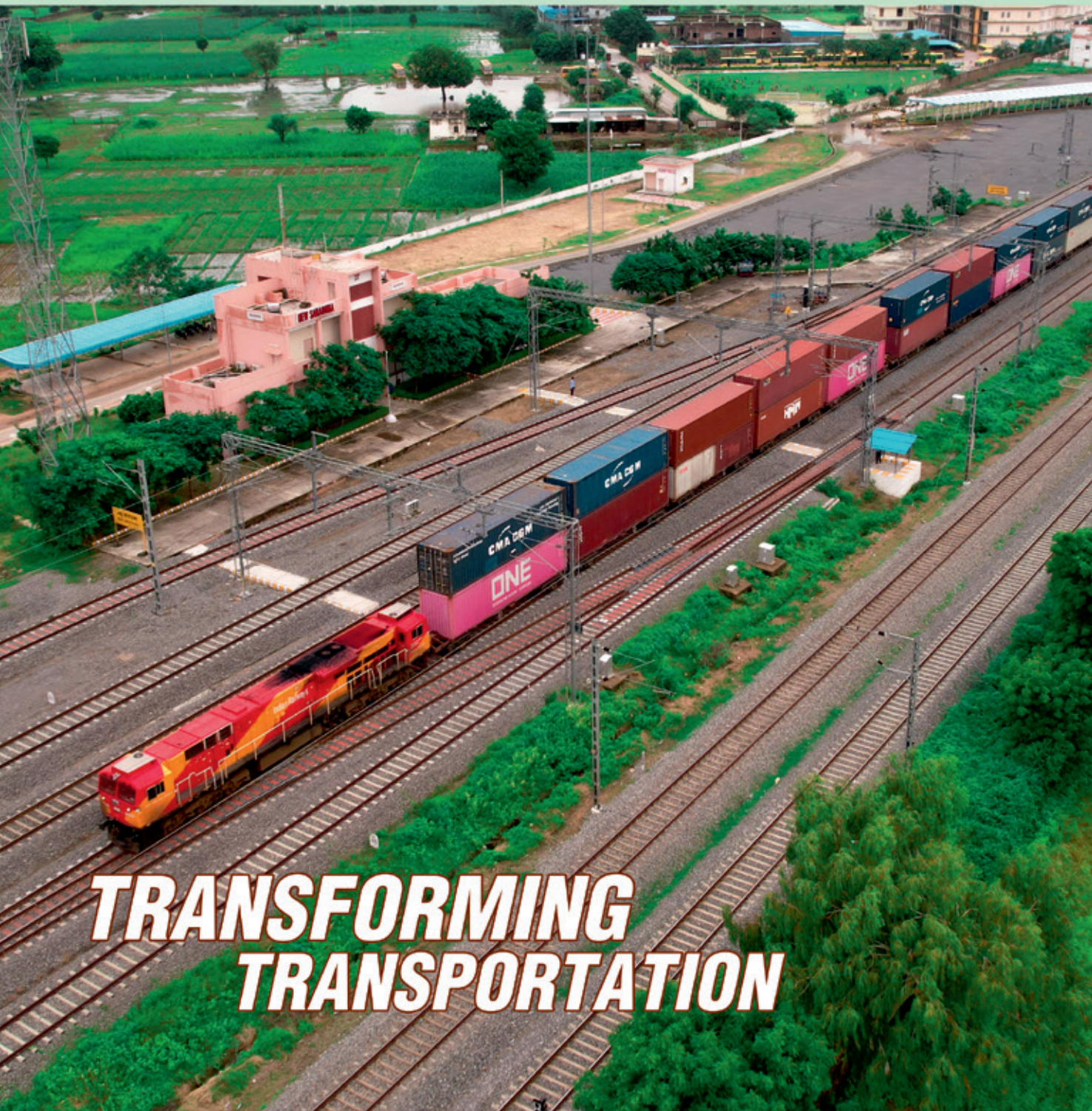
Dedicated Freight Corridor

Dedicated Freight Corridors

Game Changer

in India's freight transportation

Issue 03, November 2024

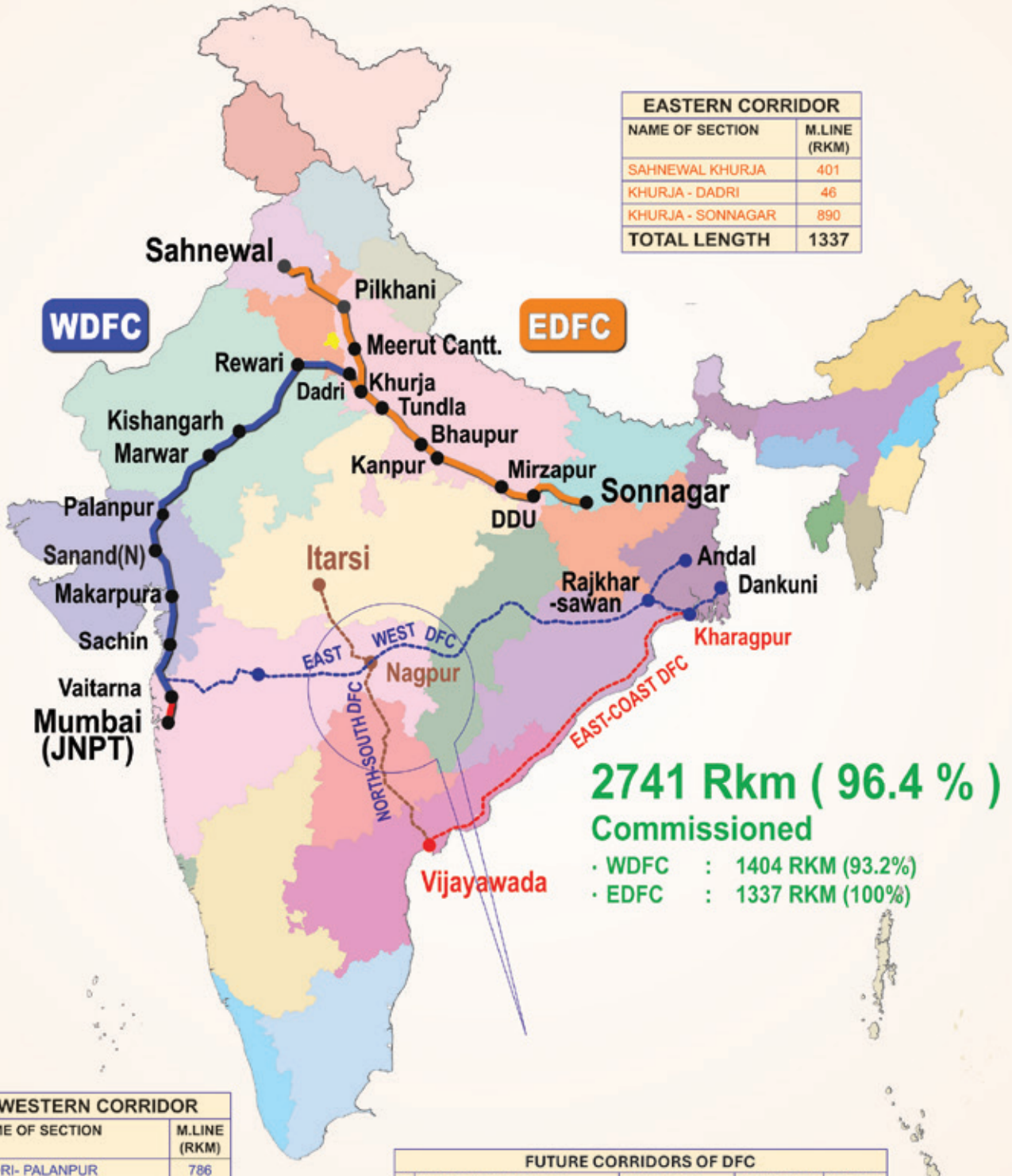


TRANSFORMING TRANSPORTATION

Dedicated Freight Corridor

DFCCIL PROJECT MAP

(2843 Route km)



EASTERN CORRIDOR	
NAME OF SECTION	M.LINE (RKM)
SAHNEWAL KHURJA	401
KHURJA - DADRI	46
KHURJA - SONNAGAR	890
TOTAL LENGTH	1337

2741 Rkm (96.4 %)

Commissioned

- WDFC : 1404 RKM (93.2%)
- EDFC : 1337 RKM (100%)

WESTERN CORRIDOR	
NAME OF SECTION	M.LINE (RKM)
DADRI- PALANPUR	786
PALANPUR - VAITARNA	618
VAITARNA - JNPT	102
TOTAL LENGTH	1506

FUTURE CORRIDORS OF DFC				
1	EAST COAST CORRIDOR	KHARAGPUR	VIJAYAWADA	1115 KM
2	EAST-WEST SUB-CORRIDOR-I	PALGHAR	DANKUNI	2073 KM
	EAST-WEST SUB-CORRIDOR-II	RAJKHARSAWAN	ANDAL	195 KM
3	NORTH-SOUTH SUB-CORRIDOR	VIJAYAWADA	ITARSI	975 KM

*Cover Picture: Aerial View of New Saradhsna Station of WDFC

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Train operations in the scenic Sachin-Vaitarna stretch of the WDFC

Aerial view of the Narmada River Bridge on the WDFC

Train in motion along the Rewari-Madar section of the WDFC

A train navigating under DFC RFO on the Palanpur-Makarpura Section of WDFC

From the Editor's Desk

Praveen Kumar
Managing Director, DFCCIL

Dear Readers,

As I pen this editorial for the third edition of "Game Changer," a vivid image captures my imagination: a majestic electric locomotive gracefully traversing our DFCCIL tracks, pulling double-stacked containers and milk trucks through India's verdant landscapes. This picture of efficiency and progress stands in stark contrast to the all-too-familiar sight on our highways – countless trucks caught in seemingly endless traffic snarls, their cargo's fate uncertain, while their emissions create a threatening haze over our communities.

In our relentless pursuit of transforming India's freight transportation landscape, we find ourselves at a crucial juncture. The compelling data from NITI Aayog's recent report reinforces significance of DFCCIL: rail freight transport, at a mere ₹1.36 per tonne per km is nearly 46% cheaper than road transport's cost of ₹2.50 per tonne per km. Yet, numbers tell only part of our story. Consider another remarkable fact: Railways demonstrate the extraordinary capability to transport more than six times the cargo volume compared to roadways, using the same quantity of fuel.

The environmental implications are even more striking. By shifting just 10% of long-distance freight traffic from roads to our railway network, we could potentially reduce greenhouse gas emissions by an astounding 12 million tonnes annually. In an era where environmental consciousness is not just a choice but a responsibility, DFCCIL stands as a beacon of sustainable progress.

However, we face a significant challenge. The current modal mix of freight movement remains disproportionately tilted towards road transport. This imbalance manifests in congested highways, escalating logistics costs, and most concerningly, deteriorating air quality in our cities and towns. As one of India's most ambitious railway infrastructure projects, DFCCIL bears the responsibility of orchestrating a shift in this paradigm.

It is with this context that I present this operations-focused edition of "Game Changer." Within these pages, you'll find a carefully curated collection of articles that delve deep into various operational aspects of freight transportation on DFCCIL. Each piece has been selected not just to inform, but to inspire – to showcase how our railway infrastructure can revolutionize India's freight movement landscape.

The article comparing the past and present of freight transportation in India highlights how far have we came in this journey; it embodies our collective vision for a more efficient, sustainable, and prosperous India. At DFCCIL, we're not just building railway corridors but also crafting the arteries through which India's economic lifeblood will flow. Every track laid, every container transported, and every milestone achieved brings us closer to our vision of a more connected and sustainable nation.

As we forge ahead with unwavering determination, I see limitless possibilities on our horizon. The dedication of our team, combined with the support of our stakeholders, will undoubtedly propel DFCCIL to new heights of achievement. Together, we are not just changing the game; but also redefining the very rules of freight transportation in India.

Let this edition of "Game Changer" serve as both a testament to our progress and a blueprint for our future endeavours. The tracks we lay today will carry the freight of tomorrow's prosperity.

Happy reading!

Praveen Kumar

Praveen Kumar

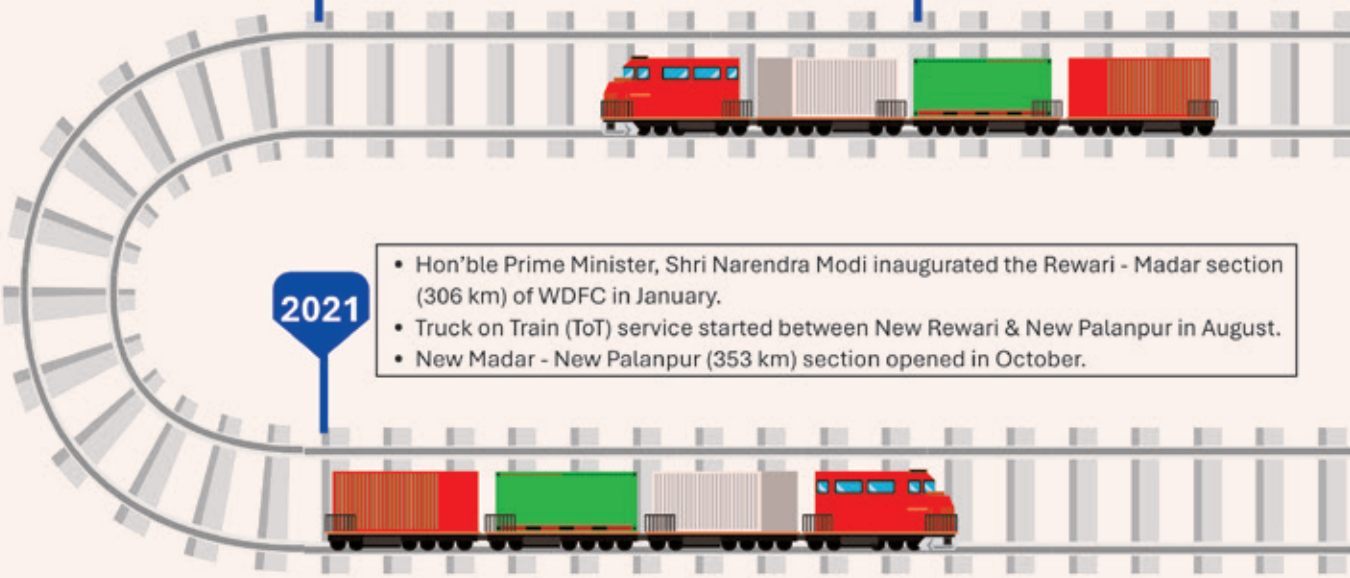
MILESTONES

2005
- Project announced by Hon'ble Prime Minister & Hon'ble Minister for Railways in April.

2006
- Cabinet approved the DFC Project in February.
- Hon'ble Prime Minister laid the foundation of DFC
  - WDFC at Mumbai in October.
  - EDFC at Ludhiana in September.
- DFCCIL incorporated as Schedule "A" Government company on 30 October.

2018
- First Trial Train ran between New Ateli - New Phulera in WDFC on 15 August.

2020
- Hon'ble Prime Minister, Shri Narendra Modi inaugurated Khurja-Bhaupur (351 km) section of EDFC on 29 December.



2021
- Hon'ble Prime Minister, Shri Narendra Modi inaugurated the Rewari - Madar section (306 km) of WDFC in January.
- Truck on Train (ToT) service started between New Rewari & New Palanpur in August.
- New Madar - New Palanpur (353 km) section opened in October.

2024
- Hon'ble Prime Minister, Shri Narendra Modi dedicated New Khurja - New Rewari (173 Km) section to the nation in January.
- New Gholvad to New Saphale (90 KM) section of WDFC commissioned.
- Hon'ble Prime Minister, Shri Narendra Modi dedicated Khurja - Sahnewal section (401 km) of EDFC, Makarpura - Gholvad section (242 km) of WDFC, and Operation Control Centre, Ahmedabad on12 March.
- Sanand North - Makarpura section (138 km) commissioned in March.

2007
- Cabinet granted permission of land acquisition in November.

2009
- JICA loan approved for WDFC in September.

2011
- Loan Agreement signed with World Bank for USD 975 Million for EDFC-1 (Khurja - Bhaupur) in October.

2014
- Concession Agreement between DFCCIL & MoR signed in February.

2013
- First Civil, System & Track Contract (Bhaupur - Khurja) - EDFC worth Rs.3267.54 Cr awarded in January.

2022
- New DDU to New Sonnagar (137 km) section commissioned in March.
- New Rooma to New Sujatpur section (130 km) of EDFC commissioned in March.
- Hon'ble Prime Minister inaugurated Madar-New Palanpur (353 kms) section in June & New Palanpur - New Mahesana Section (75 kms) in September.
- Heavy Haul Institute, Noida started in June.

2023
- Rewari-Dadri (127 km) of WDFC, Khurja-Khatauli (134 km) & New Dagmagpur -New Ahraura Road (23 km) of EDFC commissioned in March.
- Sahnewal -Khatauli section (267 km) commissioned in October. **EDFC completed.**
- Makarpura - Sachin section (130 km) of the WDFC was commissioned in November
- Hon'ble Prime Minister dedicated DDU - Sonnagar section in July & New Bhaupur - New DDU section (402 Km) in December.

On Track to Green Railways

Unveiling Railways' Decarbonization Potential

Nav Goel
DGM/Finance/F&RM/CO

Aerial View of train passing through Haripur-Bangurgram section of WDFC

"To tackle climate change, we must innovate. Railways can be a cornerstone of our green logistics strategy, paving the way for a sustainable future."

- Barack Obama

The transport sector is responsible for approximately one-quarter of all greenhouse gas emissions and accounts for 22 percent of global CO_2 emissions. Transport is the fastest-growing energy-consuming sector. So fast that in 2021, it has consumed one-third of the world's total energy. Astonishingly, 96% of this energy came from fossil fuels.

In COP 28, the inclusion of land transport decarbonization on the COP agenda for the first time marked a significant milestone. It was highlighted during a ministerial-level assembly and a transport-energy forum, where a call to action was issued. The goal is to strive towards doubling the portion of energy-efficient and fossil-free land transport by 2030. India's Nationally Determined Contributions encompass strategies directly impacting travel demand and modal choice management.

At present, within India's transportation industry, roads shoulder 61% of the freight, contributing to 90% of the emissions generated by the sector. In stark contrast, railways, despite handling 27% of the freight, are responsible for a mere 7% of the total emissions.

Indian Railways (IR) is on track to make it even further less carbon intensive. Consider these key highlights: (i) IR's complete electrification is nearing completion, (ii) Implementation of Head-on-generation (HOG) Systems coupled with regenerative braking capabilities, (iii) Electric locomotives boast approximately 85% efficiency as compared to the 35% efficiency of Diesel Locomotives, (iv) The IR is making strides towards its ambitious goal of achieving net-zero emissions by 2030.

IR's full-scale electrification initiative is set to significantly reduce the carbon footprint of rail transportation in India. Recent available data shows a remarkable shift: in 2018-19, IR consumed 27 lakh kilo litres of diesel, whereas, in 2021-22, diesel usage had plummeted to just 14 lakh kilo litres, marking an impressive 46% decrease. Despite a 4.56% increase in traffic, electricity consumption rose by a mere 22.73% during the same period. This apart from saving on forex on imported oil, has also resulted in avoiding 6.27 Lakh tonnes of carbon dioxide emissions.

These statistics provide insight into the anticipated results for 2023-24 as the electrification process approaches its conclusion, particularly with the ongoing efforts of the IR to

attain net-zero emissions. When the IR achieves net-zero status by 2030, potentially making it the first in the world to do so, an estimated annual reduction of 60 million tonnes of CO_2 emissions will be realized. This achievement is significant on a global scale given that the railway systems of the USA, Canada, France, Germany, and Japan are aiming to be net-zero by 2050.

Need for Modal Shift

India possesses a high proportion of dry bulk and semi-bulk products which are more suitable to be carried by train, however, rail modal share is not in sync. In some cases, even the bulk cargo over medium to long distances is carried by trucks. Compounding the issue is the fact that 75% of road freight operations are managed by small freight operators, each owning fewer than 5 trucks, operating at an efficiency level ranging between 40-50%. This inefficiency not only impacts the overall process but also contributes significantly to carbon emissions.

In the immediate term, transferring freight from high-emission modes like roads to lower-emission options such as rail transport holds significant potential for reducing overall transport sector emissions. In fact, in a recent European survey (McKinnon and Peterson 2021), freight modal shift was identified as the most cost-effective method of decarbonising logistics.

The advantages of modal transition extend far beyond addressing climate change, encompassing the reduction of transport expenses, traffic congestion, air pollution, and various externalities linked to road traffic. While railways commonly encounter challenges like restricted first & last-mile connections, minimum consignment sizes, and customer concerns regarding valuable freight, the Truck on Trains model, currently implemented in Dedicated Freight Corridor (DFC), presents a solution to tackle these issues in the immediate term. This *intermodal* approach not only saves transit time but also alleviates road congestion, enhances drivers' quality of life by ensuring adequate rest, and most importantly reduces carbon emissions.

Considering this: transporting a single milk truck-tanker with a capacity of 30 tonnes of milk over the WDFC section between Palanpur and Rewari instead of via road leads to an annual saving of approximately 381 tonnes of CO_2 emissions. Now, envision the staggering potential for carbon emission reductions achievable through a significant shift in traffic toward this eco-friendly route.

By integrating rail and road transport for containerized goods, this model allows railways to compete for a share in transporting higher-value, non-bulk goods. This strategic combination offers multifaceted advantages, creating a more efficient and environmentally friendly transportation landscape.

Apart from the above, Railways is also trying to integrate Cargo O-D Pairs i.e. Originating and Destination points into the Railway system by establishing the Gati Shakti Cargo Terminals and thus enabling the development of industrial hubs, particularly around Dedicated Freight Corridor and facilitating the establishment of multi-modal hubs. A case in point is the multi-modal logistics hub near Dadri, a part of DMIC which will be connected to the New Dadri station of DFC through a 3.5-km-long rail approach track.

With the freeing up of tracks owing to DFC, it will be an enabler to cater to more passengers, thus bringing a modal shift in inter-city passenger movement.

Way Forward

By way of a Fuel switch from Diesel to Electricity and through modal shift from road to rail, IR is avoiding carbon emissions within and outside its value chain respectively. Capitalizing on these efforts financially is crucial. However, the limiting factor is the lack of available methodologies under Clean Development Mechanism or Voluntary Carbon Markets. The Bureau of Energy Efficiency (BEE) has recently laid down the Voluntary Carbon markets in India wherein entities can register their projects as per the published sectoral methodologies for accounting greenhouse gas emission reduction, removal, or avoidance for issuance of Carbon Credits in the offset mechanism. In this context, BEE can consider developing methodologies to suit the needs of Railways in India.

The revenue generated from Carbon Credits to IR can be used to incentivise the customers to move from road to rail modelled in a manner somewhat like the Station-to-Station (STS) Rates Scheme of IR. UK through its Mode Shift Revenue Support Scheme (MSRS) assists companies with the operating costs associated with running rail or inland water freight transport instead of road.

However, for a comprehensive reduction in transport-related emissions, resolving infrastructure and rolling-stock limitations is crucial. Railways' enhanced focus on these constraints shall accommodate the escalating logistics demands while substantially reducing the carbon footprint of logistics in India.

> *"The railway sector holds the key to unlocking sustainable logistics; decarbonization is both an opportunity and a responsibility."*
>
> **- Paul Polman**

DFC Railroad Manual

Redefining Rules for Modern Infrastructure Maintenance

Rakesh Kumar Gupta
GGM/Track/CO

Anurag Yadav
GM/Coordination/Noida

Track maintenance on the route of WDFC

"The secret of success in the railroad industry lies in precise planning and adherence to the manual."

- Andrew Carnegie

The Dedicated Freight Corridor Corporation of India Limited (DFCCIL) is transforming India's freight transportation landscape with its adoption of advanced technology and sustainable practices. Through the **DFC Railroad Manual (2024)**, DFCCIL has introduced refined procedures that reflect a departure from traditional track maintenance, with focus on automation, safety, and efficiency. These advancements are reshaping how track network is maintained in DFCCIL, ensuring both safety and reliability on a large scale, making it more on system based rather than resource based.

Automated Maintenance and Safety Standards

The DFC RRM emphasizes mechanization to achieve higher consistency and minimize human error, while also maintaining the same stringent safety standards of Indian Railways. Whether on stretches with only a handful of trains per day or sections with heavy traffic, safety protocols remain uncompromised. This is ascertained from DFC policy to not to allow any track work without block.

Mechanized maintenance systems, such as the On-track Mechanized Maintenance Units (OMU) and Mobile Maintenance Units (MMU), are deployed to manage the tracks with precision. This mechanized approach not only enhances the efficiency of track upkeep but also leads to significant operational cost reductions. Manual through packing and manual deep screening is not kept in this manual. Curve realignment calculation has been removed from the manual. All the realignments are to be done as per geo coordinates in future thereby reducing the chances of mistakes in the manual.

Moreover, the introduction of Key Performance Indicators (KPIs) like the Track Quality Index (TQI) ensures outsourced maintenance work is thoroughly monitored, with a strong emphasis on adhering of overall performance benchmarks.

Sustainable Practices and Structural Reforms

Due to stable formation and use of blanketing, the track parameters are not likely to deteriorate as it used to in the past. OMS run is done monthly and TRC run is planned every six months. In addition to foot plating on the train is done regularly. We can assume that except in monsoon, track deterioration can be caught and attended. There has been large improvements in rail maintenance like USFD testing, rail grinding, rail lubrication etc. The most common reason for rail failure is due to temperature induced stress. SFT gets

changed with time and normally reduces with time. Therefore measuring SFT at certain frequency can give us data to decide destressing of LWRs. All the maintenance part related to rails have been kept sensitizing the importance of rail management for ensuring safety and economy. World over through packing of stable tack is done after 7-8 years and destressing is also not done as per time frame. It is advised that stress will be measured, and destressing should be need based. The frequency of packing is also mentioned to be done condition based, rather than time based. Also, zero missing fittings have been stressed. This approach has allowed the DFC to achieve remarkable results—zero rail fractures till its inception, a stark contrast to the high failure rates seen in traditional Indian Railway tracks.

DFC RRM has also promoted use of advance technology for maintenance. Use of Phased array technology for FB welds, imparts a boost to maintenance standards. Additionally, manual also paves the way for use of Supper-pullar along with mobile FB plant setup, which can drastically change the maintenance parameters by reducing AT welds in the network.

Furthermore, the DFC has moved away from manual maintenance practices, which have been the norm in Indian Railways for decades. Instead, DFC has embraced fully mechanized systems, ensuring more precise work and fewer opportunities for error. Only in extreme emergencies is manual work allowed, with stringent safety protocols in place. For instance, Manual destressing has been named as temporary destressing to discourage officials from adopting manual destressing. All permanent destressing is mandated to be done by Rail tensor and FB Plant with super pullers. In summers only temporary destressing is to be done.

New Partapur Yard

Inspection schedules of all levels of DFC staff have been complied in this manual, to avoid any confusion or duplicity between the officials.

The Role of Outsourcing and Simplification of Procedures

Outsourcing in maintenance has become a key aspect of the DFCCIL's strategy, as it enables a large volume of technically demanding work to be completed efficiently. It was envisaged that there may be variations in the duties of outsourcing workers in various units, therefore duties of outsourcing staff are required to be fixed so that uniform and safe working can be done in railway environment. This concern was catered in DFCRRM, duties have been defined not only for regular staff, but for outsourced staff also. This transition to contract-based work brings uniformity in practices, while also keeping pace with the government strategy.

There are very few SEJs in DFC network, making it more robust in comparison to Indian Railways. Due to this, T/Os becomes next crucial part in track network. T/Os details are clubbed with structure and a separate chapter has not been given for it. The maintenance part of the T/Os are clubbed with rail maintenance to give more importance to T/Os within LWRs.

In line with the effort to streamline operations, the DFC Railroad Manual (2024) also reduces redundancy. Those inspection formats, which are already available in Track Management System (TMS), have been removed from the manual to declutter and simplify procedures, ensuring that all essential information is easily accessible and manageable. The manual also introduces innovations like block management under the DFIS system, which has enhanced communication and operational efficiency.

Conclusion

The DFCCIL is at the forefront of modernizing India's freight rail infrastructure, incorporating both advanced technology and sustainable practices into its operations. The DFC Railroad Manual (2024) reflects a progressive shift towards automation, safety and efficiency with a keen focus on reducing operational costs and enhancing track reliability. By outsourcing maintenance and implementing mechanized systems, the DFC ensures the smooth and safe movement of freight across India, while also staying committed to reduce environmental and economic footprint of its operations.

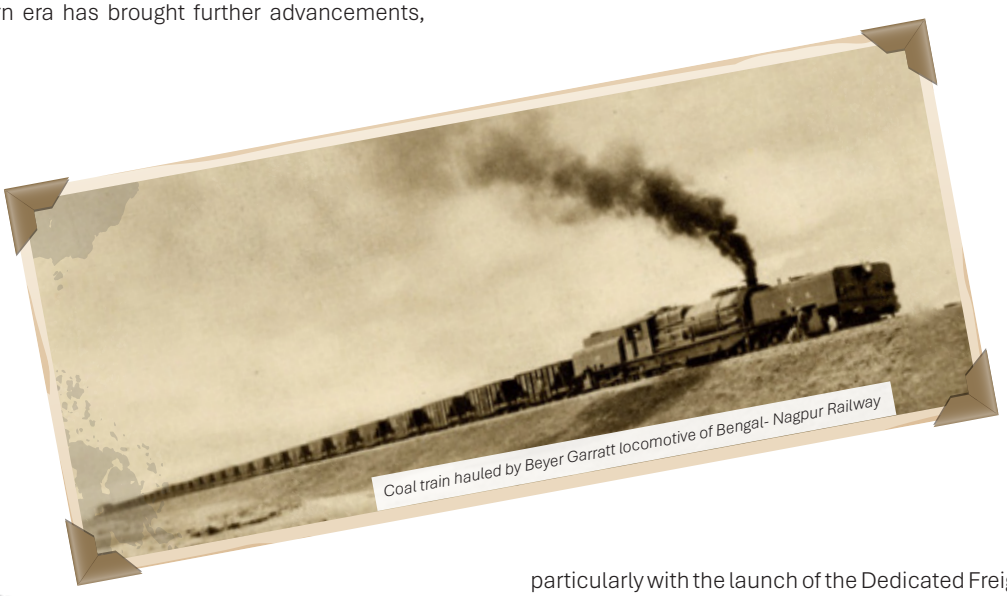
> *"In the age of innovation, a railroad manual is as vital as the tracks themselves; it ensures progress while maintaining safety."*
>
> **- Thomas Edison**

Evolution of Indian Railways

Journey through the lens

Photo Gallery

The evolution of railways in India since the introduction of the first railway line in 1853 has been transformative. Beginning with a 34 Kms route from Wadi Bandar (in Mumbai) to Thane, Indian Railways grew rapidly as an engine for economic and social development. Over time, the network expanded and adopted major technological innovations, transitioning from steam to diesel/electric locomotives, computerized ticketing systems and faster trains. The modern era has brought further advancements, particularly with the launch of the Dedicated Freight Corridors (DFC) initiative. DFC has brought state of the art methods for railway construction to India. The DFC aims to revolutionize freight movement across India by creating specialized freight lines that reduce congestion, enhance speed, improve efficiency, enabling faster and more economical goods transportation.

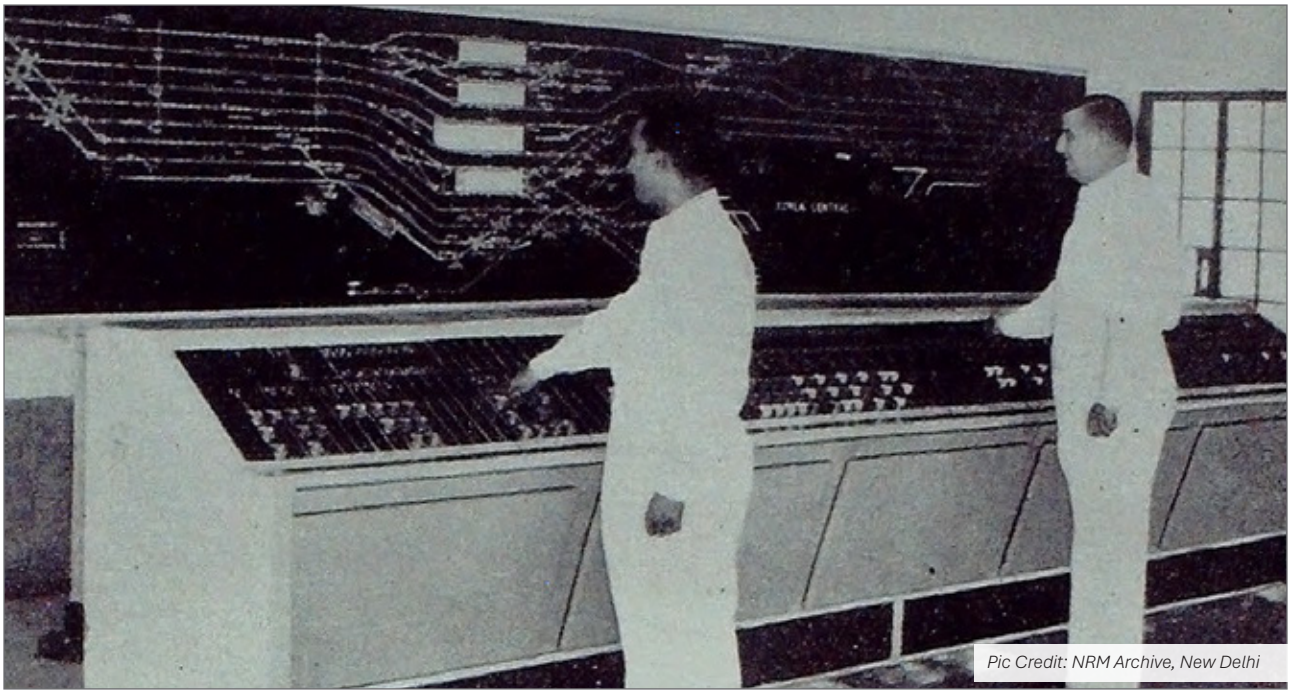


Coal train hauled by Beyer Garratt locomotive of Bengal- Nagpur Railway

The Powerful WAG-12 Locomotive hauls freight train along the routes of DFC

A comprehensive photo gallery showcasing dynamic journey from vintage steam locomotives to modern electric locomotives, manual to mechanized track laying, single stack to double stack container trains, route relay interlocking system to Operation Control Centre (OCC), semaphore signals to color light automatic signal, etc. The visual tour aims to highlight the transformative role of Indian Railways and DFCCIL in enhancing freight efficiency, meeting India's growing transportation needs with specialization, innovation and improved performance.

Route Relay Interlocking Cabin Kurla



Pic Credit: NRM Archive, New Delhi

Showcasing an all-electric power signal interlocking panel. This intricate system was once the nerve centre of train movements, allowing the signalman to control track switches and signals with precision. The illuminated signal and track diagram, visible above the frame, provided a real-time display of train positions, routes, and signal statuses.

OCC Ahmedabad (WDFC)

The Operation Control Centre (OCC) in Ahmedabad is key to the Western Dedicated Freight Corridor (WDFC) project which manages train operations, ensures safety, and optimizes schedules using advanced technology for real-time communication. This even enhances logistics efficiency and supports regional economic growth.

Steam Traction

Pic Credit: NRM Archive, New Delhi

Steam Traction revolutionized rail transport in the 19th century, enabling faster, long-distance travel and freight movement. It powered industrial growth and expanded railway networks globally. Although, largely replaced by diesel and electric locomotives by the mid 20th century, steam engines laid the foundation for modern rail transport.

High Rise Overhead Electric Traction

High-rise OHE on DFC involves installing taller overhead electric lines, typically at a height of 7.5 m, accommodate double stack container trains. It improves freight efficiency, increases capacity, and reduces transit times by enabling the operation of heavier and faster trains with greater energy efficiency.

Remarkable Tales
of Freight Rail Transportation in India

Shubhabrata
Archivist/CO

Steam hauled Freight Train carrying at Ayodhya Station

> *"Efficient transport and logistics are key drivers of economic growth and development."*
>
> **K.V. Kamath** *(Former Chairman of the New Development Bank)*

Freight Rail transportation serves as the lifeline of India's economy playing a pivotal role in connecting industries, markets and consumers across the vast subcontinent.

With a diverse geographical landscape & growing population, the efficient movement of Goods is crucial for supporting the country's economic growth, trade and development. From agricultural products to Industrial products, freight transportation ensures that essential commodities reach every corner of the nation. India's multi model transportation network, comprising Roadways, Railways, Waterways and Airways is vital in bridging regional disparities and fostering interconnectivity. As the country continues to modernise enhancing the efficiency sustainability of freight transportation become more essential in maintaining the momentum of progress and ensuring equitable access to resources for all. Moreover, efficient logistics reduce costs for business, boost exports and enhance the competitiveness of Indian goods in global markets. As rise as a global economic force, the backbone of that journey will undoubtedly be built on the strength of its freight transportation system.

From the days of bullock carts to rhythmic chugging of steam engines that once carried nation's goods across newly laid tracks during the colonial era. To today's High Speed Electrified Railways transporting freights with precision & efficiency India's Rail freight transportation stands as a testament to progress, reflecting the enduring importance of this mode to the nation's journey from past to present. India's freight rail transportation carries with it a legacy of remarkable stories of goods & materials traversing vast landscape from the early steam engines conquering the challenging terrains to complex logistics networks that move millions of tonnes across the subcontinent driving the nation and industrial & economic evolution.

Instances of First of its Kind

India's First Container Train

The inaugural container train in India is less obscure than one might assume. In February 1966 the first container services were launched in India connecting Bombay (Now Mumbai) and Ahmedabad. The service utilized containers with a payload capacity of approximately 4.5 tons each with four containers secured to each four wheeled flat wagons. These

wagons were modified to function as rail flats enabling the transfer & securement of the containers. Both the wagons & containers were designed by Research Design and Standards Organisation (RDSO) and manufactured at Amritsar Workshop.

The Tractor-Trailer units for the service were built by the private sector strictly as per the RDSO specifications.

As traffic increased, the issue of empty haulage was greatly reduced for both Bombay and Ahmedabad. The service further expanded to accommodate 32 containers, with five Tractor-Trailer units in Bombay and three in Ahmedabad. In the span of 12 months leading up to March 1967, Western Railway transported 61,555 quintals of freight earning Rs 3,70,699 without receiving any compensation claims. The service then extended to new routes. Such as Bombay (Mumbai)-Delhi, Faridabad & by the end of 1968, the use of 1000 containers were projected.

India's First Open Wagon Train

The first experimental train of open wagons carrying traffic by Indian Railway got inaugurated from Kanpur to reach Anwarganj for Assam on 17 October 1956. This experience proved a success and brought forward favourable response from the trade for the running of more such trains.

A complete train of open wagons loaded with traffic loaded from Hathras, Kanpur and other places left Kanpur Anwarganj on the morning of 19 November 1956 for Siliguri Junction, a distance of 656 miles adequately escorted by Railways owned protection force personnel.

A Look at exceptional and fascinating special freight train service

There are multiple special freight trains which have revolutionized cargo transport with innovation In India since mid-1950. The advantage been to alleviate congestion on passenger line which enabled faster delivery of goods across the country.

One such unusual services was named as the "**Tea Princes**" introduced by Northeast Frontier Railway to facilitate the coordinated movement of both Meter-Gauge (MG) and Narrow-Gauge (NG) trains transporting tea from tea gardens of Darjeeling and Assam. The service aimed to streamline the transfer of tea to a central loading station, from where it would be sent to Kolkata for auction.

Under this service, four special broad-gauge (BG) covered wagons were provided, equipped with bamboo dunnage, tar-coated strips, and armed guards, all at no extra cost.

8 wheeler Fruit Wagon of GIPR

Special Cargo Operation carrying Choper at flat bed wagon of IR

DFCCIL and MIGA Partnership

Ushering in a New Era of Infrastructure Financing in India

Pallavi Joshi
GM/Finance

Double Stack container passing through scenic stretch of WDFC

February 2024 marked the launch of pioneering infrastructure financing project through External Commercial Borrowing (ECB) backed by The Multilateral Investment Guarantee Agency (MIGA). A first of its kind in India, an amount of USD 100 Million was raised for financing the Rail Logistic Project of Dedicated Freight Corridor Corporation of India Limited.

About MIGA

MIGA, set up in 1988 with HQ at Washington D.C, is a member of the World Bank Group. It's objective is to promote foreign direct investment in emerging economies by helping to mitigate the risks associated with restrictions on currency conversion, transfer, and breach of contract by Government expropriation, war and civil disturbance and offering credit enhancement to private investors and lenders. The Agency derives its unique strength from the World Bank and from its structure as an international organization whose shareholders include most countries of the world. MIGA offers clients extensive knowledge of emerging markets and of international best practice in environmental and social management. Since its inception, MIGA has issued over US$76 billion in guarantees across 123 developing countries, supporting over 1,000 projects.

India & the World Bank

In India, World Bank has played a crucial role in providing loans and financial support for various development projects. DFCCIL has been one of the major beneficiaries of World Bank loan with USD 2071 Million sanctioned for funding the Eastern Dedicated Freight Corridor. However, the exposure limit for each country for World Bank loan is limited, determined by multiple factors including the country's creditworthiness, its economic size, repayment capacity etc. Historically, the World Bank has had a maximum exposure limit to any single country in the range of approximately 20-25% of its total capital.

DFCCIL & MIGA Partnership

The genesis of financial partnership with MIGA goes back to extensive deliberations between Department of Economic Affairs (DEA) and World Bank in December 2021. It was recommended that India should explore opportunities to work with MIGA and the IFC to meet its financing requirement, especially with the funding requirement for the National Infrastructure Pipeline(NIP) being too large to be met from World Bank. This paved way for the decision by Ministry of Railways (MoR) to finance additional USD 100 million for Rail Logistics Project (RLP) of Eastern Dedicated Freight Corridor (EDFC) through External Commercial Borrowing (ECB) guaranteed by MIGA, basis recommendation of DEA to leverage 'IBRD-MIGA blended financing' in India.

The process of selection of lender for this ECB was through open bidding. Being the first of its kind, DFCCIL engaged SBI Caps and reputed legal counsel to manage the process.

Seven international lenders participated in the bidding. MUFG Bank, being the lowest bidder, was finalized as the lender. The transaction was completed through International Financial Services Centre of GIFT City, Gujarat. The tenor of loan is 15 years with MIGA providing 95% of coverage.

Partnership Benefits

This important rail infrastructure project is supporting India achieve a transformative modal shift from road to rail, creating new economic opportunities while contributing to India's on-going climate transition," said Junaid Ahmad, Vice President, Operations of MIGA "*It is not only the first time that DFCCIL will access private commercial financing, and that too from global markets, it is a historic first for MIGA in India.*"

The benefits of this partnership between MIGA and DFCCIL are far-reaching:

- India's focus on infrastructure-driven sustainable economic growth projects such as DFCs can help elevate trade efficiency, boost economic activity, and improve logistics across the nation. MIGA's support could ensure steady flow of funding and expertise into these projects.
- Raising of funds through ECB reinforces DFCCIL's independent credit worthiness, a strong signal to the financial market, thereby, expanding the breadth of financing options available for its future projects.
- Large Infrastructure Needs: The Dedicated Freight Corridors are large, long-term, and complex projects. The involvement of international investors and lenders will require the kind of risk mitigation that MIGA offers.

Project Financing: Way Forward

"This is a great showcase of how MIGA can utilize its guarantees to scale up private investments in a strategic and important sector for the economy." said NK Singh, co-chair of the G20 Expert Group on MDBs.

The foray of MIGA into infrastructure financing opens possibilities beyond DFCCIL. As India strives to become the third largest economy in the world, the success story of DFCCIL with MIGA offers an unparallel opportunity for alternate financing solutions to accelerate large-scale logistic, infra-development and transformational projects in India.

As aptly summarized by Hira Ballabh, Director (Finance) of DFCCIL '*The MIGA-backed loan in India, facilitated through MUFG Bank, marks a significant milestone for DFCCIL's venture into commercial financing. This initiative opens new vistas of financing, fostering India's infrastructure growth and aligning with its ambitions of attaining "Viksit Bharat" status by 2047.*'

Aerial View of MJBR No. 93 of Sachin-Vaitarna section

Manthan

Learnings and Way Forward

Ajay Kumar
CGM/Kolkata

NTC machine in action

Project deliverables aren't the only valuable things you can take away from a project. Whether our initiative is a resounding success, an unfortunate failure, or somewhere in between, there are always lessons to be learned from any project. Identifying what did not go as planned and rectifying it or applying different approach in future projects is a great way to prevent the same mistakes happening. That way, we can evaluate what went well, what went wrong, and what you can learn from it.

DFCCIL has rich experience in implementation of mega infrastructure projects and successfully commissioned major portion of DFC Corridor. In this long journey of execution & commissioning of projects, many good and bad experiences are encountered by DFCCIL. DFCCIL took an initiative to identify & effectively capture such experiences and documenting the lessons learned. DFCCIL organized a two-day Brain Storming session on 12th & 13th June 2024 on lessons learned in which all CGMs as well as senior officers at Corporate Office shared and discussed lessons learned during implementation of projects.

Casting of Box at Project site

We learn something new on every project, but a lessons learned session ensures you capture and codify that information to share it with other teams. When you conduct lessons learned and create a lesson learned report, you are producing a document the entire project team can use to improve future projects. DFCCIL management constituted a committee to collate, deliberate, and prepare a comprehensive report based on the discussions, observations, ideas, challenges, good practices, and lessons learnt which were shared during the brainstorming session held on 12th and 13th June 2024 with an aim to ensure that the insights and learnings from the session are utilized effectively in future projects of DFCCIL.

After threadbare deliberation by committee, a comprehensive report consisting of good practices and lessons learnt have been prepared and was released by Managing Director, DFCCIL on 31.07.2024. The major issues, over which recommendations are given in the report, are summarized below:

I. **Detailed Project Report (DPR):** Preparation of Detailed Project Report (DPR) is a very critical activity. The quality of survey and accuracy of data in DPR is very important and is prerequisite for proper execution of project. Fixing alignment by avoiding obligatory points and connecting maximum of traffic nodes are main focus areas. As far

as possible, alignment should be away from IR yards except at stations where connectivity is provided with IR. Efforts should be made to avoid major utility shifting or displacement of habitants specially while passing through Towns/Cities. Viaducts may be provided in place of high embankments specifically in towns/ densely populated area. Connectivity with IR should be decided at the time of preparation of DPR. ESPs should be finalized in consultation with zonal Railways and should be part of DPR.

II. **Acquisition and handing over of land:** Land acquisition is a long lead item and very prone to disputes. Assessment of actual requirement of land and acquisition of the same under appropriate act and payment of right amount of compensation to bonafide owners are the basic parameters for faster acquisition of land. A realistic assessment of available encumbrance free land and approximate time for acquisition of balance land should be done before invitation of tender for main work. Encumbrance free land should be handed over to the contractor with joint verification and signature of employer and contractor.

III. **Utility Shifting:** Mapping of utilities should be done at DPR stage and shifting of chartered utilities should be done in advance. Shifting of Unchartered Utilities should be kept in the scope of main contract. Construction of long lead items such as ROBs, RUBS etc should be done separately and preferably in advance.

IV. **Bid Document:** There is a need for Model Tender Document for EPC as well as item rate contracts. Scope of work should be defined clearly. There should not be any ambiguity. Specifications should be latest and should be in line with the details/ drawings/ codes mentioned in the bid document. Bid document should clearly specify that CCP (Contractual Construction Program) should be

Rail loading at Rail Yard

resource loaded. Pre-Bid clarifications should be made part of the Contract agreement. PMC contract should also be awarded before or along with works contract.

V. **Packaging for civil, electrical, and S&T work:** DFCCIL has mixed experience of contract packaging. Integrated packaging and multi packaging have its own pros and cons. To avoid undue interfaces between Civil, Electrical and S&T contracts, integrated packaging is preferred. The value of each contract package shall be appropriate to have a reasonable competition to ensure workable rate and technically competent bidders. Any super-specialized or long-lead works like tunnel, important/ mega Bridges, GSM-R, OCC or TSS may be excluded and considered as a separate tender.

VI. **Project Cash Flow:** Timely cash flow to the contractor is very important for progress as well as successful completion of project. Contract clauses should be framed in such a way that it should not attribute to hindrance in cash flow of contractors. Contracts should be modelled on Cost Centre wise payment to Contractors. Cost Centres payment should be commensurate to the quantum of work to be done.

Train passing under DFC RFO

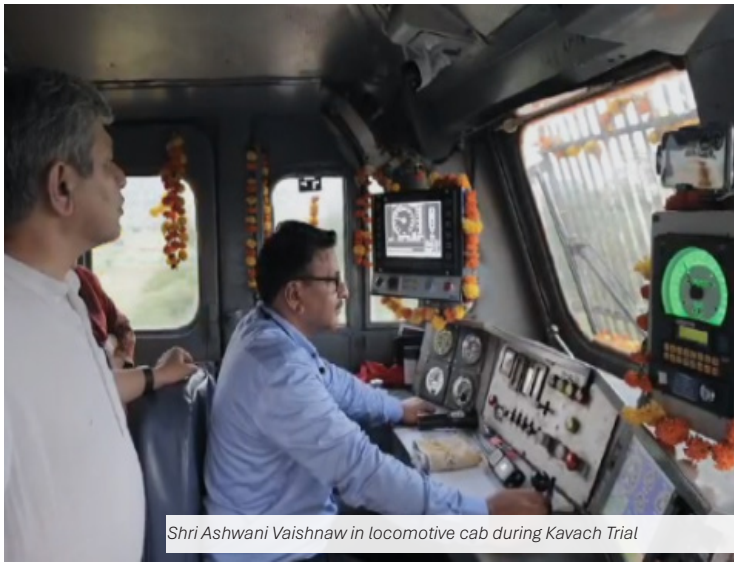
News From Indian Railways

Anti-Collision system 'Kavach' undergoes successful trial

Union railway minister Ashwini Vaishnaw reviewed a trial of an Automatic Train Protection System called 'Kavach' between Sawai Madhopur and Indargarh Railway stations on 24th Sep'2024.

Vaishnaw travelled in the engine of a Kavach-fitted train, which, while speeding at 130 kmph, stopped 50 metres before red signal on its own without any manual braking function by the loco pilot.

According to Vaishnaw, the Kavach 4.0 will be able to tackle all kind of communication challenges in all geographical conditions such as hilly terrain, forest, coastal, and desert areas. Kavach has so far been deployed on 1,465 Route km and 139 locomotives (including Electric Multiple Unit rakes) on South Central Railway.



Shri Ashwani Vaishnaw in locomotive cab during Kavach Trial

Railway Minister unveils Vande Bharat Sleeper Coach

Interiors of Vande Bharat Sleeper train

Railway Minister Ashwini Vaishnaw unveiled the prototype of the much-anticipated Vande Bharat sleeper coach at BEML's facility in Bengaluru on 1st Sep'2024. The coach will undergo a rigorous trial period before hitting the tracks for further testing.

"After Vande Bharat chair cars, we were working on Vande Bharat sleeper cars. Its manufacturing has now been completed. This train will go out for the trial and testing from the BEML facility today," Vaishnaw said.

Vaishnaw announced that the Vande Bharat sleeper train is expected to be operational for passengers within the next three months. Once the prototype has been thoroughly tested, production will commence, with plans to roll out two to three trains every month after the initial one-and-a-half years of production.

Elsewhere In World Railways

60 years of bullet train-Shinkansen Story

Shinkansen train in backdrop of Mt. Fuji

Sixty years ago, on October 1, 1964, the Shinkansen, world's first bullet train, set off from Tokyo to Osaka, Japan marking a new era of rail travel. At the time, the journey took four hours on trains running 131 miles per hour. Now, the **fastest trains** run at 200 miles per hour, cutting travel time between the two cities down to two hours and 25 minutes. Today, Japan Railways operates a network that covers three of the country's four main islands and spans nearly 2,900 kilometres. It has ferried over 10 billion passengers since 1964.

JR Central says it has never had an accident resulting in death or injury on the bullet train, even in a country where earthquakes, typhoons and heavy snow are common.

China tests high-speed hyperloop 'Flying Train' in 2km vacuum tube

China has carried out another test run of its maglev hyperloop project that is designed to reach a top speed of 1,000 kmph (621 mph).

It was the first time the integration of the train's systems has been put to the test, which was carried out in a 2km tube with a low-vacuum environment in Datong, in the central province of Shanxi.

It said the superconducting maglev vehicle achieved controlled navigation during the test, its suspension was stable and it stopped safely. Its track closely matched the theoretical trajectory, according to the report.

Engineers involved in the project hope that the maglev trains will eventually be able to "**fly on the ground**" at speeds that rival planes.

Construction of the full-scale test line in Datong – integrating aerospace and railway technology – began in April 2022 and was completed in November 2023. A few months later, the developers claimed a hyperloop test had **set a new record**, faster than the previous record of 623km/h.

Hyperloop tested upto 1000 Kmph

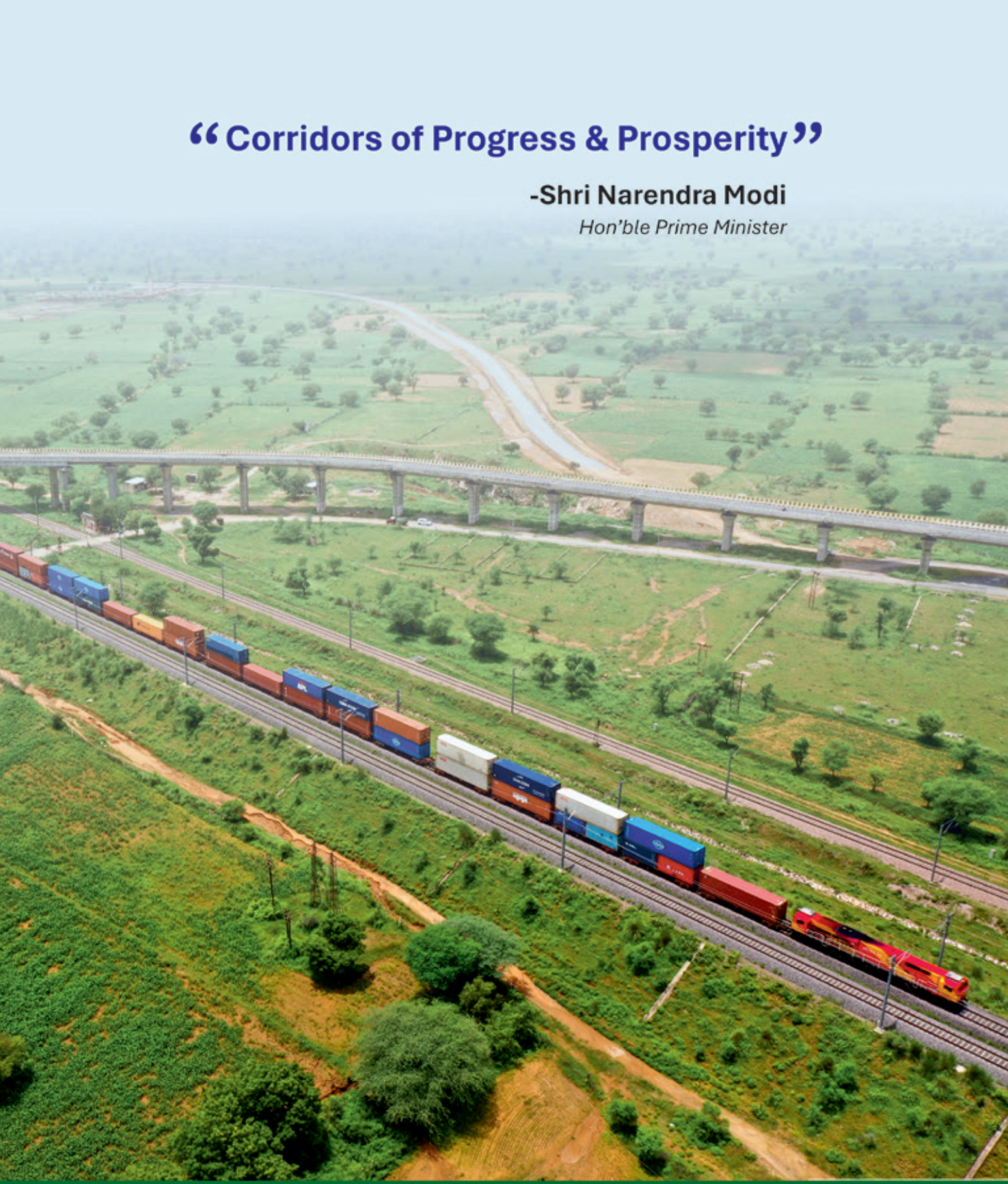
The Diamond Loop at New Sanand

The Diamond Loop at New Sanand, is a significant infrastructure enhancement featuring four connecting lines (DFC Sanand North- IR Sanand, DFC Sanand North- IR Goreghuma, DFC Sanand South- IR Sanand & DFC Sanand South- IR Goreghuma) to avoid surface crossing. Its design and crossing layout are rare in the Indian rail system, tailored specifically to reduce detention due to crossing and optimise Freight movement. This Innovative configuration allows for smoother, uninterrupted rail transitions, making it a model for future Infrastructure projects aimed at enhancing capacity and efficiency. This Diamond Crossing stands as a symbol of innovation and excellence, paving the way for a more connected and prosperous India, while elevating the nation's infrastructure to Global standards.

“Corridors of Progress & Prosperity”

-Shri Narendra Modi

Hon’ble Prime Minister



Dedicated Freight Corridor

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लिमिटेड

Dedicated Freight Corridor Corporation of India Ltd.

A Govt. of India (Ministry of Railways) Enterprise

Corporate & Registered Office; 5th Floor, Supreme Court Metro Station Building Complex, New Delhi-110 001

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