. Other metro routes are also under consideration in the city.

Tricity Metro Network Expands: Phase 1 Reaches 77 Kilometers

The governments of Punjab, Haryana, and Chandigarh administration have expanded the first phase of the Tricity Metro network from 66 km to 77 km. RITES is tasked with creating a detailed project report for the Metro project, covering 35 km in Chandigarh, 11 km in Panchkula, and 31 km in Mohali/New Chandigarh. The project's cost is estimated at Rs 10,570 crore, with construction expected from 2027 to 2037.

DMRC Begins Soil Testing for Bhubaneswar Metro Project

The Delhi Metro Rail Corporation (DMRC) has commenced soil testing for the Bhubaneswar metro rail project in Odisha. The investigation aims to assess the soil's physical properties and strength to support the metro structure. Soil sampling is underway between Trisulia to Nandankanan. The findings will be used to prepare a detailed project report, crucial for route, alignment, and related decisions of the 30 km first phase connecting Cuttack to Biju Patnaik International Airport with future extensions planned.

Delhi Metro's Rithala-Narela Corridor May Extend to Kundli in Haryana

The Delhi Metro Rail Corporation (DMRC) is planning to extend the Rithala-Narela corridor up to Kundli in Haryana to improve connectivity to the neighboring state. The proposed extension will be the fourth expansion of Delhi Metro into Haryana The proposed extension involves extending the operational Shaheed Sthal-Rithala Red Line corridor. This corridor may become the first-ever connection between Haryana and Uttar Pradesh through Delhi within the Delhi Metro network. The detailed project report (DPR) is expected to be submitted for approval soon.

Two Firms L&T and NCC Ltd Submit Bids for 5,688 Crore Hyderabad Airport Metro Project

Hyderabad Airport Metro Rail project attracts bids from Larsen & Toubro and NCC Ltd for the 5,688 crore tender. Only these two firms participated in the bidding process. The bids will be evaluated, and recommendations will be presented to the government after a 10-day evaluation period. The project is fully funded by the Telangana government.

Historic Milestone: Agra Metro Successfully Conducts First Test Run, Surprising Residents

The Agra Metro project achieved a significant milestone as it conducted its first successful trial run from the Ramp Area of Agra Metro Depot to Taj East Gate Station. This trial took place on a ballastless track spanning approximately 3 km. The metro trains in Agra will be powered by a charged third rail running parallel to the track. The officials are determined to commence metro operations soon.

Pune Metro Line 3: 622 Piers Erected on Hinjawadi-Shivajinagar Route

The 'Puneri Metro' project in Pune, connecting Hinjewadi and Shivajinagar, is progressing rapidly. Recently, the 622nd pier was successfully erected on Ganeshkhind road, marking a significant milestone. The project, undertaken by Tata Group and PMRDA under PPP, aims to construct 922 piers, and 600 have been completed in just over a year. Once completed, the metro will provide a convenient and affordable transportation option for citizens.

RAILWAYS

Railway Ministry Approves 129 KM Rail Corridor Connecting Delhi, Haryana, and Gujarat Ports

The Ministry of Railways has approved the 129km South Haryana Economic Rail Corridor, linking Haryana with four ports in Gujarat via Rajasthan. The project aims to reduce travel time and improve connectivity to industrial hubs. Trains on the corridor will run at speeds of 130-160kmph. The estimated cost of the project is Rs 1,225 crore. It will be executed by HRIDC. The corridor will significantly shorten travel distances between Delhi-NCR and Gujarat.

Railways Plans to Acquire ₹5,000 Cr Kavach ATP Systems, Tenders to be Released Soon

Indian Railways is planning to acquire the Kavach automatic train protection (ATP) systems at a cost of ₹5,000 crore to prevent head-on collisions and enhance safety. Two tenders for Kavach covering a total of 12,000 kilometers will be launched in phases. The Kavach system will automatically apply brakes if the train pilot fails to respond to signals. The goal is to cover the entire 70,000 kilometers of the railway network within a decade.

K-RIDE Proposes 452 Km Bengaluru Suburban Rail Expansion

Karnataka Rail Infrastructure Development Company (K-RIDE) has proposed extending the Bengaluru Suburban Rail project to nearby cities and towns, seeking approval from the Ministry of Railways for a pre-feasibility study. The extension, known as Phase-2, would cover a total of 452 km, connecting places like Kolara, Tumakuru, Mysuru, Bangarapete, Hosuru, and Gauribidanuru. This move aims to enhance commuter convenience and foster industrial development in the region.

Gurugram Railway Station Set for ₹200 Crore Redevelopment

Gurugram Railway Station is set for redevelopment with a budget of ₹200 crore. Gurugram MP Rao Inderjeet Singh made the announcement after meeting with Railway Minister Ashwani Vaishnav. Pataudi and Rewari stations will also receive upgrades of ₹12 crore and ₹7 crore, respectively. The project aims to improve passenger amenities, seating arrangements, displays, and waiting rooms. It will also add multiple entry and exit points.

RRTS

Opportunity for Brands: NCRTC Issues Tender for Co-Branding of RAPIDX Stations

NCRTC issues a tender for semi-naming and co-branding rights at selected stations along the RAPIDX corridor, including Anand Vihar, Sahibabad, Ghaziabad, Guldhar, and Duhai. The move aims to enhance passenger experience and generate non-fare revenue to ensure the financial sustainability of the Delhi-Ghaziabad-Meerut RRTS Corridor project. Brands will have the opportunity to display brand names, offering impactful advertising campaigns and innovative offerings at the stations.

Milestone Achieved: Solar Power Plant Inaugurated at RRTS Depot in Duhai

NCRTC inaugurates a 585 kWp Solar Power Plant at Duhai Depot for the Delhi-Ghaziabad-Meerut RRTS Corridor. The plant is expected to generate 666,000 units of solar energy annually and reduce CO_2 emissions by 615 tonnes each year, contributing to a remarkable reduction of 15,375 tonnes over its lifespan. The surplus solar energy will meet the Depot's requirements and other RRTS operations, solidifying NCRTC's commitment to sustainability.

Track Laying Work Begins in Delhi's Underground Section on RRTS Corridor

The Track-laying work has begun in the underground tunnels of the Delhi segment on the Delhi-Ghaziabad-Meerut RRTS corridor. For the first time in India, advanced technology is being used to produce high-strength ballastless track slabs. These slabs have a longer lifespan, require less maintenance, and reduce overall costs. The mass-spring system is being employed to reduce tunnel vibrations caused by high-speed trains. The entire Delhi corridor is targeted to be commissioned by 2025.

High-Speed/Semi-High Speed Rail

MAHSR Project: NHSRCL Releases Tender Worth 11000 Cr. to Procure 24 Shinkansen Trainsets

National High-Speed Rail Corporation Ltd. (NHRSCL) has invited tenders to acquire 24 E5 Series Shinkansen trainsets for India's first bullet train project at around Rs 11,000 crore cost. Only Japanese firms can participate as per JICA's funding norms. The bullet train is set to debut on the Ahmedabad-Mumbai corridor by 2027. The construction of the bullet train project is well underway in Gujarat, with around 349 km out of the total 508 km falling within the state.

Production of Vande Bharat Sleeper Trains to Commence From June 2025

Titagarh Rail Systems Ltd. (TRSL) and its partner BHEL will commence commercial production of Vande Bharat sleeper trains at their Uttarpara plant from June 2025. They have been assigned the task of building 80 sets of semi-high-speed trains, with around 50-55% of components produced in Bengal. The total contract value is Rs 24,000 crore, with TRSL's share being Rs 12,716 crore. The first prototype is expected to be delivered within two years from the start of production

A JOURNEY THROUGH TIME & AGES: THE WHISTLING INDIAN RAIL

Indian Railways recently marked 170 years since the country's first passenger trains entered service. It is worthwhile to investigate and analyse the extensive and complex history of one of the world's greatest rail systems, from the British Raj to modern rail operations of a rising and developing economy. It may be noted that despite being started as an initiative to suffice the requirements of the colonial British East India Company to foster and strengthen their rule in the nation, over more than a century and a half, Indian Railways have come to define, shape and influence the country. The goals of the British plan to build railways were to reduce transportation costs and to provide English merchants with greater access to raw cotton from India. In addition, the railway would open the Indian market to British-made goods such as cotton textiles.

However, the self-driven motive of the Britishers to suffice their narrow needs on a fraudulently entered nation appeared to be a boon for the country and perhaps one of the most significant engines of its growth in due course of time. The networks and connections that were once laid to boost and help an authoritarian regime and fill the coffers of foreign investors evolved to transform the country itself, helping to establish a staggeringly large network that the world today refers to as a jewel in India's crown.

On April 16, this year, exactly on this day 170 years ago, the first passenger train ran and headed from Bombay to Thane for around 34 km. On April 16, 1853, a 14-carriage train carrying 400 passengers set out from what is now called Chhatrapati Shivaji Terminal for a distance of thirty-four kilometres. Three engines, Sahib, Sindh, and Sultan, pulled the train. However, the first significant milestone for the nation was created when steam locomotives started to be manufactured in country workshops. The Rajputana Malwa Railway's Ajmer workshop manufactured the first steam locomotive, No. F-734, in 1895.

The Great Indian Peninsula Railway (GIPR) built and operated the passenger line. It had been built in 1,676 mm (5 ft 6 in) broad gauge, which later became the standard gauge for the railway. In 1925, the first railway budget was proposed. The first electric passenger train in India travelled between Victoria Terminus (VT) and Kurla on February 3, 1925. Since then, Indian Railways have progressed and advanced in a significant way, and it has now become one of the most vital means of transportation in the nation, carrying over 30 million passengers and more than 3 million tonnes of freight across the country every day. Under one management, the Indian Railways network is the largest in Asia and the second largest in the world.

Indian Railways in Independent India

After independence, India inherited a rail network that needed significant modernisation. Many lines were rerouted, and new lines were constructed to connect important towns and cities. Later, Indian Railways was established through the merger of 42 railways held by former Indian princely states. The rail network in the country stood around nearly fifty-five thousand kilometres after independence in 1947.

For administrative purposes, the existing rail networks were divided into six Zones in 1952. With the growth of the economy, Indian Railway started making all railway productions indigenously. Steam locomotives were phased out beginning in 1985, and electric and diesel locomotives took their place. Today, Indian Railways is one of the world's most prominent rail service providers. With nearly 1,30,000 Kms of total route length, it truly is a mammoth rail system of the world. Indian Railways operates the world's second-biggest network under a single administration and Asia's largest rail network. The railway operates around 7,500 cargo trains every day, carrying more than 3 million tonnes of freight. With approximately 1.4 million employees, Indian Railways is the world's seventh-largest employer.

Soon after independence, Indian Railways was nationalised in 1951. It is currently Asia's largest rail network. Millions of people in India rely on the Indian railway as a lifeline. It plays an extremely important role in nation-building, whether economic or social. It is a low-cost transportation system that not only carries people but also goods and cargo. Under the control and ownership of Railways, DFCCIL is also constructing dedicated goods and freight corridors to improve and smoothen the rail operations in the country. Additionally, the railway is also working on the development of a Diamond quadrilateral for a high-speed rail network. The railways in India employs the highest number of people. In addition, a large section of the society relies on the rail services to earn their bread and butter and living. Rail service companies such as RailRestro and e-catering apps are linked to the Indian railways. The Mettupalayam-Ooty Nilgiri passenger train is the slowest in India. It averages 10 kmph, while the Vande Bharat Express is the fastest train presently. This train, also known as Train 18, travels at a speed of 160 kilometres per hour on average. This train can reach to a top speed of 180 kmph.

India's rail network is one of the world's largest and busiest. Every day, about 10,000 trains connect twenty-eight states and two union territories. Rail connectivity to the main cities of the North East states of Sikkim, Meghalaya, and Arunachal Pradesh is improving, and one can expect full-fledged connectivity to every area of the country in the future years. The railway's dense and complicated network is administered by dividing it into several zones, which are further subdivided into divisions.

Today, the railway comprises seventeen zones and sixty-eight divisions, which help in connecting the urban and rural areas of the country. The railways in the country operates on a multi-gauge system with broad, narrow, and metre gauges. With over 1.5 million employees, it is the world's largest commercial employer. Other than long-distance trains, many cities have a suburban or local train network for its commuters.

There are several classes of travel available on the trains, including First Class AC, Air-conditioned coaches that are 2-tier or 3-tier, First Class, Sleeper Class, AC Chair car/Seater Class, and General or unreserved. The fare list varies based on the services offered. Trains are the most dependable and inexpensive mode of transportation. The Shatabdi Express, Rajdhani Express, and Duronto Express are some of India's fastest trains, competing with the country's low-cost airlines. Every year, railways tries to incorporate and adopt new safety measures and introduce new trains in various locations to accommodate and handle the increasing number of passengers.

The history and phase-wise development of Railways in India can be stated as under:

1853-1869: Launching passenger rail services

Although rail services were first proposed in India in the 1830s, historians attribute 16 April 1853 as the turning point for India's passenger rail revolution. The country's first passenger train began its 34-kilometre journey between Bombay's Bori Bunder station and Thane on this date. It consisted of fourteen carriages pulled by three steam locomotives and carried four hundred passengers.

The railway was established through an alliance between the Great Indian Peninsular Railway (GIPR), founded in 1849, and the East India Company, which governed significant portions of the country at the time. The success of the alliance prompted the development of railways in Eastern India (1854) and South India (1856). Following the completion and opening of the Calcutta-Delhi line in 1864 and the Allahabad-Jabalpur line in 1867, these lines merged with the GIPR to form a 4,000-mile network

that stretched across India. This initial phase of passenger transportation was predominantly financed and supported by private corporations under a British Parliament-created guarantee system that ensured they would earn an established and certain rate of interest on their capital investment. Between 1855 and 1860, eight railway companies were established, including the Eastern India Railway, Great India Peninsula Company, Madras Railway, Bombay Baroda Railway, and Central India Railway.

1869-1900: Famine & economic growth

The British Raj reigned dominant and supreme in India following the Indian revolt of 1857 and the subsequent liquidation of the East India Company. From 1869 to 1881, it took over railway building from external contractors and expanded to help areas hit by hunger and famine following the country's severe droughts. By 1880, the network had grown to 9,000 miles long, with lines winding inward from the three major port towns of Bombay, Madras, and Calcutta. Toilets, gas lamps and electric lighting were among the new passenger facilities introduced in the 1890s. By this time, the railways' popularity had soared, and overcrowding forced the introduction of a fourth class onboard. By 1895, India had begun to develop its own locomotives and was able to send its own experts and equipment to aid and assist in the construction of the Uganda Railway by 1896.

1901-1925: Moves towards centralisation

In 1901, the railways began to make a profit after years of construction and financial investment. Nonetheless, the scope of government interference rose considerably in the early years of this century. In 1900, GIPR was the first corporation to become state-owned. By 1907, the government had bought all major lines and began leasing and renting them back to private operators.

In 1901, the Railway Board was formed, consisting of a government official, an English railway manager, and an agent of one of the company railways. The government, then led by Viceroy Lord Curzon, formalised the board's powers in 1905, and the board thereafter rose in size and influence ever since then. Both the GIPR and the East Indian Railways (EIR) were nationalised in 1923, as part of a move towards a more centralised management system.

Nonetheless, World War I had a negative impact on the growth of the railways, with production redirected to satisfy British needs outside of India. The network was in disrepair by the war's end, with many services banned or reduced. In 1924, railway funds were separated from the general budget, and the railway received its first independent dividend in 1925.

1925-1946: Electrification and hard times

On 3 February 1925, the first electric train ran between Bombay and Kurla, laying the groundwork for future electrification. By 1929, the railway network had expanded to a total length of 66,000 kilometres, carrying approximately 620 million passengers and 90 million tonnes of goods every year. However, even in the final days of the British Raj, foreign events continued to influence rail operations in the country. The economic depression caused by the Wall Street Crash resulted in the withdrawal of INR 11m from the railway reserve funds. Meanwhile, World War II also hampered railway development and seized the construction works as waggons were largely appropriated and commandeered for military movements and transportation.

1947-1980: Partition & zonal creation

The departure of Britain in 1947 divided the country in two, producing a ripple effect on the railways as more than 40% of the network was lost to the newly formed Pakistan.

The Bengal Assam and North Western Railways were divided and disconnected from the Indian rail system. During the post-partition uproar, rioters destroyed railway infrastructure and attacked refugee trains.

A few years later, Indian Railways began to shape its own future, gaining control of the majority of railway franchises in 1949-1950. It began reorganising the network into zones in 1951-1952. The Samjhauta Express, the first train between India and Pakistan, began service between Amritsar and Lahore in 1976. As

the twentieth century progressed, the railways made more strides towards modernisation. Colonial-era locomotives were replaced with cutting-edge trains, while efforts to adopt 25kv AC traction in the 1950s spurred a new wave of electrification.

1980-2000: Technology & phasing out steam

As a result of energy challenges that occurred in the 1970s, steam locomotives were completely phased out in the 1980s. Between 1980 and 1990, approximately 4,500 km of track were electrified. Meanwhile, the first metro system in India debuted in Calcutta in 1984. Though economic stagnation and political unrest hampered network expansion in the 1980s, the Konkan Railway, a 738-kilometer behemoth connecting India's western coast to the rest of the country, opened in the 1990s. The greatest transformation of the time, however, originated in the field of computing.

The Indian Railways in particular was benefitted by it, and subsequently, the Indian Railways online passenger reservation system was developed in 1985 and gradually launched at Delhi, Madras, Bombay, and Calcutta. This was designed to allow customers to reserve and cancel reserved accommodations (reservations) on any train from any terminal, which was expanded in 1995 with the introduction of the country-wide network of computerised enhanced reservation and ticketing (CONCERT).

2000-2017: Moving online

Metro stations have been sprouting up in India's main cities since 2000, including Delhi (2002), Bangalore (2011), Gurgaon (2013), and Mumbai (2014). In 2002, the East Coast, South Western, South East Central, North Central, and West Central Railway zones were established on the network.

However, the launch of online train bookings and ticketing through its IRCTC system in 2002 was undoubtedly the most significant stride forward for IR. Passengers could now schedule their journeys online or buy tickets from thousands of agents across the country, which truly was an important convenience added considering that passengers had reportedly travelled more than 4.5 billion kilometres on the railways between 2000 and 2001. More recently, on 5 April 2016, the Gatimaan Express, India's fastest train with a top speed of 160km/h, made its inaugural run from Delhi to Agra. On March 31, 2017, Indian Railways declared that the country's entire train network would be electrified by Dec, 2022.

2018 to present & beyond: The future of Indian Railways

Today, Indian Railways manages the fourth-largest rail network in the world, with tracks spanning more than 120,000km of the country. The railway is preparing for the future with a number of initiatives like running freight and goods trains on a separate dedicated corridor across the nation called the Dedicated Freight Corridors (DFC). The first Regional Rapid Transit System (RRTS) called RapidX, which is also the country's first indigenous semi-high speed train.

The priority section of 17 Kms from Shahibabad to Duhai Depot of the 83.14 Km corridor from Delhi to Meerut is complete, and the operations shall commence shortly. Apart from that, Indian Railways is already spearheading with its plans of launching Vande Bharat 3.0 Sleeper Version, Vande Bharat Trains after successful implementation of Train-18 alias Vande Bharat Semi-High Speed Trains. The Railways by the end of the year, may come up with the first prototype of the country's first hydrogen-powered trains along with Vande Metro and other significant development in train operations. The nation is already on the verge of achieving a significant milestone of hundred percent electrification

of its entire route length. The works on the nation's first HSR Mumbai-Ahmedabad Bullet Train Project are also in full swing, and the priority corridor is expected to be completed by 2025. The Indian Railway also envisages the ambitious goal of going completely green by 2030.

Freight, Tourist & Luxury Trains

The rail journeys are always thrilling and provide a true taste of India's rich tradition and culture. The goods and freight sector contributes over

seventy per cent of the railway's revenue. It delivers a wide range of commodities, including fertilisers, petrochemicals, agricultural produce, mineral ores, and many others. It also transports vehicles to and from long-distance locations. Indian Railways has been exceptionally successful in helping tourism growth. It has been an excellent host to all of the visitors. The most luxurious trains in the country include Deccan Odyssey, Maharaja Express, Palace on Wheels, The Golden Chariot, Royal Orient Train, Royal Rajasthan on Wheels, and the Fairy Queen. The Fairy Queen is also the nation's pride and the world's oldest functioning locomotive. On board, passengers can look forward to an unforgettable royal experience that combines Indian heritage and hospitality. The finest way to see the incredible India is through a train journey. Indian Railways is the nation's lifeline, whether for passenger or freight transport. The railways contribute significantly to tourism, being the primary source of transportation for all types of tourists from both the domestic and international sectors. In addition to simple train excursions from point to point for visitors and the general public, the Indian Railways offers the following exclusive tourist trains:

Luxury Tourist Trains
Mahaparinirvan Express
Bharat Darshan Trains
Punj Takht Train
Steam train

Additionally, the Indian Railway Catering and Tourism Corporation, a Public Sector Undertaking under the Ministry of Railways, offers a wide range of specialised tourism products and packages as well as assistance with unique tourism needs.

12,000 HP most powerful locomotive

The Indian Railways' most powerful 12000 HP Made in India locomotive made its commercial debut between the Deen Dayal Upadhyaya and Shivpur stations of Uttar Pradesh. These engines, built at the Railways' Madhepura factory in Bihar under the government's Make in India programme, are the most powerful locomotives that are running on Indian rails. All 800 of these locomotives are being built in the country after being designed at the company's engineering centre in Bengaluru. With the debut, India has joined a selected and elite group of countries that have 12,000 HP or higher capacity electric locomotives, including Russia, China, Germany, and Sweden.

India's first bullet train project

The design of bridges and tunnels for the country's first high-speed bullet train between Ahmedabad and Mumbai is well underway. The train would cover the over 500 km trip between the two cities in less than three hours, as compared to the current seven hours. The train shall stop at 12 stations, four of which are located in Maharashtra. The projected corridor will run from Mumbai's Bandra-Kurla Complex (BKC) to Ahmedabad's Sabarmati Railway Station. Three trains have been planned to run during peak hours and two trains to run during non-peak hours. Train operations have been slated to be divided into two categories. A few trains that would stop only at a few stoppages, while the others that shall stop at every station between Mumbai (BKC) and Sabarmati. There will be 70 trips each day (35 in each direction) connecting the two stations, with an estimated ridership of nearly forty thousand passengers per day.

The soil testing, surveying and land acquisition works are underway. The route travels and passes through more than hundred villages of Maharashtra. The majority of these villages are located in the Palghar district. The National High-Speed Rail Corporation (NHSRC) issued a notice of intent to acquire land in 17 villages and notified

the landowners. Those who donate their land will be reimbursed above and beyond the existing market values. Those who do not appear will have their lands taken under Section 19 of the Land Acquisition, Rehabilitation, and Resettlement Act of 2013. The train will reach a top

speed of 320 km/hr in 320 seconds and will have travelled nearly eighteen kilometres by then. Passengers would go from BKC in Mumbai to Thane in 10 minutes and to Virar in Palghar district in 24 minutes.

Different Types of Trains in India

There are many types of trains which are operated by Indian Railways. These include:

Special Trains: Special trains are not permanent because they are put in place on a temporary basis to meet the high volume of traffic during the summer vacation and festival season. The numbers for Special Trains begin with zeros.

Covid-19 Special Trains: During the pandemic outbreak, Indian railways launched Covid-19 Special Trains to transport passengers trapped in cities to their homes. To reduce the possibility of spreading COVID 19, Indian Railways cancelled all regular trains, but began COVID 19 special trains to serve passengers. The tickets for these trains could be purchased 120 days in advance.

Train 18 Vande Bharat Express: Vande Bharat Express is a semi-high-speed, completely air-conditioned daytime train capable of reaching speeds of up to 180 km/h. Train 18, as it is often known, began operations on February 15, 2019. These trains include odour control systems, sensor-based water taps, bottle holders, on-board Wi-Fi, CCTV cameras, and bio-toilets.

Humsafar Express: The Humsafar Express is a premium train featuring three-tier AC and sleeper class accommodations. Humsafar trains are equipped with most of the latest features and conveniences, such as CCTV surveillance, charging connections, bio-toilets, an innovative GPS tracking system, reading lights, LED screens that indicate passing by stations, train speed display, and so on.

Rajdhani Express: The Rajdhani Express is one of the Indian Railway's oldest trains, connecting the national capital with various other states. It is a completely air-conditioned, superfast long-distance train capable of reaching speeds of 130-140 km/h. There are currently 24 pairs of Rajdhani trains operating in the country.

Shatabdi Express: Shatabdi Express trains are superfast daytime trains that arrive and depart on the same day. The Shatabdi trains may reach speeds of up to 150 km/h. It travels short to medium distances with fewer stoppages. It only has an AC chair car sitting facility. Indian Railways is currently operating 25 pairs of Shatabdi trains.

Tejas Express: Tejas Express trains are air-conditioned chair car trains that travel at a semi-high speed. It only has two modes of accommodation: executive chair car (EC) and AC chair car (CC). It is India's first private train, run by the IRCTC. It can reach a top speed of 180 km/h. Onboard modern amenities include tea and coffee vending machines, LED TVs for individual travellers, a celebrity chef menu, free Wi-Fi, CCTV cameras, charging plugs, and so on.

Duronto Express: The Duronto Express is one of our country's fastest trains. It's a nonstop premium long-distance train that doesn't stop at any stations except for technical stoppages.

Antyodaya Express: Antyodaya Express began service on March 4, 2017. These trains are entirely unreserved and run on congested routes to alleviate congestion. Travellers do not need to reserve a ticket in advance; they can purchase one whenever they want to board the train.

Passenger Trains: Passenger trains in India provide railway passengers with cost-effective train travel. It links minor towns, villages, and cities to major cities. Passenger trains stop at nearly every station along the route and can travel at speeds ranging from 40 to 80 km/h.

Garib Rath Express: Garib Rath Express Trains are a series of low-cost, air-conditioned long-distance trains that provide rail travel at a low cost. These trains can reach speeds of up to 130 km/h.

Double Decker Express: Double Decker Express trains are superfast express trains that travel during the day and provide bi-level seating to passengers.

Uday Express: Uday Express trains are completely air-conditioned double-decker trains for business travellers, with 120 seats for each coach. Uday Express has a top speed of 110 km/h.

Jan Shatabdi Express: Jan Shatabdi Express trains are a cheaper variant

of the Shatabdi Express. It has a top speed of 130 km/h and, like the Shatabdi, completes its route on the same day. AC and non-AC seating is available on Jan Shatabdi trains.

Sampark Kranti Express: Sampark Kranti Express trains are non-AC high-speed express trains that connect India's capital to other major cities. It has a top speed of 130 km/h and only stops at major stations.

Suvidha Express: Suvidha Express is a fleet of premium express trains with dynamic fare pricing. Tickets for these trains can only be booked and purchased through IRCTC. Suvidha trains have a 15-day advance reservation period, and only confirmed tickets are booked. It is not possible to cancel e-tickets for these trains.

AC Express: AC Express trains are fully air-conditioned high-speed trains that connect the country's major cities. It has limited stoppages and has a top speed of 130 km/h.

Mail Express Trains: Unlike passenger trains, express/mail trains only stop at key stoppages and do not stop at all stations along the route. Express trains can travel at speeds of up to 130 km/h.

Superfast Express: Superfast trains stop less frequently than regular passenger trains. Superfast trains can travel at the maximum permitted speed of 160 km/h. The superfast surcharge is added to tickets for these trains.

AC Superfast Trains: Superfast AC Trains are totally air-conditioned trains that the Indian railway operates. These trains have precedence over conventional passenger and mail trains on the tracks. It does not stop at smaller stations in order to shorten journey time.

Mountain Railways: Mountain Railways of India are train lines developed in India's hilly regions that provide train services to mountain areas. Our country has seven mountain railways, three of which have been designated as UNESCO World Heritage sites.

Local Trains: Indian Railway also operates commuter or local train services to connect cities and metropolis with its peripheral and adjoining areas. Some of the popular local train services in India are- The Mumbai Suburban Railway or Mumbai, Chennai, Kolkata, Delhi, Pune, Hyderabad suburban, commuter or local train systems.

DEMU Trains: DEMU trains are commonly used by passengers who travel on a regular basis in India's semi-urban and rural areas.

MEMU Trains: MEMU Trains operate on railway tracks that have multiple electrical units and provide short and medium-distance routes.

Tourism Trains

The railways contribute significantly to tourism, being the primary means of transportation for all types of tourists from both the domestic and international sectors in the country. In addition to simple train journeys from point to point for visitors and the general public, the Indian Railways offers the following exclusive tourist trains:

- Luxury Tourist Trains
- Mahaparinirvan Express
- Bharat Darshan Trains
- Punj Takht Train
- Steam train

Metro Rail Services

The first Metro Rail stretch in Kolkata city, between Esplanade and Bhowanipur, was commissioned in 1984, covering a distance of 3.40 kilometres with five stations under Metro Railway, Kolkata. At the moment, 27 cities have a network that is either active or under construction. There are currently sixteen operational or active rapid transit metro systems in fifteen cities across India, the largest of which is the Delhi Metro. India had 859 kilometres of operating metro lines and 16 systems as of March 2023. The metro rail services in the country have grown exponentially in the last one decade. The development is expected to surge further with more than 1,000 km of new metro lines projected to expand to nearly 30 cities by 2025. Recently, Kolkata Metro (the only metro system to be governed by Indian Railways) achieved a major feat by running the first under-water metro trial run successfully under the Hooghly River.

Conclusion

The Indian Railway network not only connects various regions but also touches the hearts of its citizens regardless of race, religion, caste, gender, or class. The tangled and twisted railway lines connect and unite the Indians in one thread. It precisely symbolises and embodies the vision of makers of our constitution, who stated that no one should be discriminated upon based on their origin and background. Railways carries us all, giving us space to learn more about others, nature, and explore different region and locations. The national carrier of people and goods in India is also packed with a number of amazing details and facts. It may be surprising to find that over 1.3 million IRCTC

rail tickets are booked every day, and thousands of passengers check their PNR status every second. These statistics should make every Indian proud of their preferred means of transportation.

The Indian railway system was established on April 16, 1853. The inaugural passenger train travelled a distance of thirty-four kilometres from Mumbai's Bori Bandar to Thane. Three locomotives, Sahib, Sultan, and Sindh, drove the train. The train consisted of thirty waggons. Some fascinating facts about Indian Railways are as follows:

- The railway's 'Shubhankar' is named Bholu. On the 150th anniversary of railways, the National Institute of Design developed Bholu, an elephant costumed as a railway guard. In 2003, the railways officially adopted this joyful, ethical, responsible, truthful, and steady elephant artwork as their emblem.
- The British government's first railway workshop was established in Jamalpur, near Munger, Bihar. It was established prior to Indian independence in 1862. With iron and steel foundries, rolling mills, and other facilities, the area rapidly evolved into one of India's most important core industrial divisions.
- With more than sixty-eight thousand km of track, Indian Railways is the world's fourth largest railway network, trailing only the United States, China, and Russia. It currently has approximately 45 thousand kilometres of the electrified rail network. Besides that, the railway is the most important rail route in the world, operated by a single government.
- Indian Railways has 34 active and three under-construction Rail Museums, Heritage Gallery, Art Gallery, and Heritage Park in various locations across India to highlight the sprawling history of the nation's lifeline. These locations both protect and promote rail tourism. The Delhi Rail Museum, also known as the National Rail Museum of India, is India's first railway museum.
- The Hubballi railway station in Karnataka has been inducted into the Guinness Book of World Records for having the world's longest railway platform. Prime Minister Narendra Modi inaugurated the 1,507-meter-long platform on March 12, 2023.
- The Royal Rajasthan on Wheels, Palace on Wheels, The Golden Chariot, The Maharajas' Express, and The Deccan Odyssey are the five royal luxury trains owned by Indian Railways. The Palaces on Wheels is the oldest luxury train of all.
- Vivek Express covers the longest rail in India, travelling from Kanyakumari to Dibrugarh. It covers 4189 kilometres spanning over 82 hours and 30 minutes, including fifty-six stoppages. On the other hand, the shortest train ride in India is from Nagpur to Ajni, stretching over only 3 kms.
- The Indian Railway is building the world's highest steel and concrete rail arch bridge over the Chenab River. It is located at an elevation of 1178 feet above sea level. The bridge would connect the Bakkal and Kauri villages in Jammu and Kashmir's Reasi district.
- In India, railways employ over 1.4 million people. The Indian Railway is, without a doubt, one of the world's major employers and institutions. Other than direct employment, some people make a living by selling goods and services at railway stations and trains. Job opportunities are created through e-catering and rail apps that supply rail services. Another attempt to use the railway as a marketplace to improve people's livelihoods is through One Station One Product.
- Pir Pranjal, located in the Pir Pranjal range of the middle Himalayas in Jammu Kashmir, is India's longest rail tunnel. It is 11.25 kilometres long. The tunnel is part of the railway line between Jammu and Baramulla.
- Howrah Junction is the busiest railway station in India, with the most platforms. Its 23 platforms serve nearly one million passengers each day. Howrah is also India's oldest railway station.
- Household appliances in India work at 220 volts, although electric appliances such as lamps, fans, and outlets on railway coaches operate at 110 volts. It assists the railway in protecting its lamps and fans from robbery because it is challenging to convert 110-volt appliances to 220 volts.
- When developing rail coaches, the resonance frequency of suspension is kept near 1.2 Hz or 72 bpm to match the frequency of the human body. It is the only reason one can sleep on a moving train.
- Fairy Queen, India's oldest functioning locomotive, is still used for rides. The locomotive is powered by a steam engine and operates as a tourist train between Delhi and Alwar. The train was built in 1885 and was decommissioned in 1909. The Fairy Queen was relaunched in 1997. It is currently in operations and used as a premium tourist train.

EXCLUSIVE INTERVIEW

JCBL inspired minds

METRO RAIL NEWS TEAM CONDUCTED AN EXCLUSIVE INTERVIEW WITH MR. RISHI AGGARWAL, MD, JCBL GROUP

Mr. Rishi Aggarwal, a distinguished entrepreneur and visionary leader, is the **Managing Director** of **JCBL Group**, a prominent business conglomerate in India. With an MBA in Finance from FORE School of Management and a Harvard Business School fellowship, he exhibits exemplary leadership and business acumen. Joining the family business at 23 in 1996, he drove JCBL's remarkable growth, achieving over 20% average growth rate and global expansion, transforming countless lives with innovative solutions.

The interview discusses Mobility Solutions Limited (MSL), part of JCBL Group, and its customized solutions for the metro and rail sector in India. It highlights MSL's major projects, overseas ventures, and efforts towards carbon mitigation and EV developments.

Here are the excerpts from the interview:

1. What are the major customized solutions offered by Mobility Solutions Limited, of the JCBL Group for the metro and rail sector in India?

At MSL, we specialize in producing a diverse range of railway parts and components, including FRP/GRP composite solutions, sheet metal products, and interior solutions. Our expertise lies in crafting high-quality FRP/GRP composites, such as Nose cone/Front-end components, Interior panelling, and toilet modules. Additionally, we excel in manufacturing sheet metal products like Front Mask/Nose, Front and Rear-end components, Under Frame structures, Bogie Frames, Side Walls, Roofs, and Doors. To ensure efficiency and precision, we leverage

advanced production and mass manufacturing technologies. Our commitment to delivering exceptional quality drives our position as a trusted provider in the industry.

2. Kindly specify the significant projects being undertaken with important orders on the book.

MSL works extensively with Indian Railways as well as for Metro Projects, nationally and internationally. Some of the projects we have contributed to are Vande Bharat Express, Chennai Metro, Delhi Metro, Mumbai Metro, etc. We continue to supply for the next phases of these projects presently. Apart from this, our collaboration with Indian Railways had been a massive success in the past, where we have worked with various Rail Coach Factories of Indian Railways. These Rail Coach Factories include ICF Chennai, MCF Raebareli, and RCF Kapurthala, where MSL manufactured many significant parts and components for the Indian Railways.

3. Please give a brief detail of your overseas ventures. How is the company performing in that segment? What have been the major business tie-ups and significant accomplishments w.r.t. high-end customized mobility solutions, especially for railways?

We have a very strong and enduring relationship with global companies, and we are doing very well on the global front. We have collaborations with global companies like Alstom and GE Transportation. With Alstom and its acquired company Bombardier, we have provided components and parts for various global projects that includes Sydney Metro and many others. Also, for GE Transportation, MSL has supplied FRP Parts for their locomotive business in the USA. The quality of our parts and components fulfil the requirements of international clients, which showcases the MSL's worldwide success.

4. Indian Railways is going through a transformation spree and plans to aggressively boost its capacity in the next 5-10 years. How do you see the opportunity and enormous market ahead? Is there any specific plan by the company in this segment?

As the Indian Railways and the rail networks transform in terms of capacity and become more and more modernized, the need to supply optimum quality components made with the best quality material and technology will also increase. We are in talks with partners internationally to guide us when it comes to such niche areas of technological advancements. For example, high-speed trains require components different from the current components used. As far as specific plans are concerned, we are always aiming to improve processes and capabilities to cater to the ever-changing and ever-developing markets and demands.

5. Despite serious efforts by the government to augment rail networks and strengthen rail capacity for both passenger & freight transportation, there continues to be congestion in both trains and on roads. What, in your opinion, can be a customized solution to this? Do you think BRTS and LRT can be sustainable transport options for India?

India is an expansive country with a very high population. We cannot rely on any one single mode of transport to fulfil our requirements. Whether it is the LRT or BRTS, or metro lines or highways, we need to constantly expand reach and connectivity. The government is taking great measures when it

comes to funding or infrastructure development. So, there is also no single answer to solve the congestion problem we face. The situation is slowly being eased as we develop more routes and means of transport.

6. JCBL Limited, a part of the JCBL Group, provides customized solutions in the luxury fleet. How is it placed amongst players like Eicher, Tata Motors, Ashok Leyland, etc? What have been the growth figures for the organization? Is there any significant development by the company in terms of luxury and customized rolling stock manufacture?

At JCBL Limited, we take pride in being a leading and preferred manufacturer of highly customized mobility solutions in the country. Our expertise spans across Passenger Transportation, Health Care Vehicles, and Special Application Vehicles, catering to diverse customer needs. With a strong focus on customer satisfaction, we provide end-to-end solutions, from selecting the right chassis from OEMs to designing, developing, and manufacturing the product after taking necessary approvals for Govt. compliance, homologation/CMVR and delivering the finished product that ensures customer satisfaction, and lastly followed by a Pan India service support. Our commitment to quality and innovation allows us to deliver around 50 highly customized mobility solutions each year, contributing to an approximate turnover of 25 crores per annum. We are grateful for the strong demand and business visibility in this segment, and we continue to strive for excellence in meeting our customers' unique requirements.

7. What are your efforts towards carbon mitigation? Kindly specify the major developments in the EV segment. In what ways, with your R&D and innovation, are you helping reduce global carbon emissions in the coming years?

As a responsible corporate citizen, we are actively working on carbon mitigation and sustainability efforts. Our major developments in the EV segment are in progress, and though we can't share specific details yet, we are committed to introducing environmentally friendly vehicles. Our R&D focuses on creating cleaner and more efficient technologies to reduce emissions throughout the vehicle lifecycle, from production to recycling. We are dedicated to achieving our carbon reduction goals through thoughtful strategies and milestones.

*****

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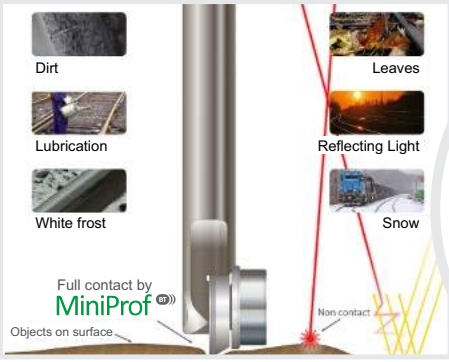

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UNLOCKING THE POTENTIAL OF STAINLESS STEEL IN METRO SECTOR

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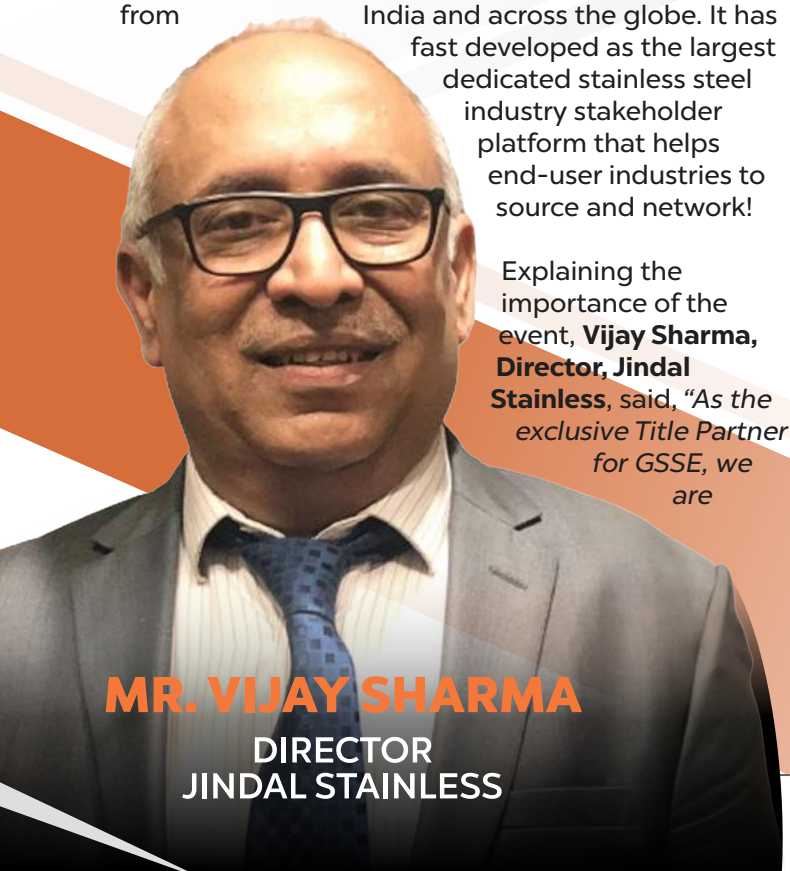
After a remarkably impressive debut last year, India's reputed tradeshow organizers, Virgo Communications & Exhibitions, are once again organizing their much-lauded second edition of GSSE: Global Stainless Steel Expo 2023 from 14 to 16 September at Bombay Exhibition Centre, Mumbai. It's a 'must-attend' tradeshow for all those who are connected with the stainless steel industry and processes related thereof.

GSSE is an apt platform that attracts participation of India's leading stainless steel producers who come together to showcase sustainable business solutions to end-user industries. The event will further augment usage of the metal mainly in India, which is the second largest consumer of stainless steel consumer in the world. The platform presents an exclusive opportunity for manufacturers & suppliers of stainless steel products to meet with potential customers representing 200+ product applications from India and across the globe. It has fast developed as the largest dedicated stainless steel industry stakeholder platform that helps end-user industries to source and network!



Explaining the importance of the event, **Vijay Sharma, Director, Jindal Stainless**, said, *"As the exclusive Title Partner for GSSE, we are looking forward to yet again interacting with fellow stakeholders in the stainless steel ecosystem, including suppliers, users, traders, associations, regulators, and fabricators. Together with these partners, we intend to leverage this event to discuss issues pertinent to the growth of India's stainless steel industry, and solutions needed to raise the bar for the whole country."*

Stainless steel has stood the test of time and proven to be the most reliable raw material compared to other metals in many industries. Discovered in the year 1913, it wouldn't be wrong to say that this metal has brought about a revolution due to its application and has been momentous in bringing about great change and progress in varied sectors. A huge percentage of stainless steel used across the world is used in the ART sector, namely in automobiles, railways and transport, apart from the construction industry and kitchen utilities. The automotive, railway and transport (ART) sector is emerging as the fastest-growing segment that consumes large amount of stainless steel in India. This industry alone has

grown around 30% over the last 8 years, propelled by large requirements, especially for railway wagons, passenger coaches and automotive exhausts. While stainless steel is a crucial metal in the construction of these transportation systems, it is also indispensable in the construction of roads, bridges and railway tracks. The strength and stability that it offers and its endurance to extreme weather conditions has made

it an ideal choice for the construction of bridges, tracks, metro stations, etc., as it can be used even in the most adverse weather conditions. Stainless steel is extensively used in the railways segment both for exterior build and internal details. Stainless steel is used for varied purposes- something as complex as coils that join the rail cars together are made of steel, while it is also used for simple handrails and tray tables inside passenger trains. Excellent resistance to fire, extreme weather conditions and high absorption of energy makes stainless steel a preferred choice for both external and internal finishes.

Rolled bars, flat plates and many other products are customized for the ART segment, as it is a very huge market for the stainless steel industry. Qualities of stainless steel, like its toughness, sterile appearance, adaptability to be rolled or pressed into varied bars, sheets, etc., make it a universal choice. Manufacturers offer parts, hardware, fittings and machinery made of stainless steel, exclusively catering to this industry that is growing rapidly every day. The fact that stainless steel is a green material that can be cleaned quickly and completely recycled further makes it a choice for many industries, replacing its contemporaries.

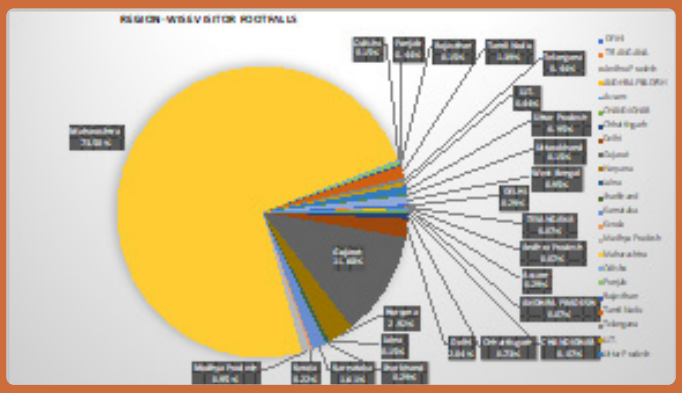
Stainless Steel has been a metal of choice in manufacturing Railway coaches and trains like Vande Bharat for the last 7-8 years. The choice of stainless steel for rail coach manufacturing was vindicated on comparing the visuals received from the recent tragic Balasore accident site with visuals of the Gaisal accident. It was seen from the visuals of the Balasore accident site that stainless steel LHB coaches post-accident had retained their shape and did not crumple, and in comparison, non-stainless steel ICF coaches which were involved in the Gaisal accident site had piled up over each other and lost their shape, resulting in higher casualties in spite of the fact that it was a collision between two trains, unlike Balasore where three trains were involved. Under these circumstances, stainless steel is better equipped to bear the stress arising due to dense crush loading (an indigenous term coined to convey the extent of overcrowding in Indian Railway coaches).

GSSE 2023: Highlights

- B2B Exhibition
- Overseas Participation
- 100000 sq. ft. Area
- CEO Round Table
- 12+ Knowledge Sessions
- 150+ Exhibitors
- 10000+ Trade visitors
- Buyer Seller Meet
- Industry & Technical Conference
- 50+ Industry Speakers

GSSE 2022: Visitor Footfalls

National **No. of States– 25**



International **Countries – 22**

Apart from the expo, a concurrent 3-day conference featuring 12 power-packed Knowledge sessions with 50+ Renowned National & International Speakers is expected to draw 1000+ attendees from 500+ organizations.
If you want to explore and learn about the advantages of stainless steel for your business, then GSSE 2023 is a must-visit for you to witness the latest advances and updates in the stainless steel industry. Visitor Registrations is Open for GSSE 2023.

For more information, visit ***www.gssexpo.com*** or scan the QR code for simple online visitor registration.

Knowledge sharing is one of the key highlights at GSSE which presents a huge opportunity to learn and discover the potential usage of stainless steel in 200+ end-user industries. At the concurrent conference, we are putting together sessions on varied topics involving powerpoint presentations and participation of a very seasoned selection of 50+ industry leaders and experts. Stay tuned on www.gssexpo.com for more updates!

THEME

STAINLESS STEEL : CREATING A GREEN AND SUSTAINABLE FUTURE

Day 1 - 14th September (Thursday)
Session 1: 2:30 PM to 4 PM
Fire-side chat on Emergence of Brand India for Stainless Steel
Session 2: 4:30 PM to 6 PM
Transitioning towards Green Steel & Sustainability
Day 2 - 15th September (Friday)
Session 3: 10:30 AM to 11:30 AM
Challenges and Opportunities in Nuclear, Defence and Aerospace sector
Session. 4: 12 Noon to 1 PM
Fueling needs of Energy sector: Fossil (Oil & Gas,) Renewables - Solar, Wind & Hydro
Session 5: 1:30 PM to 2:30 PM
Enabling the Food Processing, Pharma, Brewery and Chemical industry
Session 6: 3 PM to 4 PM
Trends in Architecture, Building & Construction - Bridges, Facades & Structures
Session 7: 4:30 to 5:30 PM
Fostering New-age Automobiles and Heavy Transport – EVs, Road Tankers, & Buses
Day 3 - 16th September (Saturday)
Session 8: 10:30 AM to 11:30 AM
Transforming Railways & Metro network in India: Coaches, Wagons & Railway Station Re-development
Session 9: 12 Noon to 1 PM
Future readying MSMEs under Atmanirbhar Bharat
Session 10: 1:30 to 3 PM
Revolutionizing Industry 4.0 – Role of Skill Development, Training & Education
Session 11: 3:30 to 5 PM
Educational Session: Fabrication, Welding & Corrosion, BIS

**the above topics and schedule are subject to change due to any unforeseen reasons*

Due to limited seats, prior online registration is mandatory. Log on to www.gssexpo.com/conference or write to conference@virgo-comm.com for further details

Inviting Manufacturers of Railway Trains & Metro Coaches to visit India's Exclusive Expo on Stainless Steel Industry

2nd Edition

GSSE

GLOBAL STAINLESS STEEL EXPO 2023

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HIGHLIGHTS

150+ Exhibitors | 10,000+ Trade Visitors | 100000+ Sq. Ft Expo Hall | International Pavilions | CEO Round Table | Industry & Technical Seminars | B2G Meetings

Timings: 10 am to 6 pm | Entry Free

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MAJOR TRAIN PROTECTION SYSTEMS & ITS WORKING: AN ANALYSIS

Train Protection

Railway signalling is the fundamental safety system that regulates train movements. It is a vital safety component of the railway's train control function. It is responsible for setting up non-conflicting and safe routes for trains, defining movement limitations, and communicating instructions or directives to train drivers once instructed by a signaller or an automation system. A train protection system consists of two major components: train detection (knowing where the train is) and movement authority (telling the train how far it can travel). These two components are used by the train protection system to ensure the safe functioning of a train.

Background

Traditionally, signalling systems in Europe, Britain, and many other nations relied on train drivers reacting to indications displayed by line-side semaphore or colour light signals and adjusting the train's speed accordingly. Over the 150-year history of railway signalling, failures by drivers to respond to directives communicated by signal elements of any type have resulted in a number of accidents, some resulting in a substantial number of fatalities. Various types of driver warning devices and signal command enforcement systems have been developed in response to the ongoing need to mitigate risks caused by train drivers failing to comply with signal commands. These are referred to as Train Protection Systems. Automatic Train Protection (ATP) systems are those that continuously monitor actual train speed and enforce conformity to a specified speed pattern.

Types of Train Protection Systems

The goal and objective of almost all train protection systems is to reduce or avoid and eliminate the likelihood of driver mistakes resulting in a train movement-related accident by failing to heed a visibly displayed line-side or in-cab signal instruction. Train protection on main line railways began with introducing and setting up warning systems and progressed to the execution and enforcement of the directives issued by these systems.

Originally, warning systems notified and warned the drivers when they approached an unfavourable or restrictive line-side signal aspect and required the drivers to recognise and acknowledge the indication issued by the warning systems. Otherwise, the systems would apply the brakes after a short delay or brief period of inactivity. Later advancements by national railway administrations included varied levels of speed limitation and enforcement. In addition, certain systems have been expanded to accommodate speed limits for permanent or temporary speed restrictions. Combinations of permanent magnets and electro-magnets, inductive polarity-changing responders, coded beacons, and simple coded track circuits are among the technologies used in such warning and train control systems.

Recently, fully Automatic Train Protection (ATP) systems have been designed and developed to enforce speed limits and movement authorities at the complete range of restrictive signals, including permanent and temporary line speed limitations, with and without line-side signals. Driving is still done manually, although speed limits are strictly enforced most of the times. However, degraded modes typically include low-speed driving on sight.

Two-Channel Safety Systems

Many older railway safety systems were built with the statistical nature of driver and equipment failure in mind. By carefully designing the systems, it is fair to presume that driver mistakes and equipment failures will not occur concurrently. A significant feature of such systems is that the driver is not informed whether the train protection system is operational or not, and is thus encouraged to drive with full responsibility for the train's movement. The technical subsystem will only interfere if the driver attempts to pass a signal or drives too quickly. TPWS, train controls, and Indusi are typical instances of this type of setup.

Automatic Train Protection Systems

ATP systems are generally divided into two types: intermittent and continuous. Intermittent systems use electronic beacons (inductive or radio frequency) or brief electrical loops placed within a four-foot radius. These short-range gadgets are commonly known as 'balises' (from the French word for 'marker'). Continuous systems feature a permanently active data transmission and monitoring system, either through electrical inductive coupling using track loops or coded track circuits or by means of radio communication of limit of movement authorities.

Fully working ATP systems were originally installed on metros in the late 1960s and are now widely used on such systems around the world. The majority of metro applications feature continuous systems in tandem with autonomous train operations. ATP was also introduced on the Japanese Shinkansen high-speed route in 1964, and it has since then been used and introduced in various forms on a number of main-line railways, frequently in conjunction with high-speed train operations.

Principles

The fundamental defining premise of ATP is that train speed is measured and monitored in context to currently approved speed limitations. The speed may be regulated by the line profile or signal indication, i.e., the requirement to safeguard other trains' routes and track-related limits. If the permitted speed is exceeded, the brakes are applied until the speed is reduced to the acceptable limit or the train is halted. Most ATP systems rely on typical block signalling, which can be relatively short. A fixed dataset describes each block's location, length, gradient, and maximum civil speed limits. Each block will also have a variable data set derived and generated from the signal aspects ahead and their impact on the resulting speed limits for that block and the blocks following it.

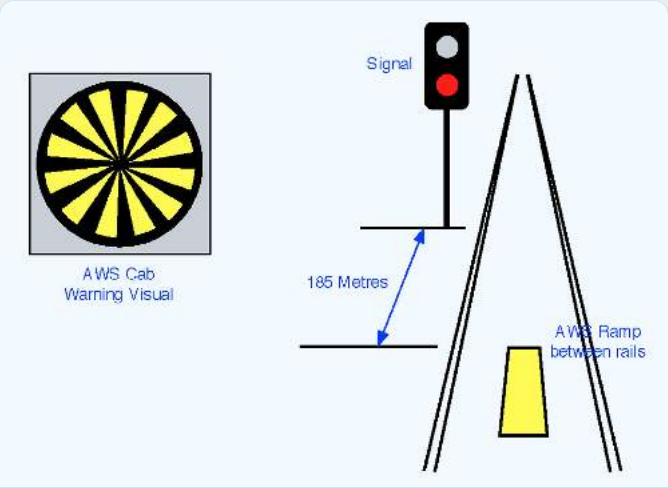
Enforcement

On the approach to a restricted signal, the speed limit creates a gradually decreasing curve that follows the braking profile required to reach the target speed at the signal. If the signal indicates a stop, the desired speed will be zero. The on-board monitoring technology will constantly compare the train speed to the curve required to attain the desired speed and shall initiate and issue a warning, which is usually both audible and can be seen. If no action is taken, the system will apply the brakes.

Track Mounted balise and the Train Mounted Data Reader

Automatic Warning System (AWS)

Following the death of 112 people in a Signal Passed at Danger (SPAD) accident in poor visibility at Harrow and Wealdstone in 1952, British Railways decided to deploy their Automatic Warning System (AWS) across the entire network to provide train drivers with an in-cab warning of the indication of the next signal. This was a non-contact variant of a system which was originally used and deployed on the Great Western Railway. After a lengthy development and certification process, widespread installation began in 1956. This system is still operational today.



Arrangement of AWS Ramp on the approach to a signal

The AWS ramp is installed between the rails so that a detector on the train may detect it and send a signal. As a result, the ramp alerts the driver about the signal's state. The French railways use a similar system known as 'the Crocodile,' and the Germans' Indusi.'

Position of AWS Ramp in the track on the approach to a signal

The AWS ramp has two magnets, one permanent and one electro-magnet, coupled to the signal, which provides an indication of the aspect.

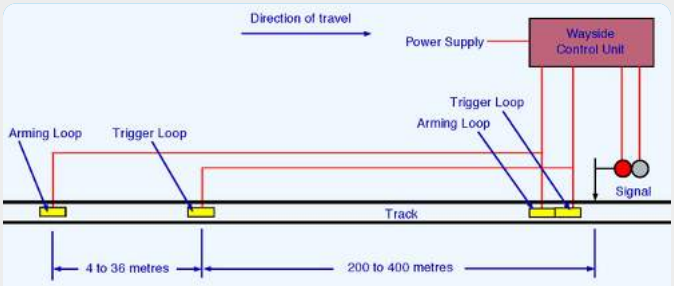
The ramp is placed between the rails so that the indication data can be received by a detector on the train. The ramps between the rails are often visible to the more observant passenger on a station platform. The AWS ramp has two magnets, one permanent and one electro-magnet, coupled to the signal, which provides an indication of the aspect. The ramp is placed between the rails so that the indication data can be received by a detector on the train. The ramps between the rails are often visible to the more observant passenger on a station platform.

Driver's Reminder Appliance (DRA)

The Driver's Reminder Appliance (DRA) was launched in 1998 to help with SPAD prevention, especially at station launching signals. In the strictest definition of the phrase, it is not a train protection device. The usefulness of this technique is debatable because it may be 'automated' as part of the train starting route and sequence.

Train Protection and Warning System (TPWS)

To counter the limitations of AWS, the British railway system designed and developed an enforcement system known as TPWS (Train Protection and Warning System). It has been developed to enforce conformity and observance to restricted speed regulations and signal stops by prompting full brake application when overspeed is detected, or a train drives past a stop signal. TPWS was tested on a segment of the Thameslink line in 1996 before being implemented over the majority of the UK network between March 2000 and December 2003.



TPWS Setup on the Approach to a Stop Signal

The theory behind TPWS is that if a train approaches a stop signal with a danger aspect at too high speed to stop at the signal, it will be compelled to stop regardless of the driver's action or inaction.

Radio Electronic Token Block (RETB)

In some rural parts of the United Kingdom, where long portions of single-line require token block operation, a centralised control system based on current computer technology was implemented. It is referred to as a Radio Electronic Token Block (RETB).

A computer system is provided to the signaller, which assigns the coded tokens to each section and prohibits more than one token from being issued for an occupied

section. It also accepts the tokens that each train sends back as it reaches the end of the single-line portion.

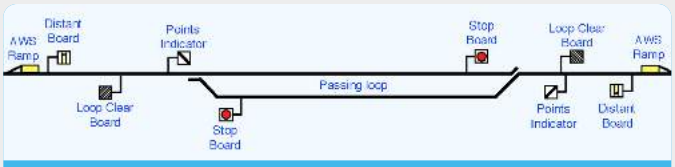


Diagram of route with Radio Electronic Token Block system

This system has been superseded by ERTMS test installation on designated routes. It was decommissioned in October 2012. RETB is still used on some of Scotland's most isolated routes.

PZB Indusi (Israel, Serbia and others)

PZB or Indusi is a train protection and intermittent cab signalling system used in Germany, Austria, Slovenia, Croatia, Romania, Israel, Serbia, on two lines in Hungary, the Tyne and Wear Metro in the United Kingdom, and formerly on the Trillium Line in Canada. The historical and ancient short-term Indusi was taken from German Induktive Zugsicherung (inductive train protection) and was developed in Germany. Later, different versions of the system were named PZB, which stands for Intermittent Automatic Train Running Control, underlining that the PZB/Indusi system is part of a family of intermittent train control systems. Later, PZB systems, which rely on a train computer, give stronger enforcement. Germany, Indonesia, Austria, Romania, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Macedonia, and Israel all use the system.

In Germany, the system is used for lines with maximum speeds up to 160 km/hr, and in Austria, used for lines with top speeds up to 120 km/hr. It incorporates speed supervision to a braking curve in the more recent computerised version. It is not fully developed to meet essential standards.

Continuous Automatic Warning System (CAWS, Ireland)

Some sections of the Republic of Ireland's mainline routes, as well as the entire line between Dublin and Cork, are equipped with coded track circuits that provide in-cab signal indicators. The system is referred to as the CAWS (Continuous Automatic Warning System). When there is a change to a more restrictive aspect, the in-cab signal communications repeat line-side indications and are accompanied by an alarm siren. The driver must acknowledge the alarm within 8 seconds to avoid an irreversible automated emergency brake application. After emergency brakes being activated, there is a two-minute delay before the system can be reset and the train can proceed. However, the technology does not seem to be vital and important because the driver may recognise a restriction signal warning and let the train proceed without slowing down.

Train Stops (Trip-Cocks, London Underground)

On most of its lines, LUL (London Underground Limited) uses mechanical train stops in conjunction with fixed blocks and individually computed signal overlaps to offer train protection. The system avoids crashes by giving an individually computed full-speed braking distance beyond each stop signal, ensuring that a train 'tripped' by the train stop comes to a stop without violating a restricted block. Trains are limited to 10 mph after being tripped for three minutes to enforce driving on sight at a cautious speed. This is referred to as SCAT (Speed Control After Tripping).

ALSN (Russian Federation/Ex-Soviet Union States)

ALSN, which stands for Continuous Automatic Train Signalling in Latin, is a train control system that is widely used on the main lines of the ex-Soviet states (Russian Federation, Ukraine, Belarus, Latvia, Lithuania, and Estonia). Similar to the Italian RS4 Codici and American Pulse Code Cab Signalling, it involves modulated pulses injected into rails. On high-speed lines, the ALS-EN (-H) variation is used, which takes advantage and utilises a twofold phase difference modulation of the carrier wave.

CBTC (Multi Nation)

Communications-based train control (CBTC) is a railway signalling system that uses telecommunications between the train and track equipment to manage traffic and control infrastructure. CBTC enables more precise tracking of trains than standard signalling systems.

This improves the safety and efficiency of railway traffic management. Metros (and other train systems) can minimise travel times while preserving or even improving safety using this system.

According to the IEEE 1474 standard, a CBTC system is a 'continuous, automatic train control system using

high-resolution train location determination independent of track circuits; continuous, high-capacity, bidirectional train-to-wayside data communications; and trainborne and wayside processors capable of implementing automatic train protection (ATP) functions, as well as optional automatic train operation (ATO) and automatic train supervision (ATS) functions.' Brazil, the United States of America, Canada, Singapore, Spain, Gabon, Hong Kong, Indonesia, Denmark, the United Kingdom, and India all employ this train security system.

Fully Automatic Train Protection Systems

BR-ATP (Two Versions)

In the early 1990s, British Rail trialled two Automatic Train Protection systems with full-speed supervision, one on the Great Western Main Line (by ACEC Belgium - now Alstom) and one on Chiltern Railways (Selcab by Alcatel) between Marylebone and Aynho Junction. Both are intermittent systems with infill loops that allow for the early release of brake demand and its supervision when signal aspects change. Despite the fact that the systems were presented as an experiment, they are still working.

Tilt Authorisation and Speed Supervision (TASS)

The primary goal of TASS is to keep trains from tilting when clearances between trains or between trains and infrastructure are restricted. In addition, depending on whether or not the tilting mechanism is active, TASS imposes line speed limits for equipped trains. The TASS system, which is designed to European Rail Traffic Management System (ERTMS) demand and specifications, is installed on the Virgin Pendolino Class 390 and Super Voyager Class 221 fleets.

Docklands Light Railway

The Docklands Light Railway (DLR) features Seltrac, an ATP system with complete continuous speed supervision supplied by Alcatel of Canada and now part of the Thales empire. Seltrac is a transmission-based ATC system combining automatic train protection (ATP) and automatic train operation (ATO) technologies. This system is only suitable for metro-type operations with a high service frequency.

Transmission Voie-Machine 430 (TVM 430)

TVM is a safe, dependable, and well-proven system, but it is expensive to install and maintain because it is based on track circuit technology.

The Channel Tunnel Rail Link (CTRL) Phase I has been equipped with the French TVM 430 continuous transmission ATP system. This is the same technique that is used in the Channel Tunnel and will be used in Phase 2. TVM 430 is a cab signalling system used on more current TGV lines that was developed by the French company CSEE from the preceding TVM 300 system.

Automatische Trein Beïnvloeding (ATB NG, Netherlands)

The ATB NG system was introduced to the NS (Netherlands) in the mid-1990s in order to implement full ATP and replace the costly and time-consuming coded track circuits. It comprises track-mounted balise and onboard computing hardware. The original ATB EG trackside equipment is fully compatible with the ATB NG onboard equipment.

Ebicab (Sweden, Norway and others)

In Sweden, Norway, Portugal, and Bulgaria, Ebicab is the standard ATP system. Despite variations in signalling systems and rules, identical software in Sweden and Norway enables cross-border train movement and operations without changing drivers or locomotives. The systems in Portugal and Bulgaria use different software. The system is available in two versions: Ebicab 700 and Ebicab 900, both of which provide identical safety functions.

KVB (France)

Contrôle de Vitesse par Balises, abbreviated KVB, is a train protection mechanism used in France and at London's St. Pancras International Station. It monitors and regulates the speed of moving trains. Based on the signals received from the balises, the onboard computer generates two-speed thresholds. If the train exceeds the speed limit, passing the first speed threshold, an audible alarm begins, and the control panel instructs the driver to lower the train speed as soon as possible. If the second speed threshold is exceeded, the KVB automatically applies the train's emergency brakes.

Except for locomotives that operate in conjunction with other locomotives, every locomotive unit on the French national railway network must be fitted with this technology. More than 5,000 engines are equipped, including foreign locomotives that move within France. This system is installed on all TGV routes that use conventional rail lines. ETCS, a European railway control system, will replace this and many other different systems in the European Union's various member states. KVB is comparable to ETCS Level 1 Limited Supervision because it provides beacon-based speed regulation with no driver indication.

TBL 2 (Belgium)

TBL 2 is used on all Belgian lines where the allowable line speed exceeds 160 km/h. TBL 2 is a cab signal system similar to the UK GWML ATP system

that uses and features a powered balise in the form of a steel loop with additional, long, and extended infill cable loops to provide early warning of signal indication changes. TBL 2 is sensitive to direction. This capability is achieved through mounting the balises between the rails at a slight offset from the centre.

LZB (Germany, Australia, Spain)

Linienzugbeeinflussung (LZB) is a cab signalling and train protection system that is used on certain German and Austrian railway lines, as well as the AVE and several commuter rail lines in Spain. The system was mandatory in Germany and Spain, where trains were allowed to exceed speeds of 160 km/hr. It is also used to boost capacity on some slower railway and urban rapid transit lines.

LZB has been planned to be phased down in favour of the European Train Control System (ETCS) between 2023 and 2030. The European Union Agency for Railways (ERA) refers to it as a Class B train protection system in National Train Control (NTC). Most driving cars must replace traditional control logic with ETCS Onboard Units (OBU) with a standardised Driver Machine Interface (DMI). Because high-performance trains are frequently not discarded or reused on second-order lines, special Specific Transmission Modules (STM) for LZB have been developed to help further and support the installation of LZB.

CTCS (China)

The Chinese Train Control System (CTCS) is a train control system used on Chinese railway lines. CTCS is a train control system similar to the European Train Control System (ETCS). It is divided into two subsystems: the ground subsystem and the onboard subsystem. Balise, track circuit, radio communication network (GSM-R), and Radio Block Centre (RBC) may be used in the ground subsystem. The onboard subsystem consists of the onboard computer and the communication module. CTCS is divided into five levels (Levels 0 to 5). Levels 2–4 are backwards compatible with earlier ones.

PTC (ITCS, USA)

Positive train control (PTC) is a type of automatic train protection system that is widely used in the United States. PTC is used on the majority of the United States' national rail network lines. These systems usually serve the purpose to ensure that trains move safely and to stop them if they do not.

Negative train control is a simplified form of train traffic governance in which trains must halt when issued a stop order and can move otherwise. Indusi is an example of negative train control. Positive train control, on the other hand, restricts and limits train movement to a stated permit; movement is terminated upon invalidation. A PTC-enabled train receives a movement authority with information about its location and where it is safe to travel. According to the American Association of Railways (AAR), the nation's leading freight railways has been using PTC on 83.2 percent of the mandated route miles as of 2019. The ITCS (Incremental Train Control System) is a positive train control application.

KLUB (Russia)

The modern Russian train control systems are known as KLUB. The KLUB-U systems can handle high-speed tracks as the Velaro RUS (Sapsan). The KLUB-P type is limited to cab signalling and lacks track safety equipment. Only category II trains (including special cars and shunting actions) use it. The KLUB-UP variation is permitted for category-I trains (including passenger transport), where it substitutes the ALSN cab signalling.

KLUB-U is the most prevalent version, with U indicating for unified. KLUB-U in-cab signalling systems can decode trackside ALSN codes (Continuous Automatic Train Signallisation), which are akin to RS4 Codici (Pulse Code Cab Signalling in the United States). The KLUB-U systems in the latest ABTC-M block control decode signals through TETRA digital radio, including remote activation of a train stop. A satellite navigation system (GPS or GLONASS) determines the train's position in certain areas. The ITARUS-ATC connects the KLUB-U in-cab system to the ERMTS Level 2 RBC block control via GSM-R digital radio.

European Rail Traffic Management System

The European Rail Traffic Management System (ERTMS) is an essential component and fundamental building block in the TEN's interoperability implementation. The European Train Control System (ETCS) handles ERTMS's physical signalling and train control section of the ERTMS. ERTMS has been developed and established to assist with the execution of two European 'interoperability' directives: 96/48/EC for high-speed lines and 2001/16/EC for conventional services. The European Rail Traffic Management System (ERTMS) includes the requirements for European interoperability.

ETCS

The ETCS design has three significantly different ATP functioning levels that enable for a stepwise transition from traditional line-side signalling to a full moving block concept with certain incremental modifications. Throughout a train's journey, the levels give complete speed supervision and varied amounts of in-cab information, and can be summarised as follows:

- **Level 1 – No Infill (System A)Level 1 – With Infill (System B)**
- **Level 2**
- **Level 3**

Global System for Mobile Communications (GSM-R)

GSM-R or satellite-based train control systems require some ground-based validation (passive Eurobalises) and train detection through track circuits most likely required for turnout locking and in complex junction areas. The installation of GSM-R as the data and speech carrier is required to implement ETCS Levels 2/3.

Conventional (Community) Railways

The ETCS technical specifications for conventional rail systems are yet to be released and made public. However, the equipment is expected to be identical to and compatible with that required for high-speed lines. This will allow trains to travel freely between ETCS-equipped high-speed lines and community railways without the need for dual system installation.

Kavach Automatic Train Protection System (India)

Kavach is a train collision prevention system developed in India. This anti-collision technique reduces the likelihood of an error to one error in ten thousand years. Kavach technology is also known as the Train Collision Avoidance System (TCAS) or the Automatic Train Protection System (ATP) system. The primary objective is to eliminate all rail accidents. The technology has also received SIL4 certification, indicating that it can minimise errors to one in several hundred decades.

Kavach, designed and developed in collaboration with the Indian industry by the Research Design and Standards Organisation (RDSO), can assist locomotive pilots in avoiding Signal Passing At Danger (SPAD) and overspeeding. Additionally, it facilitates train operations in adverse weather situations such as heavy fog. The device promotes train speed management and minimises potential accidents by automatically deploying brakes when necessary.

Other popular warning & train control systems

Crocodile (France)

This is a French-designed AWS system that is conceptually very similar to the UK AWS. The term is derived from the track-mounted equipment's corrugated appearance. It is officially referred to and described as the Brosse Repetition Signal (BRS). BRS is installed on all main lines of SNCF, SNCB, and CFL. Crocodile basically is a vigilance system. Crocodile tends to be lesser protective than AWS since voltage absence cannot be detected. The device usually fails to provide the driver with any indication if the system becomes problematic or faulty. The crocodile system may now be considered obsolete and outdated.

ASFA (Spain)

ASFA is a popular cab signalling and train protection system in Spain. Intermittent track-to-train communication is based on magnetically coupled resonant circuits and can communicate nine different sets of data. A trackside resonant circuit is tuned to a frequency representing the signal aspect. The device is not fail-safe, but it does remind the driver of the signalling conditions and requires him to recognise limiting characteristics within 3 seconds. The driver is given a lamp and bell warnings.

Automatische Trein Beïnvloeding (ATB EG, Netherlands)

On Dutch railway lines, the ATB system is available in two basic configurations: ATB EG and ATB NG. The original continuous system is the ATB-EG, while the new intermittent system, ATB-NG, is suited for speeds up to 360 km/hr.

ATB EG is a fail-safe system that uses coded track circuits of traditional design and two variants of on-board equipment, ACEC (computerised) or GRS (electronic) and is deployed on the vast majority of ProRail (the new Dutch infrastructure authority) lines. Vehicle-mounted induction pickup coils suspended above the rails transmit data between coded track circuits and onboard equipments.

Transmission Balise Locomotive: (TBL, Belgium)

TBL is available in two versions: TBL1 and TBL2. TBL1 indicates the signal aspect in advance, followed by an emergency brake application and a train trip function for signals passed at risk. Data is delivered by track-mounted loops. Unlike most other balise systems, the TBL loops require an external power supply.

BACC-RS4 Codici /-SCMT (Italy)

BACC or BAcc (automatic block with codified currents) is a signalling block system used on 3 kV DC electrified railway lines in Italy. The track circuits that detect the presence of a train also provide coded signals to the trains for train protection and cab signalling. RS4 Codici, RS9 Codici, and SCMT are train protection systems that use BAcc.

BACC is used in two variants on the majority of RFI (Rete Ferroviaria Italiana) infrastructure, both of which operate in a similar fashion. Conventional coded track circuits operate at one of two carrier frequencies to handle two train classes that travel at speeds higher than 180 km/hr or lesser. Induction pickup coils suspended above the rails transmit data between coded track circuits and onboard equipments.

Train Protection and Warning Systems in various countries

System	Country
ACSES	United States of America
ALSN	Russian Federation, Belarus, Estonia, Latvia, Lithuania, Ukraine
ASFA	Spain
ATB	Netherlands
ATC	Sweden, Denmark, Norway, Brazil, South Korea, Japan, Australia (Queensland), United Kingdom
ATCS	United States of America
ATP	United Kingdom, United States of America, Brazil, Australia (Queensland), Hong Kong, Indonesia, Ireland, Dominican Republic, Denmark
AWS	United Kingdom, Queensland, South Australia
BACC-RS4 Codici /-SCMT	Italy
CAWS	Ireland
CBTC	Brazil, United States of America, Canada, Singapore, Spain, Gabon, Hong Kong, Indonesia, Denmark, United Kingdom
CONVEL	Portugal
Crocodile/Memor	Belgium, France
CTCS	China
EBICAB	Bulgaria, Finland, Norway, Portugal, Spain, Sweden
EVM 120	Hungary
HKT	Denmark
I-ETMS	United States of America
Integra-Signum	Switzerland
ITARUS-ATC	Russian Federation
ITCS	United States of America
Kavach	India
KLUB	Russian Federation
KVB	France
LZB	Germany, Austria, Spain
LS	Czech republic, Slovakia
LKJ 2000	China, Ethiopia
PZB Indusi	Germany, Indonesia, Austria, Romania, Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Montenegro, Macedonia, Israel
SACEM	France, Hong Kong
SHP	Poland
TASC	Japan
TBL	Belgium, Hong Kong
TPWS	United Kingdom, Victoria
TVM	High speed lines in: France, Belgium, United Kingdom, Channel Tunnel, South Korea
VEPS	Estonia
ZUB 123	Denmark
ZUB 262	Switzerland

Metros and Light Railways

Although most metro systems around the world already have more or less advanced train protection systems available, and risks are generally low, the European Union is working to standardise a single European Urban ATP system for better train security and enhanced operations. Since most operators have their own standards, implementation is likely to be a long-term and extended objective. The benefits of unified metro train protection may appear limited at first glance, but they could result in significant cost savings in the long run.

High-Speed Line Requirements

In recognition of the difficulty in preventing driver perception overload, line-side signals are no longer considered suitable for trains travelling at speeds in excess of 125 miles per hour. Full ATP with cab signalling is expected to boost operating speeds to 140mph and above, and the deployment of ETCS-compatible equipment is expected to be an unambiguous approach to accomplish this. The current signalling systems need to be maintained for conventional trains and may be required for fall-back purposes, at least during the early years of operation of any stand-alone ETCS Level 2/3 system, until reliability and operational experience allow line-side signals to be removed.

Conventional Railways

When signalling renewals become essential, it will be a logical development for traditional railways to incorporate ATP using ETCS standards. Once the GSM-R network is built and developed and the omission of full line-side signalling has been approved, viable, and reasonable, this is expected to be demonstrated as a cost-effective alternative for renewals.

Conclusion

As per the analysis of various train protection systems around the world, it is possible to conclude that the majority of the systems require a positive action to issue a warning or restrictive data and that almost every signalling systems discussed are more or less used for continuous speed supervision and that all of them can be isolated in the cab and the train can be driven at normal speeds regardless of signal aspects. While the signalling technologies discussed above appear to give some protection against collisions and over-speed derailments, none seem to provide the complete and critical safety as provided by modern automatic train protection systems.

Given that the system is capable of recognising missing balises, TASS exhibits some of the behaviours of a legitimate ATP system. In the case of TPWS, the transmitters at a given location are linked to the signal in the rear so that in the event of TPWS failure at the next signal, this signal will show a red aspect. This is because passing trains are unable to notice track-mounted equipment failures. The indigenous Kavach train safety system, newly deployed by Indian Railways, is a SIL4 (Safety Integrity Level-4) certification technology, demonstrating that it can decrease errors to one in several hundred decades.

However, fully automatic railway protection systems have some drawbacks as well. First and foremost, it is crucial to approach the implementation of any new system from a life cycle perspective. Rapid technical change is not permitted in the railway industry. The high equipment cost and the requirement to design to tough specifications to guard against a severe operating environment necessitate a lengthy depreciation period before replacement. This limits the ability to adapt to technological progress and development. Shortages of skills will further limit the scope of change that can be handled through a life-cycle replacement task.

The benefits of deploying a fully ETCS-compliant ATP system may be difficult to sustain in many regions, with TPWS and TPWS+ train protection systems being deployed across most of the advanced and majority of the European rail networks. When maintenance is factored in, the situation becomes even more challenging and complicated. Infrastructure managers aim to reduce the amount of line-side or track-based hardware that needs to be maintained regularly. However, a balance needs to be established between the cost of providing complex technology and updating software with highly trained staff on one hand and ground-based hardware that requires regular but less expensive maintenance on the other. With modern, safe working practice regulations and the proliferation of electronic signalling systems and accompanying knowledge, this balance is likely to benefit ETCS systems.

However, the position regarding the provision of ETCS capabilities is obvious in the case of new trains - all new stock is provided with at least the physical capability of accommodating ETCS. It should also be a necessity that future rolling stock designs accommodate the needs and sensitivities of the new generation of electronic control and protection systems across all rail transport networks worldwide for increased and safe rail transit.

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THE DEVBHUMI TO WITNESS A MODERN & FUTURISTIC TRANSPORT SYSTEM

The Uttarakhand Metro Rail Corporation (UKMRC) is developing the Dehradun-Haridwar-Rishikesh Metro Corridor in order to provide residents with convenient travel options. The proposed metro system would connect Dehradun, Rishikesh, and Haridwar. The Haridwar-Rishikesh Metro line shall run parallel to the National Highway that connects the two cities.

- The upcoming metro project shall consist of a 73-kilometer elevated track.
- The Metro Corridor will serve over a lakh passengers on a daily basis.
- The Uttarakhand Metro Rail Corporation Limited will carry it out.

Uttarakhand's metro train project is scheduled to be completed by 2024. The detailed and comprehensive project report has been submitted to the state government and is expected to be approved soon. The initiative is expected to improve connectivity and enhance the pedestrian flow and footfall between Rishikesh (the 'yoga capital of the world') and Haridwar (a Hindu pilgrimage site in North India). Once operational, roughly one lakh commuters per day are estimated to use the Dehradun-Haridwar-Rishikesh Metro Corridor. This will significantly reduce road traffic.

Uttarakhand Metro Rail, Urban Infrastructure and Building Construction Corporation Limited have developed & prepared the comprehensive project report for Metro Neo, an innovative transportation system, in-house. It relies and is based on both the primary and secondary traffic and data analysis. In November 2020, the Ministry of Housing and Urban Affairs (MoHUA) specified Metro Neo standard specifications. The first Metro Neo project has been proposed for Nashik, Maharashtra.

Details of the project:

- The project is being carried out by Uttarakhand Metro Rail Corporation Limited.
- The detailed and comprehensive project report will be approved by the state cabinet before being sent to the Union Ministry of Urban Development for perusal and approval.
- Metro services are expected to begin operations in Dehradun within the next three years.
- The Unified Metropolitan Transport Authority approved a 73-kilometer-long Dehradun-Haridwar-Rishikesh Metro Corridor in Uttarakhand in June 2020.
- The Uttarakhand state government signed a memorandum of understanding (MoU) with the Delhi Metro Rail Corporation in December 2016 to provide its detailed project report.
- The project's estimated cost is **Rs 40,150 crore.**
- The metro line's tracks will be standard gauge.

Route Details

The 73-kilometer elevated metro will be completed in two stages. It will feature two lines that will connect at Nepali Farm on the banks of the Song River.

Phase 1 / Line-1:

Haridwar – Rishikesh

- Length: 32 Km
- Number of Stations: Ten
- Route Description: The projected metro line would begin near the Jatwara Bridge in Jwalapur (western Haridwar). It will then run parallel to the NH-34 Haridwar-Rishikesh highway. The metro line would end at Rishikesh's Chandrabhaga Bridge.

Phase 2 / Line-2:

Dehradun (ISBT) – Nepali Farm

- **Length: 41 Km**
- **Route Description: The route will follow National Highway-7 from Nepali Farm to Dehradun's Inter-State Bus Terminal (ISBT) via the Vidhan Sabha.**

Conclusion

Uttarakhand, a Himalayan state in northern India, has 39,000 km of road network, two domestic airports, and 339.80 km of rail connections. The Uttarakhand Metro Rail Corporation (UKMRC) has announced plans to build state-of-the-art rapid transit systems in Dehradun, Haridwar, and Rishikesh in an effort to reduce traffic congestion in the state. According

to MD Jitendra Tyagi, UKMRC GFX, the nation's first Neo Metro would be deployed on two corridors in Dehradun, while the country's first Pod cab will be introduced in Haridwar. The aforementioned initiatives aim to significantly increase the state's environmentally friendly and cost-effective transport options.

The Neo-Metro, a mass transit system based on rubber tyres, will be powered by an overhead electric conductor and will run on a dedicated elevated track. On the other hand, Pod taxis are driverless electric vehicles that travel on specifically built tracks. These modern and futuristic public transportation systems will help improve connectivity and reduce traffic congestion in their respective locations. In addition, the UKMRC intends to build two ropeways in Haridwar and Rishikesh to improve the travel experience for pilgrims and spiritual seekers visiting the region. Ropeways and Pod taxis will be built using a public-private partnership (PPP) model, with equal funding from the central and state governments. The Neo-Metro project will be supported and financed jointly by the central and state governments.

The two Neo Metro routes, totaling 22.42 kilometres in length, will connect ISBT to Gandhi Bagh and FRI to Raipur, effectively covering the city's breadth and length. The Neo-Metro trains would have a top speed of 70 kilometres per hour and an average speed of 25 kilometres per hour. The state government has already approved the project, which is now pending approval from the Union Ministry of Housing and Urban Affairs.

Latest Update

To relieve traffic congestion, the Uttarakhand Metro Rail Corporation (UKMRC) will build state-of-the-art rapid transit systems in Dehradun, Haridwar, and Rishikesh over the next four years. The first Neo Metro line in the country would run along two corridors in Dehradun. In addition, Haridwar will be home to the country's first Pod taxi. The decision will significantly improve the state's environmentally friendly and cost-effective public transportation. Neo-Metro is a rubber-tired mass transit system powered by an overhead

electric conductor. It travels on an elevated track. Pod (Provide on Demand) taxis are driverless electric vehicles that travel on a specially built track.

Additionally, the corporation plans to build two ropeways in Haridwar and Rishikesh to improve the travel experience of tourists who come from all over the world for pilgrimage and spiritual solace. Ropeways and Pod taxis will be constructed under PPP, while the Neo Metro project would be shared equally by the Centre and the state. The two Neo Metro routes from ISBT to Gandhi Bagh and FRI to Raipur will span the city's width and length (22.42 km).

The Neo-Metro train would have a top speed of 70 kilometres per hour and an average speed of 25 kilometres per hour. The project has already been approved by the state government and is awaiting clearance from the Union Ministry of Housing and Urban Affairs. The Pod taxis would travel 20.74 km with 21 stops in Haridwar. The main stretch of the Pod taxi will be 14.55 kilometres long, connecting Sitapur (Jwalapur) to Bharat Mata Mandir via three tributary stretches: City Hospital to Daksh Mandir, Valmiki Chowk to Laltaro Bridge, and Ganeshpuram to DAV School. The 2-kilometre-long ropeway will transport pilgrims in 9 minutes from Har Ki Pauri to Chadi Devi. UKMRC has stated that they are planning to construct Asia's longest ropeway, measuring approximately 6.5 kilometres, in Rishikesh.

RAPIDX – INDIA'S FIRST INDIGENOUS S-HSR ALL SET TO BEGIN OPERATIONS ON PRIORITY SECTION

This month, RAPIDX, India's first regional train service, is expected to begin operations on a 17-kilometre priority section linking Shahibabad and Duhai Depot. Sahibabad, Ghaziabad, Guldhar, Duhai, and the Duhai Depot are the five stations along the route. The stretch is part of the Delhi-Meerut Regional Rapid Transit System (RRTS) Project. Trains on the RRTS corridor have been designed to reach a top speed of 180 kmph. Along with the priority stretch, a 42-kilometre viaduct between Sahibabad and Meerut South Station has also been developed.

Following the priority segment, a 25-kilometre-long section encompassing Muradnagar, Modi Nagar South, Modi Nagar North, and Meerut South will be commissioned. The Delhi-Meerut Regional Rapid Transit System, development and construction works commenced in June 2019. The National Capital Region Transport Corporation (NCRTC), which is building the RRTS corridor, hopes to open the entire 82-kilometer-long Delhi-Ghaziabad-Meerut length to the public by 2025, along with Metro services in Meerut.

The trains are called RAPIDX because the acronym is easy to read and speak in a number of languages. The X in the name implies future-generation technology and the new-age mobility solution, in addition to speed and progress. It is also associated with youth, optimism, vigour and energy. The NCRTC, a joint venture operation of the Centre and the state governments of Delhi, Haryana, Rajasthan, and Uttar Pradesh, is developing the semi-high speed regional rail service across the National Capital Region (NCR).

The Making and the Features

The RapidX trainset is an Electric Multiple Unit (EMU) train designed specifically for the country's RapidX (regional rapid transit) services. The train had been designed in Hyderabad, Telangana, by the French rolling stock company Alstom, and manufactured at Savli, Gujarat. The train has an aerodynamic design that decreases drag when it travels and advances at the top operational speed of 160 km/h. Though, the design speed of the RapidX is 180 Km/Hr.

Different From Metro & Conventional Railway

RRTS differs from metro in the sense that it caters to passengers who want to travel a longer distance with fewer stops and at a faster speed. RRTS differs from the conventional railway in a fact that it shall enable dependable, frequent, point-to-point regional transport at high speeds over a designated path. RRTS is a new, dedicated, high-speed, high-capacity, comfortable commuter service that connects regional nodes in the National Capital Region.

India's Pride: The Make in India Initiative

Under the Chairmanship of the Secretary Ministry of Urban Development (MoUD), the Planning Commission established a Task Force in 2005 to build a multi-modal transit system for the Delhi National Capital Region (NCR). This was included in the NCR 2032 Integrated Transport Plan, with a focus on Regional Rapid Transit System (RRTS) connections between regional hubs. The Task Force identified eight corridors and prioritised three corridors for implementation: Delhi-Meerut, Delhi-Panipat, and Delhi-Alwar. The National Capital Region Planning Board (NCRPB) appointed M/s. Delhi Integrated Multi-Modal Transit System for Delhi-Meerut and Delhi-Panipat, and M/s. Urban Mass Transit Company Limited for Delhi-Alwar, to conduct feasibility studies and prepare the Detailed Project Report in March 2010.

There was a need for a new semi-high-speed trainset envisaged, specifically designed for semi-high-speed regional rail travel when the RapidX service was conceived. The train sets were intended to be locally produced in compliance with the Make in India programme after the NCRTC opened tenders for the same in 2019. In early 2020, the NCRTC finalised the procurement of train sets, which were to be produced in Savli by Bombardier Transportation. In accordance with the Make in India policy, the tender was finalised and settled with the condition of trains to have fifty percent of local components as opposed to the original requirement

of 75 percent. The train's design was revealed to the public later in the year. The train's stainless-steel body has been designed and engineered to reach a top speed of 180 km/h.

Exterior

- The train is built with a stainless-steel body and an aerodynamic nose cone to lessen air drag resistance when operating at high speeds. Because of its stainless-steel body, the train is fairly restricted and lower in weight.
- Each car features six doors, three on each side, for simpler entry and egress, with the exception of the Business class, which has four doors, two on each side. Each vehicle features tempered safety glass windows that are double-glazed.

Interior

- The train includes 2x2 seating with plenty of leg room for passengers. For peak hours, the aisles are equipped with grab grips and poles to accommodate standing passengers. It has an overhead luggage rack as it has been designed and developed for regional rail travel and service.
- The train has onboard Wi-Fi, a public announcement and display system, an information and entertainment display, a dynamic route map display and an emergency communication facility and service.
- The train sets have ambient lighting and temperature control systems to ensure efficient energy consumption. The train also has a designated wheelchair space.
- In terms of safety, the train has a fire & smoke detector, CCTV, a fire extinguisher, and a door status indicator, as well as an innovative Train Control Monitoring System technology with predictive and condition-based monitoring capabilities.

Other Features

- For the first time in the country, a railway system shall be opened for high-speed operation along its whole length. Along with the priority stretch, a forty-two-kilometre viaduct between Sahibabad and Meerut South Station has been constructed. Trains on the corridor are expected to travel at a maximum speed of 160 kmph.
- Following the priority segment, a 25-kilometer-long section consisting of four stations-Muradnagar, Modi Nagar South, Modi Nagar North, and Meerut South-will be commissioned. Construction on the RRTS began in June 2019, with the entire length of 82.15 km corridor, as well as Metro services in Meerut, set to open in June 2025.
- The necessary finance for the construction of this corridor, estimated at Rs. 30,274 crores is being provided by multilateral help. The RRTS alias RAPIDX is co-financed by Asia Infrastructure Investment Bank (AIIB), New Development Bank (NDB), and Asian Development Bank (ADB).
- According to internal projections, the train will carry approximately 800,000 passengers every day. Despite this high traffic volume, passenger revenue is projected to remain restrained. To solve financial issues caused by regulated fares, the NCRTC is investigating advertising avenues to supplement fare income.
- Every RAPIDX train will include a separate women's coach to ensure safe and comfortable regional travel for women. Moving from Delhi to Meerut, the women's coach will be the second coach of the train set, just behind the premium coach. While travelling to Delhi from Meerut, it will be the train's second-to-last coach, immediately before the premium coach. Diaper-changing facility has also been provided at every station.
- Proper signage at the platform level and on the train door openings is being provided to identify these coaches. This reserved coach can accommodate seventy-two passengers for seating.

System Specifications

- **Operational:** 0 Km
- **Under Construction:** 82.15 Km
- **Approved:** 209 Km
- **Proposed:** 700 Km (Approx)
- **Design Speed:** 180 Kmph
- **Operational Speed:** 160 Kmph
- **Average Speed:** 100 Kmph
- **Track Gauge:** Standard Gauge (1435mm)
- **Rolling Stock:** Aerodynamic (Stainless Steel/Aluminium Body)
- **Signalling:** European Train Control System (ETCS) Level 2 of ERTMS
- **Traction:** 1×25 KV AC Overhead Catenary (OHE)
- **Seating Arrangement:** Transverse
- **Classes:** Economy & Business (1 coach per train)

Conclusion

The RAPIDX, India's first regional train service, will begin operations on the priority segment soon. Sahibabad, Ghaziabad, Guldhar, Duhai, and the Duhai Depot are the five stations along the route. Work on all these stations have almost been completed and are nearly ready for operations. This section is a part of the Delhi-Meerut Regional Rapid Transit System (RRTS). In a recent development by NCRTC (National Capital Region Transport Corporation), it has been stated that safety approvals from the Commissioner for Metro Rail Safety (CMRS) have been received, and the project is expected to be inaugurated by Prime Minister Narendra Modi in the coming days.

LUXURY & GRANDEUR GUARANTEED: THE LUXURY TRAINS IN INDIA

Travelling back in time and seeing magnificent luxury and grandeur of a nation, if fascinates and attracts someone, then luxury trains in India may easily exceed anyone's expectations. There are seven luxury trains in India, managed by Indian Railways and the IRCTC: The Maharajas Express, The Palace on Wheels, The Deccan Odyssey, The Golden Chariot, The Royal Rajasthan on Wheels (modelled on Palace on Wheels and follows a similar route through Rajasthan), The Royal Orient Train, The Fairy Queen Express and the Heritage on Wheels. These top luxury trains in India cater to travellers who want to explore India's rich cultural heritage in style, luxury, comfort and elegance. Their opulence can be seen in their mind-boggling interiors, magnificent ambience, exquisite gastronomical fare, significant security systems, and virtually anything else anyone can think of. Travelling on these trains provides unparalleled comfort onboard and allows travellers to visit some of India's most renowned tourist destinations. It is indispensable to join these luxury train journeys in India to discover India in ways that would otherwise be impossible.

The Maharajas Express:

The Maharajas' Express is the best of all Indian luxury trains and one of the five most extravagant and luxurious trains in the world. This half-mile-long train boasts professionals trained to provide the greatest level of hospitality, fully stocked bars, exquisite suites, butler services, and other amenities, and it is one of India's most expensive trains. Tourists on board get to enjoy the country's hidden scenic beauty, cultural tradition, demographic treasures and richness in the most prestigious way imaginable. It has been rated 'World's Leading Luxury Train' consecutively in year 2012, 2013, and 2014.

Routes:

The Heritage of India: Mumbai–Ajanta–Udaipur–Jodhpur–Bikaner–Jaipur– Ranthambore–Agra–Delhi

Gems of India: Delhi–Agra–Ranthambore–Jaipur–Delhi

The Indian Panorama: Delhi–Jaipur–Ranthambore–Fatehpur Sikri–Agra– Gwalior–Orchha–Khajuraho–Varanasi–Lucknow–Delhi

Indian Splendour: Delhi–Agra–Ranthambore–Jaipur–Bikaner–Jodhpur– Udaipur–Balasinor–Mumbai

Treasures of India: Delhi–Agra–Ranthambore–Jaipur–Delhi

Operations Month

The Maharajas' Express runs from October to April in a year and covers the five routes stated above.

Palace on Wheels:

Palace on Wheels is another luxury train ride in India that was renovated and re-launched in 2009 to boost tourism. Luxurious cabins, magnificent wallpapers, a well-stocked bar, considerate hospitality and local culture portrayed and displayed via the artful use of paintings and handicrafts

- it's very much like a castle on wheels that recreates the bygone era of kings and royal palaces! It's no surprise that it has been voted as the fourth best luxurious and deluxe train of the world. This is one of India's best royal trains and undoubtedly the most ideal choice if someone is planning a premium and luxurious trip to Rajasthan.

Route:
Delhi–Jaipur–Sawai Madhopur–Chittorgarh–Udaipur–Jaisalmer–Jodhpur –Bharatpur–Agra–Delhi

Operations Month

From September to April, Palace on Wheels is open for service. The seven-night, eight-day voyage includes seven stoppages where guests are taken on city excursions. This train's main attractions include:

Delhi: India Gate, Lotus Temple, Qutab Minar, Humayun's Tomb
Jaipur: Hawa Mahal, Amber Fort, Rajasthali, City Palace, Jantar Mantar

Sawai Madhopur & Chittorgarh: Ranthambore National Park, Chittorgarh Fort

Udaipur: Jag Niwas, Lake Pichhola
Jaisalmer: Yellow Sandstone Fort, ancient mansions

Jodhpur: Mehrangarh Fort, grand palaces, shopping tour in Jodhpur

Bharatpur: Keoladeo Ghana National Park

Agra: Fatehpur-Sikri, the Taj Mahal

The Deccan Odyssey:

Deccan Odyssey is a 5-star hotel on wheels that takes visitors to some fascinating locations in India, inspired by the travel ways and style of the kings and emperors during different royal eras of ancient India. It is one of the best luxury trains in

India and worldwide, featuring royal treatment for passengers, palace-like cabin decoration and interiors, multi-cuisine restaurants, lounges, a conference car, an onboard spa, and other cutting-edge amenities for passengers and travellers.

Routes:

Maharashtra Splendor: Mumbai–Nasik–Ellora Cave–Ajanta Caves–Kolhapur–Goa–Ratnagiri–Mumbai

Indian Odyssey: Delhi–Sawai Madhopur–Agra–Jaipur–Udaipur–Vadodara–Ellora Caves–Mumbai

Hidden Treasures of Gujarat: Mumbai–Vadodara–Palitana–Sasan Gir– Somnath–Little Rann of Kutch–Modhera–Patan–Nashik–Mumbai

Indian Sojourn: Mumbai–Vadodara–Udaipur–Jodhpur–Agra–Sawai Madhopur–Jaipur–Delhi

Jewels of the Deccan: Mumbai–Bijapur–Aihole–Pattadakal–Hampi–Hyderabad–Ellora Caves–Ajanta Caves–Mumbai

Maharashtra Wild Trail: Mumbai–Aurangabad–Ramtek–Tadoba–Ajanta–Nashik–Mumbai

Operations Month

The Deccan Odyssey runs from October to April, with a duration of all six excursions spanning seven nights and eight days.

Golden Chariot:

The Golden Chariot is one of India's finest luxury trains, taking visitors to some of the most popular tourist destinations in South India. The Golden Chariot, which opened in 2008, is highly renowned for its exceptional service. The train features AC cabins with royal, elegant furnishings and interiors, bars, restaurants serving a wide range of cuisines, a tiny gym, an Ayurveda spa, and other 5-star amenities. Tourists regard it as one of India's best luxury trains, and it has also been awarded as 'Asia's Leading Luxury Train' in 2013.

Routes:

Pride of the South: Bangalore–Kabini–Mysore–Hassan–Hampi–Badami–Goa–Bangalore

Southern Splendour: Bangalore–Chennai–Mahabalipuram–Pondicherry– Thanjavur–Madurai–Thiruvananthapuram–Alleppey–Kochi–Bangalore

Operations Months

The Golden Chariot runs from October to March, with duration of both routes extending to seven nights and eight days.

Royal Orient Train:

To have an unforgettable experience, tourists need to embark on a graceful and royal journey with the

Royal Orient Train and have a lovely experience travelling to major tourist locations onboard with one of India's top luxury trains. Travelling by luxury

train in India is an experience of incredible splendour and total chivalry. It is without a doubt India's unrivalled royal train. The Royal Orient Train offers palatial-style comfortable accommodations, well-trained hospitality professionals, a multi-cuisine restaurant with the 'Watering Hole' Bar, spacious baths, a library and practically all facilities that come to mind while visualising oneself in a five-star hotel.

Routes:
Delhi–Chittorgarh/Udaipur-Junagarh/Veraval-Sasan Gir/ Dilwara–Palitana- Sarkhej-Ahmedabad- Jaipur- Delhi

Operations Month
The Royal Orient Train operates all year and lasts seven nights and eight days. On the way, one can see and view the following city attractions:

Delhi : Qutub Minar, Red Fort, Jama Masjid and India Gate

Chittorgarh/Udaipur : Chittorgarh Fort, City Palace, boating in Lake Pichhola, Shilpgram, and Royal Gardens

Junagarh/Veraval: Ashokan Rock Edict, Darbar Hall Museum, Mausoleum of Nawab Mahabat Khanji, Somnath Temple on the shore of the Arabian Sea

Sasan Gir National Park: Lion Sanctuary

Dilwara: St. Paul's Church and Mandir Beach

Palitana: Jain Temple atop Shatrunjaya Hills

Ahmedabad: Gandhi Ashram, Calico Museum of Textiles, Sidi Sayyad's Mosque

Jaipur: Amar Fort and elephant ride, Hawa Mahal, City Palace, Jantar Mantar (observatory)

Fairy Queen Express:

Last but not least, the Fairy Queen Express is one of India's oldest trains, offering luxury rail experiences and train journeys. Fairy Queen, powered by the oldest serving steam locomotive built around 1855, has its own charm as it rambles across Rajasthan to Alwar. With a mention in the Guinness Book of World Records and a National Tourism Award, Fairy Queen easily ranks amongst one of India's finest and most extravagant trains.

Route:
Delhi–Alwar–Sariska-Alwar–Delhi

Operations Month
From October through March, on the second and fourth Saturdays of the month. The journey lasts one night and two days. Attractions at its two stoppages, Sariska and Alwar, include:

Sariska: Lake Palace, Sariska National Park

Alwar: Alwar Museum

The Heritage on Wheels:

The Heritage on Wheels, one of India's oldest luxury trains, shows the traditions and culture of Rajasthan that have been passed down from generation to generation in the most luxurious way conceivable. With interiors that never fail to carry the onboard passengers back to the golden days of the state, the Heritage on Wheels is one of India's most expensive and premium trains. With local restaurants serving authentic and continental cuisine on the train's floors and rooms that never fail to emanate the Royal vibes and emotions, this is one of those trains that everyone should experience at least once in their life. This luxury train in India is sure to offer a spectacular experience, treating passengers as if they were queens or kings.

Route:
Jaipur –Bikaner–Tal Chhapar and Shekhawati – Jaipur

Popular sights to view when going on the Heritage on Wheels for three nights and four days include:

Bikaner: Junagarh Fort, Haat, Camel Safari, Lalgarh Palace and National Research Centre

Tal Chhapar & Shekhawati: Laxmangarh Fort, Goenka Haveli, Sikar, Churu, Mandawa and Nawalgarh

Jaipur: Hawa Mahal, Amber Palace, City Palace and Jantar Mantar

METRO & RAILWAYS IN INDIA & THE MAKE IN INDIA CAMPAIGN

Overview

Make in India is a Government of India initiative announced in 2014 by Prime Minister Narendra Modi to stimulate domestic manufacturing and increase investment in the country. Through this scheme, the government wishes to revitalise the sluggish industrial and manufacturing sectors and stimulate economic growth. The GoI also seeks to encourage foreign enterprises to invest and manufacture in India by strengthening the country's 'Ease of Doing Business' index. The long-term goal is to gradually transform India into a global manufacturing hub while also simultaneously improve job prospects in the country.

The highlights of this scheme are mentioned in the table below:

Name of the Scheme	Make in India
Date of Launching	25th September 2014
Launched By	PM Narendra Modi
Government Ministry	Ministry of Commerce and Industry

Make In India - Focus on various Sectors

The campaign focuses on twenty-seven sectors outlined as under:

Manufacturing Sectors:

- Aerospace and Defence
- Automotive and Auto Components
- Pharmaceuticals and Medical Devices
- Bio-Technology
- Capital Goods
- Textile and Apparels
- Chemicals and Petro chemicals
- Electronics System Design and Manufacturing (ESDM)
- Leather & Footwear
- Food Processing
- Gems and Jewellery
- Shipping
- Railways
- Construction
- New and Renewable Energy

Services Sectors:

- Information Technology & Information Technology enabled Services (IT & ITeS)
- Tourism and Hospitality Services
- Medical Value Travel
- Transport and Logistics Services
- Accounting and Finance Services
- Audio Visual Services
- Legal Services
- Communication Services
- Construction and Related Engineering Services
- Environmental Services
- Financial Services
- Education Services

Need of Make in India

The government has chosen to focus on manufacturing & make efforts to boost production for a variety of reasons. The following are the most important:

- The services sector appears to have led India's growth and economic story over the last two decades. This strategy paid off in the short run, as India's IT and BPO sectors rose sharply, helping the nation often referred to

as the 'back office of the world.' Although the fact that the services sector's proportion to the Indian economy increased to nearly 57% in 2013, it just accounted for a meagre twenty-eight percent as the percentage share of jobs and employment in the economy. Withstanding the fact, in order to increase employment, the manufacturing sector has been envisaged to be elaborated and expanded. This is because, considering the country's demographic dividend, the services sector currently seems to experience low absorption potential of job opportunities.

- Another reason for launching the campaign is India's dismal manufacturing position. Manufacturing accounts for roughly 15% of the Indian economy overall. There is no need to compare with developed nations, the manufacturing share in the country's GDP is also significantly lower even when compared to our East Asian neighbours. When it comes to goods, there is an overall trade imbalance. The services trade surplus barely covers one-fifth of India's goods trade deficit. This trade deficit cannot be addressed alone by the services sector. Manufacturing will have to contribute. The government hopes to encourage domestic and foreign enterprises to engage in manufacturing in India, which will benefit the sector and create jobs at both the skilled and unskilled levels.

- According to several studies and research, no other sector appears to have as a large multiplier effect on a country's economic growth as manufacturing does. Because the manufacturing sector has more backward links, growth in manufacturing encourages growth in other sectors as well. This results in more jobs, investments, and innovation, leading to an overall better and higher standard of living of the people in an economy.

Various Initiatives

- For the first time, railways, insurance, defence, and healthcare equipment sectors have been opened up for greater FDIs (Foreign Direct Investment).

- The maximum FDI ceiling in the defence sector under the automatic route has been raised from 49% to 74%. On May 16, 2020, Finance Minister Nirmala Sitaraman announced an increase in the FDI.

- Hundred percent FDI has been approved under the automatic route in construction and certain rail infrastructure projects.

- There is an Investor Facilitation Cell that aids investors from the time they arrive in India till they leave. This was established in 2014 to provide services to investors at all stages, including pre-investment, execution, and post-delivery.

- The government has taken several steps to enhance India's ranking in the 'Ease of Doing Business' index. In 2019, India climbed 23 points in the Ease of Doing Business ranking to 77th place, making it the highest-ranked country in South Asia in this index.

- The Shram Suvidha Portal, as well as the eBiz Portal, have been launched. The eBiz portal provides one-stop access to eleven government services related to launching a business in India.

- Other permits and licences needed to start a business have also been eased. Reforms are being implemented in areas like property registration, tax payment, obtaining a power connection, contract enforcement, and insolvency resolution.

- Other reforms include the licencing process, time-bound clearances for foreign investor applications, automation of processes for registration with the Employees State Insurance Corporation and the Employees Provident Fund Organisation, state adoption of best practices in granting clearances, reducing the number of documents required for exports, and ensuring compliance through peer evaluation, self-certification, and so on.

- The government intends to improve physical infrastructure mostly through PPP investment. Investment in ports and airports has increased. In addition, dedicated freight corridors are also being developed.

The government has initiated plans to build five industrial corridors, which is currently under progress. These corridors shall spread and run through the length and breadth of the country, with a strategic emphasis on inclusive development that would supplement industrialisation and urbanisation in a structured manner. The corridors are as follows:

- **Delhi-Mumbai Industrial Corridor (DMIC)**
- **Amritsar-Kolkata Industrial Corridor (AKIC)**
- **Bengaluru-Mumbai Economic Corridor (BMEC)**
- **Chennai-Bengaluru Industrial Corridor (CBIC)**
- **Vizag-Chennai Industrial Corridor (VCIC)**

The various schemes

Several schemes and programmes have been initiated to support the Make in India initiative. These schemes are discussed below:

(i) Skill India: The programme aims to train ten million individuals in diverse sectors in India every year. To make 'Make in India' a reality, the vast amount of human resource available must be up-skilled. This is significant because India's formally skilled workforce accounts for barely 2% of the population.

(ii) Start-up India: The basic aim behind this project is to create an ecosystem that promotes the growth of start-ups while also driving long-term economic growth and generating large-scale employment.

(iii) Digital India: The goal is to make India a knowledge-based and digitally enabled economy.

(iv) Pradhan Mantri Jan Dhan Yojana (PMJDY): The objective envisions financial inclusion ensuring affordable access to financial services such as banks savings and deposit accounts, remittances, credit, insurance, and pensions to a vast group of society and people.

(v) Smart Cities: The project attempts to rejuvenate and transform Indian cities. The goal through various sub-initiatives is to build and create hundred smart cities in India.

(vi) AMRUT: The Atal Mission for Rejuvenation and Urban Transformation is abbreviated as AMRUT. Its goal is to improve basic public services and make 500 Indian cities more livable and inclusive.

(vii) Swachh Bharat Abhiyan: Swacch Bharat Mission has been one of the most successful campaigns of the government. The aim of this campaign is to make India cleaner and to promote basic sanitation and hygiene.

(viii) Sagarmala: The focus and objective of this scheme is to enhance ports and promote port-led growth in the country.

(ix) International Solar Alliance (ISA): The ISA is an alliance of 121 countries, the majority of which are sunshine countries that lie entirely or partially between the Tropics of Cancer and Capricorn. This is India's initiative to promote solar technology research and development and to formulate policies in this area.

(x) AGNII: AGNII, or Accelerating Growth of New India's Innovation, has been initiated to propel the country's innovation ecosystem by linking people and supporting the commercialisation of innovations.

Key Objectives

The key objectives of Make in India mission has been envisaged as under:

- Raise the growth of manufacturing sector by twelve to fourteen percent, taking every year into account and on an annual basis.
- Creating 100 million additional jobs in the manufacturing sector by 2022.
- Increasing the share of the manufacturing sector's contribution to GDP by twenty-five percent until 2022.
- Developing necessary skill sets among urban poor and rural migrants to promote inclusive growth.
- An increase in domestic value addition and technological depth in the manufacturing sector.
- Having a growth that is environmentally sustainable.
- Augmenting and strengthening the Indian manufacturing sector's global competitiveness.

Significant Progress

The Make in India initiative has achieved various milestones. Some of the notable accomplishments are as follows:

- The implementation of the Goods and Services Tax (GST) has simplified the taxation structure for businesses. The GST has given the Make in India campaign a boost.
- The Digitization scheme has been a mammoth success, and it is continuously gaining momentum not only in India but across the world. Many countries have recognised the Indian UPI digital system and have allowed transactions in respective countries through UPI gateway. Similarly, Indian RuPay credit card is gaining international acceptance. Recently, RuPay achieved a major milestone of issuing 25 million RuPay - Discover global cards. In addition, Taxation, company development and incorporation, and a variety of other activities have been made available online, streamlining the overall process and increasing efficiency. This has improved India's position in the EoDB index.
- The new insolvency code, known as the Insolvency and Bankruptcy Code 2016, has helped consolidate all insolvency laws and rules into a single legislation system. This has brought India's bankruptcy code at par with global and international standards.
- Financial Inclusion initiative like Pradhan Mantri Jan Dhan Yojana (PMJDY) has been an ambitious program launched by the Government of India under Make in India campaign to ensure access to financial services like bank accounts, remittances, credit, insurance and pension in an affordable manner to every citizen especially. Nearly 48 crore

accounts have been opened under the scheme so far. The scheme, ever since its launching, made remarkable progress. The total balance in PMJDY account crossed 2 lakh crore recently as a major milestone.

- India's EoDB index has been benefited from FDI liberalisation. Increased FDI inflows are expected to result in the creation of employment, revenue, and investments.
- Infrastructure and connectivity have garnered considerable focus with the help of schemes like Bharatmala and Sagarmala, as well as different railway infrastructure development schemes and programmes.
- BharatNet is a telecom infrastructure provider established by the government of India to improve digital networks in rural areas of the country. This is perhaps the largest rural broadband projects in the world.

The Various Advantages

The Make in India programme has resulted in a number of positive outcomes for the country. The following are some additional benefits that have been an outcome of this scheme.

- Creating new job opportunities.
- Increasing GDP by accelerating economic growth.
- With more and more countries recognising the Indian RuPay, UPI payment and financial service system and with an increase in FDI inflows, rupee is expected to strengthen.
- Small manufacturers and entrepreneurs have been significantly benefitted by financial inclusion programs and schemes like Mudra Yojna, Start-Up India etc. With nation improving on the Ease of Doing Business index, a greater influx of capital is expected through investors from all sections, both domestic and abroad. Accordingly, with the arrival of various investors from different countries to invest in India, an up-gradation of technologies is also expected with exchange and know-how of the latest technologies in various fields that would accompany the investors.
- As a result of the Mission's various initiatives, India has risen in the EoDB index. Similarly, establishing manufacturing centres and companies in rural areas is helping and promoting the growth of these communities.

Major Challenges

Despite the campaign's success in various circles, there have been a number of concerns as well that need to be addressed on priority. There are also other hurdles as well that the country must overcome if it is to meet the ambitious goals set by the establishment. Some of the concerns may be stated as under:

- India has more than sixty per cent cultivable land. The over emphasis on industry can have a negative impact on agriculture. It has the potential to permanently destabilise fertile land.
- It is also considered that fast industrialization (especially with the emphasis on 'going green') might contribute to natural resource depletion.
- Local farmers and small entrepreneurs may be unable to compete with foreign players as a result of welcoming large-scale FDI.
- The campaign's emphasis on manufacturing may result in pollution and adverse environmental effects.
- There are significant gaps in the country's physical infrastructure facilities. For the campaign to be effective, it is vital to improve the country's infrastructure while simultaneously addressing issues such as corruption at the grassroots level. India may learn from China, which increased its share in global manufacturing from 2.6% in the 1990s to 24.9% in 2013. China rapidly expanded its physical infrastructure, such as railways, roads, power, and airports.

Make in India in Railways: Metro Coaches - A Success Story

When the first line of the Delhi Metro opened in 2002, the coaches were supplied from Germany and South Korea as CBUs (Completely Built Units). After twenty-one years, ninety percent of the coaches that run on the ten lines of the nearly four hundred km network of India's largest and the world's eighth-longest Metro network are built in India. The

contract requirements of DMRC, which set a ceiling on the upper limit of 25 percent for production abroad with the balance to be made in India, permitted this indigenization of Metro coaches. As a result, multinational manufacturers such as Bombardier and Alstom established their businesses, subsidiaries and joint ventures in the country.

According to the International Association of Public Transport (UITP), a non-profit advocacy organisation for public transportation authorities and operators, policymakers, scientific institutes, and the public transportation supply and service industry, the capital costs of Metro coaches manufactured in India are significantly lower than those in the rest of the world. According to UITP estimates, the capital cost of an Indian-made coach is roughly INR 89.4 million (US$ 1.35 million), which is much lower than the cost in Vancouver (US$ 2.5 million) and San Francisco (US$ 2.30 million).

Bombardier Transportation at Savli near Vadodara, Alstom Transport India in Sricity near Chennai (Tamil Nadu), and Bharat Earth Movers Limited (BEML) in Bengaluru are the three metro coach manufacturing facilities in India already operational. Other organisations, including Hitachi, Mitsubishi, Hyundai, and a couple of Chinese firms, have also established consortiums with one or more of these three companies.

Bombardier Transportation

Bombardier has been a supplier to Indian Railways for over three decades and opened the Metro Coach production facility in Savli in 2008. The company actively participates in the Make in India programme by offering locally built rail vehicles, products, and solutions for both Indian and overseas markets. Apart from being a significant supplier to the Delhi Metro, to which it has delivered nearly thousand coaches to date, Bombardier has begun exporting Metro rail coaches to Australia, as well as components to Brazil, Australia, and Saudi Arabia. In addition to the Savli location, the company also has a transportation engineering services centre in Gurgaon. Bombardier's India unit received its first export order in 2012 for the supply of components for trains in Adelaide and has since then supplied and delivered components and railway coaches for projects in Australia's Victoria and Queensland, Brazil's Sao Paulo, and Saudi Arabia's Riyadh. It also provides engineering services to its parent company's projects in Germany, Switzerland, China, and the United Kingdom.

Bombardier also has supplied enhanced rail control for the new, automated Delhi Metro route 7, which is a significant milestone because it is a completely automated route that will eventually run driverless trains. To ensure safe and reliable automatic train operations, all four stages of Line 7, or the Pink Line, that have opened in the last 14 months are equipped with the Bombardier Cityflo 650 communications-based train control solution. To enable centralised train supervision, Cityflo 650 employs advanced radio networks and moving block operation.

Alstom Transport

Alstom marked a key milestone in December 2018 by completing the export of the final of 22 Metropolis trains for Sydney Metro, delivered from its Sricity manufacturing facility. Alstom was awarded a contract in 2014 to supply 22 six-car trainsets and the CBTC signalling system for the North West Rail Link, Australia's largest public transport project and the country's first fully-automated Metro network. Alstom's engineering base in Bengaluru tailored the Metropolis and Urbalis applications to the specific needs of Sydney Metro in order to provide people with rapid, safe, and dependable services.

Sricity, which began production in 2014, has already established high quality and operational safety standards via excellence in innovation and sustainable manufacturing practices. The factory, which has an annual production capacity of 240 automobiles, has delivered coaches to the cities of Chennai, Kochi, and Lucknow. It has already started construction of its second export order for the light Metro project in Montreal and production for the Mumbai Metro Line 3. Alstom's Sricity manufacturing facility is now one of the group's global manufacturing centres of excellence for rolling stock, following the quality standards maintained and on-time delivery of the trainsets for various projects globally.

Alstom has also been recently awarded a contract by Mumbai Metro Rail Corporation Limited (MMRCL) to supply a CBTC signalling system for the Mumbai Metro's Line 3. The contract, which builds on prior rolling stock and power supply contracts won and awarded for the same line, is worth more than €100 million. Alstom shall outfit Line 3 with Urbalis 400, the company's most recent generation of CBTC signalling equipment. Unmanned train operation (UTO), computer-based interlocking and centralised train supervision, platform screen doors, and the electrical and mechanical supervisory control and data acquisition system (E&M SCADA) are all included as per the contract.

The BEML

The Rail Coach manufacturer of BEML Limited, located in Bangalore, India, was the first all-steel integrated rail coach manufacturing unit set up and established by the Government of India in 1948. It was established with the support and technological know-how offered by M/s MAN of Germany to produce passenger rail coaches (of broad gauge) for Indian Railways.

BEML, a public sector undertaking of the Government of India, and Rotem (now Hyundai Rotem) signed a Technical Collaboration agreement in 2002 during the implementation of DMRC's first urban transit project for its Phase-1, and BEML became the first to indigenously manufacture Metro Cars for DMRC RS1 contract, manufacturing 220 units of Metro cars. BEML later received a developmental order from DMRC to develop 8 units of intermediate cars in order to indigenise the manufacturing and integration of Metro train sets. BEML's position as an indigenous source of Metro cars has been strengthened by the successful execution of this development order.

BEML's three production lines have provided over nearly 1,500 Metro cars for various projects in India so far. BEML extended its role and presence in the Metro Business as an outcome of its experience in the manufacture, integration, and testing of Metro cars, and it now commands a significant market share in India. Encouraged by India's good track record in manufacturing world-class Metro coaches, all three players have begun further indigenisation, with the main subsystems of Metro coaches indigenised. Window glasses, battery boxes, brake blocks, bogie frames, vacuum circuit breakers, propulsion systems and signalling systems, among other components, are made in India.

The Delhi Metro is the largest of sixteen currently operational or active Mass rapid transit or metro systems in fifteen cities across India. As of March 2023, India had 859 kilometres of operating metro lines and 16 systems. In the last ten years, the country's metro rail services have grown at an exponential rate. The expansion is set to accelerate further, with more than 1,000 km of new metro lines planned to connect over 30 cities by 2025. More and more cities in India are working on Metro plans today, extending from Srinagar in the north to Thiruvananthapuram in the south, while dozens more are in need of one, opening up a vast avenue for additional business in the sector in the near future.

Recent Achievements & Latest Update

Russian and Indian Railways have reached an agreement to build Vande Bharat trains as part of the Make in India campaign. In March this year, the Russian-Indian consortium of Transmashholding (TMH) and Rail

Vikas Nigam Limited (RVNL), which operates as an extension of the Ministry of Railways, won the tender for the manufacturing, supply, and maintenance of 120 passenger electric trains (1920 cars) for India. The $1.7 billion contract is believed to be the largest foreign order in Russian railway engineering.

After formally endorsing the planned agreement in mid-May this year, TMH had claimed that everything would be built in India because India has a make-in-India act that necessitates localisation. The Transmashholding, which competed in the tender through its Metrovagonmash facility in the Moscow Region's Mytishi, stated that the first sample of the train would be available in two years, with the first delivery of Vande Bharat Express trains expected within the next five years.

The overall cost of rolling stock under the tender, including maintenance organisation over a 35-year period, might reach $6 billion. Transmashholding also signed a deal in March this year for the supply of 28 new modern metro cars for the Belarusian subway after representatives from the Minsk Metro visited its production site. Between 2020 and 2023, the Russian conglomerate will also supply sixty cars for the Baku Metro in Azerbaijan's capital.

TMH signed a 1 billion Euro contract with the Egyptian National Railways in 2018 for 1300 passenger cars, with production taking place in Russia and Hungary. Trains with new passenger cars run daily between Cairo and Alexandria (208 km), Asyut (380 km), and Sohag (473 km). The Vande Bharat Express, India's first indigenous and locally-produced semi-high-speed train, is a huge effort made by the government to strengthen and acknowledge the 'Make in India' project as an impressive success story. The train, which is outfitted with cutting-edge passenger facilities, has significantly transformed the country's passenger travel experience. Till July 2023, a total of twenty-five Vande Bharat trains are operational in the country. In the next five years, four hundred Vande Bharat trains have been planned to run across the country on various routes.

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PRAYAGRAJ LIGHT METRO OR METROLITE PROPOSED FOR SANGAM CITY

Overview

Metrolite is an Indian light rail urban transit system being designed for cities and areas with lower projected ridership and as a feeder route for existing metro systems. It has been designed to serve a smaller passenger capacity at a lesser cost than a metro line. The system features its own dedicated tracks that are isolated from the road. RITES has received the survey report from the Urban Mass Transit Company (UMTC). Based on the UMTC study, the draft plan shall be submitted to the government prepared by RITES. After getting approvals, the detailed project report (DPR) on the 'Metrolite' has been planned to be prepared. The concept of a Metrolite was agreed in principle last year at a meeting presided over by the Principal Secretary, Urban Development. It was additionally decided that the same would be made available to Sangam City commuters before the Mahakumbh in 2025. A survey has been conducted for the operations of Metrolite on two city routes—Phaphamau and Bamrauli and Andawa (Jhunsi) to Bamrauli. Either of the two routes could begin prior to the Mahakumbh. Another development is that a considerable proportion of Sangam City commuters will be able to take an electric bus before Mahakhumbh 2025. Prayagraj will receive 100 new electric buses by 2025. Electric vehicles will be added in the fleet of 50 buses by 2023. The bus maintenance will be handled by the charging station established at Naini. These fully air-conditioned buses have been proposed to have CCTV cameras for passenger safety, comfortable seats, and other modern facilities. Its operation shall also help mitigate and lower the city's pollution. The buses have been planned to start arriving in Prayagraj around May before the completion of the scheduled registration process by December 2024. Currently, fifty electric buses operate on five city routes. A proposal has been sent to operate 150 electric buses in Prayagraj; 50 are currently operational, and more such buses are expected to reach to the city in the coming months. Meanwhile, the Public Works Department (PWD) has approved Rs 41.88 crore for the construction of a rail over bridge (ROB) at Cheoki station in Naini on the North Central Railway's Prayagraj-Pandit Deen Dayan Upadhyay (Mughalsarai) railway section.

After the approval from the Ministry, now the work of ROB is expected to gain momentum. This would help in relieving daily traffic congestion for those travelling from Banda to Prayagraj. ROB had been approved five years back. NCR had spent Rs 7 crore on ROB till March 2022. ROB's primary pillar had been completed. Meanwhile, due to some issues regarding land ownership, the ongoing work was halted after the army opposed the construction work. The PWD has now released the budget for the remaining amount after receiving approval by the army to continue with the work.

Prayagraj Metro

Prayagraj Light Metro, with two lines and thirty-nine stations, is a light rail transit (LRT) system proposed by the Uttar Pradesh Metro Rail Corporation Ltd. (UPMRCL) for Prayagraj (Allahabad), Uttar Pradesh. The Government of Uttar Pradesh appointed the Uttar Pradesh Metro Rail Corporation (UPMRCL) as the 'coordinator' in 2017 to get all stakeholders together and get the Phase 1 project underway. Later in the year, RITES had been assigned with the responsibility of preparing its feasibility report and Detailed Project Report, both of which had been submitted to the Prayagraj Development Authority (PDA) in November 2019.

Key Figures

- Operational: 0 km
- Under Construction: 0 km
- Approved: 0 km
- Proposed: 42 km

Metro Lines (Proposed)

Line-1:
Shantipuram in Phaphamau–Naini

Type: Elevated
Line-2: Bamrauli – Jhunsi
Type: Elevated
Interchange Station is proposed to be constructed at Parade Grounds near Alopibagh

Conclusion

Metro rail networks in India have demonstrated how the landscape of cities changes dramatically when the metro is operational. While large cities like Delhi and Bangalore benefited greatly from such projects, their adoption in tier I and II cities also promises to accelerate development in these places. The forthcoming Prayagraj Metro is also projected to transform the city's infrastructure and economy.

Prayagraj Metro, also referred to as the Allahabad Metro, is a proposed light rail system for Prayagraj. The metro project has been planned to consist two lines spanning over twenty kilometres. Notably, in 2019, the Rail India Technical and Economic Service (RITES) submitted a comprehensive project report to the Prayagraj Development Authority. The metro is set to open before the Kumbh Mela in 2025.

The Prayagraj Metro plan was approved in 2016 at a cabinet meeting presided over by then-Uttar Pradesh Chief Minister Akhilesh Yadav. The State government allotted Rs 175 crore in its 2019 budget to commence with the preliminary works. The rail system has been planned to have two lines: one from Manauri to Trivenipuram (East-West) and another from Shantipuram to Karchana (North-South). Line 1 will have 20 stations, while Line 2 will have 19 stations. The project's total cost is expected to be around Rs 8,000 crore.

AHMEDABAD SUBURBAN RAILWAY: EXISTING ASSETS TO BE UPGRADED AS RRS

Overview

The suburban rail system for the city has been proposed in order to allow people to live in satellite towns and travel comfortably, reducing the strain on urban infrastructure. The Delhi Metro Board conceived of the scheme in 2003. The Delhi Metro Rail Corporation presented the Detailed Project Review to the Gujarat Infrastructure Development Board (GIDB) in October 2005. GIDB forwarded it to RITES for verification. The project was approved in 2009 but could not be implemented. MoU had been signed with Rail Vikas Nigam Ltd for a suburban railway system in Ahmedabad during the Vibrant Gujarat Global Investors Summit

2015. It was later announced in the 2016 Union Rail Budget that the project shall leverage the existing Right of Way of Indian Railways, travelling through Ahmedabad, by modernising and integrating existing facilities. Two corridors have been planned for Ahmedabad Suburban Railway: Corridor 1 with proposed stoppages at Barejadi-Ahmedabad Junction-Kalol (43.49 km) with stops at Geratpur, Vatva, Maninagar, Sabarmati, Chandkheda, Khodiyar, and Saij Sertha Road and Corridor 2 with stoppages at Ahmedabad Junction-Naroda (9.47 km) with stops at Asarva, Ahmedabad Airport, Saijpur and Sardargram.

As a result of the IPTS (Integrated Public Transport System) study for Ahmedabad City initiated by the Gujarat Infrastructure Development Board (GIDB) to identify solutions for the city's Urban Transport problem, the GIDB initiated the preparation of a Detailed Project Report (DPR) for Regional Rail System for Ahmedabad through Delhi Metro Rail Corporation (DMRC) and RITES in 2003. The goal is to encourage people to stay in Ahmedabad's satellite townships by ensuring that they can get to work through a suburban rail-based transportation system. The project plans to use the existing railway facilities to create separate tracks and suburban train stations at 1.5-2 kms with an operating frequency of one train every 10 minutes during peak hours. The following railway assets are intended to be upgraded as part of the Regional Rail System:

Corridor 1:
Barejadi – Ahmedabad Jn – Kalol Jn (43.49 Km)

Corridor 2:
Ahmedabad Jn – Naroda (9.47 Km)

Summary

DMRC submitted the DPR in October 2005. Following the detailed project report, the Ministry of Railways initiated the discussions for the project's realisation through public-private partnerships (PPP). The DPR was revalidated and submitted by RITES in 2009, as per the Railway Board's recommendation. Pursuant to the government's decision, the viability of connecting more small towns to the Regional Rail System is being investigated and under study. The following are the extended corridors with a total length of 288 kilometres:

- **Kalol – Kadi (20 Kms)**
- **Kadi – Katosan Road (18 Kms)**
- **Katosan Road – Viramgam (38Kms)**
- **Ahmedabad Jn. – Sanand (29Kms)**
- **Sanand – Viramgam (36 Kms)**
- **Kalol – Mehsana (42 Kms)**
- **Naroda – Prantij (57 Kms)**
- **Barejadi – Mehmedabad (12 Kms)**
- **Mehmedabad – Anand (36 Kms)**

Current Status

A discussion with the Ministry of Railways for the formation of SPV is under process.

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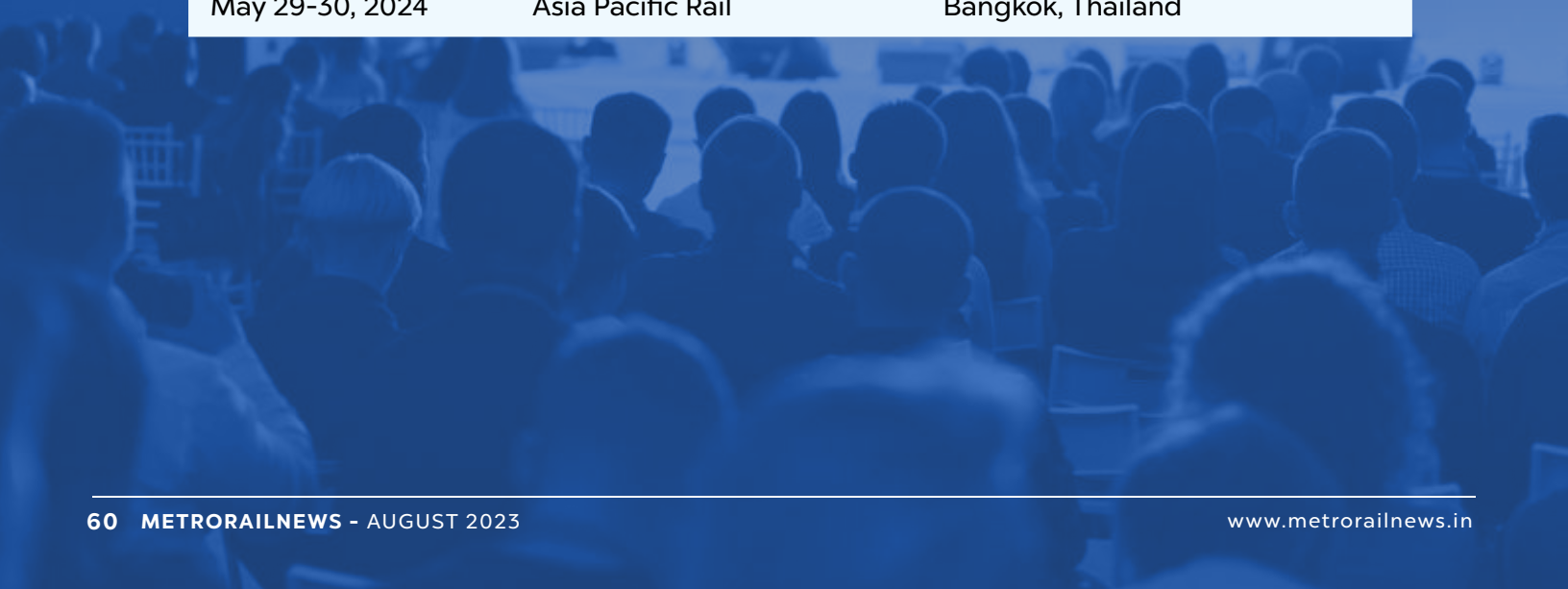
CONTRACTS BAGGED

Company	Contract for	Contract Value	Brief Description
L&T	Telecom Systems in Phase 2	Rs. 99 Crores	Chennai Metro Rail Limited (CMRL) has awarded Larsen & Toubro Limited (L&T) a contract worth INR 99 Crores to provide a comprehensive telecommunications system for Corridor 4 of Phase-II project. L&T will undertake the installation and implementation of the telecommunication system across 27 stations and 1 depot. The system will encompass various features, including an optical fiber network, passenger information displays, public address systems, CCTV surveillance, and access control systems.
DINESH-CHANDRA-SOMA Joint Venture	Construction of Underground Stations in CMRL Phase 2	Rs.1063.37 Cr	Chennai Metro Rail Limited (CMRL) has signed a contract with M/s DINESHCHANDRA-SOMA Joint Venture for the construction of four underground metro stations in Corridor 3 of Phase-II Project. The scope of work includes building stations at Moolakadai, Perambur Market, Sembiyam, and Perambur Metro Crossover at Sembiyam, along with works for Madhavaram Milk Colony and Murari Hospital stations. The contract, worth INR 1063.37 Cr and funded by Japan International Cooperation Agency (JICA), aims to boost Chennai's metro infrastructure, improving public transportation and connectivity for residents and commuters.
TATA Projects Limited	Construction of underground stations for CMRL Phase 2 project	Rs. 1204.87 Cr.	Chennai Metro Rail Limited has awarded a significant contract worth INR 1204.87 Cr to M/s TATA Projects Limited for the construction of four underground stations in Corridor-3 of Phase-II Project. The scope of work includes building stations at Otteri, Perambur Barracks Road, Pattalam, and Kellys, along with works for two underground stations at Ayanavaram & Puraisaiwakkam High Road Cum Crossover Box. This milestone contract, funded by Japan International Cooperation Agency (JICA), will expand Chennai's metro rail network and enhance public transportation connectivity.
L&T	Package C-3 of the Mumbai – Ahmedabad High-Speed Rail (Bullet Train) project	Rs. 15,697 Crore	The National High-Speed Rail Corporation Ltd. (NHSRCL) has awarded Larsen & Toubro (L&T) a substantial Rs. 15,697 crore contract for Package C-3 of the Mumbai – Ahmedabad High-Speed Rail (Bullet Train) project. The 135.45 km elevated package in Maharashtra will connect Shilphata to Zaroli and include three stations at Thane, Virar, and Boisar. This is the final civil package of the entire main-line to be awarded, marking a significant milestone in the project's progress.
L&T	Design and construction of the Joka-Esplanade Metro Corridor's underground metro project	Rs. 2447 Crore	Larsen and Toubro Construction has been awarded a significant contract by Rail Vikas Nigam (RVNL) to design and construct the Joka-Esplanade Metro Corridor's underground metro project in the city. The contract is valued at INR 24,47,91,31,603. The major works for the project involve Design and Construction of the Ramp and Underground Metro Railway Works from Mominpur (Excl.) to Esplanade, 5.05 Km (chainage 9063.00m to 14113.00m), including four underground stations (viz. Khidderpore, Victoria, Park Street and Esplanade), tunnels by Tunnel Boring Machine (TBM) and Cut & Cover methods, architectural finishing works, track works, etc.
Ircon International Ltd	Integrated tunnel communication system and optical fibre cable-based industrial-grade network system	Rs 144 crore	Ircon International Ltd secured a Rs 144 crore contract from N F Railway Construction in Manipur. The project involves supplying, testing, installing, and commissioning an integrated tunnel communication system and optical fibre cable-based industrial-grade network system for the Jiribam-Khongsang section of the Jiribam-Imphal new railway line project. The completion is expected within 365 days from the issuance of the Letter of Acceptance.

EVENTS CALENDAR

Dates	Event Name	Venue
August 23 - 25, 2023	Railwaytech Indonesia	Jakarta, Indonesia
Sep 06-07, 2023	8th Railway Forum	Berlin, Germany
Sep 14-16, 2023	Global Stainless Steel Expo (GSSE)	Bombay Exhibition Centre, Mumbai, India
Oct 11-13, 2023	India eMobility Show 2022	KTPO, Bengaluru
Oct 19-21, 2023	Rail + Metro Asia	Jakarta International Expo, RW.10, East Pademangan, Central Jakarta City, Jakarta, Indonesia
Oct 12-14, 2023	15th International Railway Equipment Exhibition (IREE)	Pragati Maidan, New Delhi, India
Nov 1-3, 2023	Asian Railway Conference	Jeju, Korea
Nov 21-23, 2023	Intermobility Expo	Dubai, UAE
May 24-25, 2024	4th InnoMetro 2024	New Delhi
May 29-30, 2024	Asia Pacific Rail	Bangkok, Thailand



LIVE TENDERS

METRO RAIL

TENDER DETAILS	LOCATION	VALUE	DEADLINE
Manufacturing & Supply Of 16935 Mt Head Hardened Rails Uic 60/60 E-1, (Class-A) 1080 Grade, Irs-T-12- 2009 On Cif Basis / Ex. Works Basis For Delhi Metro Rail Project - Phase-Iv Corridors (I) Line-8 Extn. – Janakpuri West To R.K. Ashram, (Ii) Line-7 Extn. Maujpur To Majlis Park, (Iii) Line-10 - Tughlakabad To Aerocity.	Delhi, India	Refer Document	11-09-2023
Engagement Of Detailed Design Consultancy Services For Construction Of Metro Bhawan (Headquarter Of Gmrcl) At Indroda Depot, Gandhinagar For Gujarat Metro Rail Corporation Limited	Gujarat, India	INR 1.52 CR	11-09-2023
Corrigendum : Licensing Of Exclusive Advertising Rights On Outside Civil Structures Of Elevated Section From Taj East Gate To Fatehabad Road Metro Station Of Agra Metro Rail In Upmrc Network As Per Scope Of Work Mentioned In Tender Document.	Uttar Pradesh, India	Refer Document	04-09-2023
Design, Manufacture, Supply, Installation Testing And Commissioning Of Fully Automatic Train Wash Plant & Blow Down Plant For Surat Metro Rail Project And Blow Down Plant For Ahmedabad Metro Rail Project Phase-I.	Multi Location	INR 10.33 CR.	04-09-2023
Corrigendum : Design Manufacture Supply Testing And Commissioning Of 108 Nos Standard Gauge Cars Including Training For Metro Line 6 Of Mumbai Metro Rail Project Of Mmrda	Maharashtra, India	Refer Document	28-08-2023
Miscellaneous Signalling Repair And Maintenance Works At Metro Railway Kolkata For One Years.	West Bengal, India	Refer Document	28-08-2023
Licensing Of Built-Up Spaces Having Area More Than 100 Sqm At Selected Metro Stations At Reach-1, Reach-2, And Reach-4 Of Nagpur Metro Rail Project For A Period Of 15 Years.	Maharashtra, India	Refer Document	24-08-2023
Design, Manufacture, Supply, Testing And Commissioning Of 108 Nos. Standard Gauge Cars Including Training For Metro Line 6 [Swami Samarth Nagar -Vikhroli (Eeh)] Of Mumbai Metro Rail Project Of Mmrda." (Opens New Window)	Maharashtra, India	INR 6.47 Lacs	22-08-2023
Rate Contract For Oil Filtration (Dehydration) Of Traction And Auxiliary Transformers Oltc Tank Installed At Mspa And Tpnr Rss Of Up Metro Rail Corporation Limited At Lucknow For Five (5) Years	Uttar Pradesh, India	INR 6.47 Lacs	22-08-2023
Corrigendum : Part Design And Construction Of Elevated Viaduct, Six Elevated Metro Rail Stations Viz Pul Bogda A Passenger Interchange Station Between Orange And Blue Line Aishbagh Sindhi Colony Dig Bungalow Krishi Upaj Mandi And Karond And Two Ramps Between Chain	Madhya Pradesh, India	INR 647.47 CR.	18-08-2023
1Supply Of Traction Converter Input Main Contactor For Medha Rakes Of Kolkata Metro Railway As Per Medha Spare Parts Price List Code No. Sp676301018. [Warranty Period: 30 Months After The Date Of Delivery]	West Bengal, India	Refer Document	18-08-2023
Corrigendum : Part Design And Construction Of Elevated Viaduct Thirteen 13 Elevated Metro Rail Stations Viz Bhadbhada Chauraha Depot Chauraha Jawahar Chowk Roshanpura Chauraha Kushabhau Thakre Hall Parade Ground Prabhat Chauraha Govindpura Govindpura	Madhya Pradesh, India	INR 1121.64 CR.	17-08-2023
Procurement Of Complete Train Radio Unit With Installation, Commissioning And Integration For Jaipur Metro Rail Corporation	R ajasthan, India	INR 88.50 Lacs	17-08-2023

METRO RAIL

TENDER DETAILS	LOCATION	VALUE	DEADLINE
Licensing Of Property Business Spaces Having Area Less Than 100 Sqm At Selected Metro Stations At Reach-I, Reach-2, Reach-3 And Reach-4 Of Nagpur Metro Rail Project For A Period Of 09 Years. Notice Inviting Tender Notice Inviting Tender Bid Form Bid Form Rfp Volume-1 Rfp Volume-1 Dla Volume-2 Dla Volume-2 Annexure-2 Annexure-2	Delhi, India	Refer Document	17-08-2023
Design, Manufacture, Supply, Testing And Commissioning Of 108 Nos. Standard Gauge Cars Including Training For Metro Line 6 [Swami Samarth Nagar -Vikhroli (Eeh)] Of Mumbai Metro Railproject Of Mmrda. (Opens New Window)	Maharashtra, India	Refer Document	17-08-2023
Procurement Of Complete Train Radio Unit With Installation, Commissioning & Integration For Metro Rail Corporation	Rajasthan, India	INR 88.50 Lacs	17-08-2023
Corrigendum : Part Design And Construction Of Elevated Viaduct Five Elevated Metro Rail Stations Viz Shaheed Bagh Khajrana Chauraha Bengali Chauraha Patrakar Colony Palasia Chauraha And Ramp Between Chainages 31 755 To 34 898 And 3 669 To 586	Madhya Pradesh, India	INR 495.32 CR.	16-08-2023

INDIAN RAILWAYS

TENDER DETAILS	LOCATION	VALUE	DEADLINE
Supply Of Monitoring Health Of Ballast Bed With The Help Of Ground Penetration Radar Technology For Through Ballast Renewal (Tbr) And Formation Rehabilitation On Indian Railways".	Multi State, India	INR 33.34 CR.	27-09-2023
Designing, Manufacturing, Supplying, Installation And Field Trial Of 1 In 12 Canted Turnout With Thick Web Switch, Weldable Cms Crossing, Psc Sleepers & All Fastenings Along With, Lead Rails, Back Driving Assembly Compatible With Indian Railway Standards (Irs) Type Of Point Machine On Ir, Including All Fittings, Fastenings, Fixtures, Stretcher Bars Etc. As Required With Complete Arrangement, Excluding 'Point Machines, Rodding's & Clamp Locks', Meeting The Laid-Down Requirements I.E. Functional R.....	Rajasthan, India	Refer Document	05-09-2023
Supply Of Non Asbestos Based Organic Brake Pads For Lhb Type Coaches Equipped With Disc Brake System On Indian Railways.	Rajasthan, India	Refer Document	05-09-2023
Supply Of Brushless 110v Dc Fan 400 Mm Sweep Fixed Type To Rdso Spec.No:Rdso/Pe/Spec/Tl/0021/2005, (Rev.3) With Amendment No.1 Note: 1. The Firm Shall Supply 1no.Each Of Male Connectors With Cage Clamps To Catalogue No.721-603 And Female Connectors With Cage Clamps To Catalogue No.721-103/026-000 Of Wago Or Male Connector Part No.Hdrpcb8edgkc5/3 & Female Connectorpart No.Cagepcb8edgkrb5/3 Of Paras Make Along With Each Fan. 2. The Colour Of The Rating Plate Shall Be Black. 3. The Fan Shall Be Sup.....	Tamil Nadu, India	Refer Document	24-08-2023
Supply Of Non- Asbestos Based Organic Brake Pads For Lhb Type Coaches Equipped With Disc Brake System On Indian Railway	Tamil Nadu, India	Refer Document	24-08-2023
Sa Division -Power Supply Arrangements For Escalators On Railway Platforms Over Indian Railways Under Amrit Bharat Station -(Sa-2 Nos,Mtp-2 Nos)	Tamil Nadu, India	INR 28.76 Lacs	16-08-2023

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