BACKGROUNDERS
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From Steam to Speed: The Ever-Evolving Journey of Railways

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Key Takeaways

- Railways in India began with the **first passenger train** running between Bombay and Thane on **16th April, 1853**.
- Evolving from early steam locomotives, railways have now achieved **99.6% electrification** of the broad gauge network as of March 2026.
- The network now operates about **25,000 trains daily**, ensuring reliable connectivity across the country.
- From carrying a few hundred passengers in its early years, Indian Railways transported around **741 crore passengers** in 2025–26.
- Kavach commissioned over **3,100 route kilometres**, with implementation underway on an additional **24,400 kilometres**.

Introduction

The sound of a steam engine changed the course of history in India **173 years ago**. As the **first passenger train** rolled from **Bombay to Thane in 1853**, it carried not just passengers, but the promise of a new era of movement and connectivity. In the years that followed, railways spread rapidly across cities, towns, and villages, connecting people, goods, and ideas like never before. Steam engines gave way to diesel locomotives, and eventually to electric trains that were faster, cleaner, and more efficient. Over time, railway stations evolved from basic platforms into bustling centers of activity. Each new technological advancement built upon the achievements of the past,

steadily improving speed, safety, and comfort for millions of passengers. What began as a slow and experimental course soon grew into one of the largest railway networks in the world.

Today, that journey continues to gather momentum as Indian Railways sets new benchmarks in both passenger and freight operations. In **2025–26**, the railways carried a notable **741 crore passengers**, reflecting the scale at which it serves the nation every day. During the same period, total revenue reached approximately **₹80,000 crore**, while freight movement touched a record **1,670 million tonnes (MT)**. These achievements highlight how railways have evolved from a pioneering transport system into a vital engine of economic growth. It also serves as the backbone of the country's logistics network along with providing safe, reliable, and accessible mobility to millions across India.

The Beginning of Railways in India

The introduction of railways in India began with a historic event on **16th April, 1853**, when the first passenger train operated between Bombay (now Mumbai) and Thane. The occasion was considered so significant that the day was declared a public holiday in Bombay, allowing citizens to witness the inauguration of this new mode of transportation. Large crowds gathered at **Bori Bunder station**.

Approximately **400 passengers** boarded the train for the inaugural run. The train consisted of **14 passenger carriages** operated by the **Great Indian Peninsula Railway (GIPR)** and was pulled by a steam locomotive named **Falkland**. The departure was accompanied by a ceremonial **21-gun salute**, symbolizing the beginning of railway transport in India.

The train successfully completed its journey of about **34–35 kilometres,** demonstrating the practical potential of railways for passenger movement. This event marked the foundation of the Indian railway system and initiated a period of rapid railway expansion across the country.

Rise of the Railway Network in the Steam Era

Following the introduction of the first passenger train, Indian Railways entered a period of rapid expansion driven by steam locomotive technology. The railway system grew quickly across regions, transforming from a single experimental route into a large transport network. By **1880**, the railway

system had developed a route mileage of about **9,000 miles (approximately 14,500 kilometres)**, demonstrating the rapid growth of railway infrastructure.

One of the important operational developments during the steam era was the adoption of **different railway gauges** to support extension in diverse geographical conditions. The clear minimum distance between the running faces of the two rails is called Gauge. In 1871, **metre gauge** was officially adopted as the second standard gauge in India, following the earlier use of the 5 ft 6 inches (1.6 metre) **broad gauge** for the first railway lines. For developing poor areas and for bringing merchandise to the main railways, gauges even narrower than the metre gauge were used.

Depending upon the gauge, Indian Railways has the following categories of track:

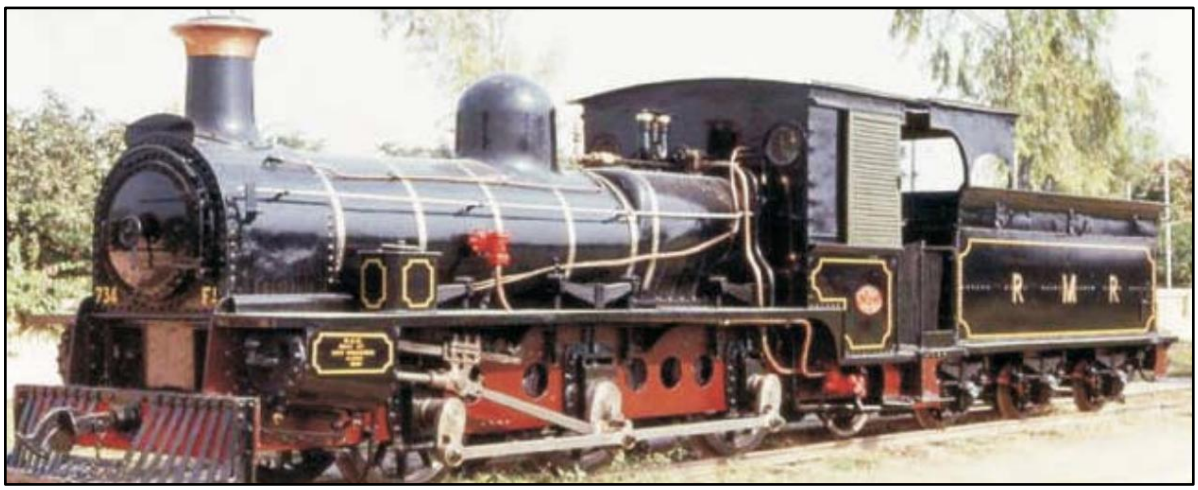
Broad Gauge – 1.6 metre

Metre Gauge – 1 metre

Narrow Gauge– 0.76 metre and 0.6 metre

Standard Gauge – 1.43 metre

Alongside this expansion, railway engineering also advanced significantly, particularly through the construction of specialized rail systems in challenging terrain. A major milestone was the opening of the **Darjeeling Himalayan Railway in 1881**. It connected the plains of West Bengal at **New Jalpaiguri** with **Darjeeling**. This demonstrated innovative engineering solutions for mountain transport and improved connectivity to hill regions. Another substantial technological milestone was the development of indigenous manufacturing capability. In **1895**, the first steam locomotive built in India was produced at the **Ajmer Workshop** of the **Rajputana Malwa Railway**. This represented an important step towards domestic railway engineering and maintenance capability.



The first steam loco No. F-734 of the Rajputana Malwa Railway

By the end of the nineteenth century, steam locomotives had enabled long-distance travel, large-scale freight movement, and nationwide connectivity. These developments established the engineering, operational, and administrative foundations that allowed Indian Railways to evolve.

During the twentieth century, railway systems around the world gradually began replacing steam locomotives with more efficient forms of traction. In India, the transition towards electric traction

began in **1925**, when the country's first electric train operated between **Bombay Victoria Terminus and Kurla Harbour**. This was a major step towards modernization, enabling faster acceleration and reduced dependence on steam locomotives. Progress in electrification remained gradual in the following decades.

- **1947:** After Independence, India inherited a railway network that required major improvement; routes were reorganized and new lines were constructed to strengthen connectivity between major cities, and Indian Railways was formed by combining **42 railway systems**, including those of former princely states.
- **1952:** The railway network was reorganized into **six administrative zones** to improve efficiency and management, while coal and diesel locomotives continued to dominate railway operations during this period.
- **1985:** Steam locomotives were gradually phased out, and railway operations increasingly shifted to more efficient **diesel and electric locomotives**, marking an important stage in the modernization of the railway system.

By the closing decades of the twentieth century, the railway system had established a strong operational base capable of supporting larger volumes of passengers and freight. This period set the stage for a new phase of development focused not only on expanding the network but also on improving speed, safety, efficiency, and passenger services.

The Modern Era of Indian Railways

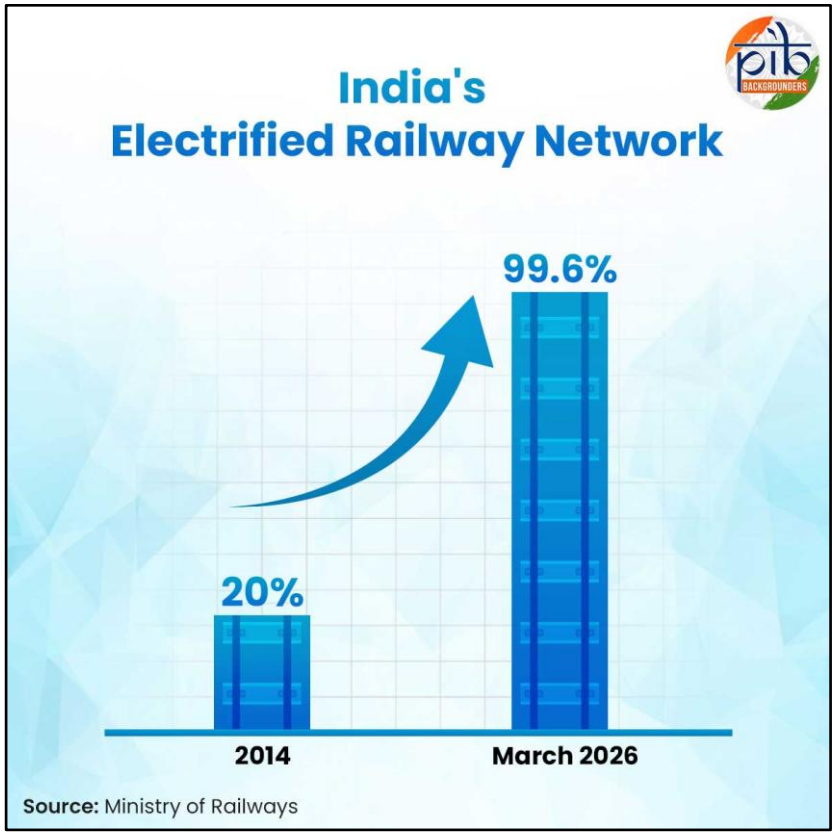
Entering the twenty-first century, Indian Railways began adopting upgraded technologies and infrastructure upgrades at a faster pace. It has witnessed progress in areas such as electrification, modern train design, safety systems, station redevelopment, and digital services. These developments reflect a shift from expansion to modernization, with a stronger focus on sustainability, passenger comfort, operational efficiency, and seamless connectivity.

Railway Electrification

Over the last decade, the electrification of railway lines has accelerated at an unprecedented pace. Before 2014, only about 20 percent of India's railway network was electrified. This limited operational efficiency and increased reliance on diesel fuel. Today, the transformation is nearly complete, with **99.6% railway network electrified** out of the total 70,142 broad gauge route kilometers. The expansion has been significant in scale. **69,873 route kilometers** (rkm) have been electrified as of March 2026, increasing from **21,801 rkm** in 2014.

The shift to electric traction has produced measurable benefits for the nation's energy economy. Most notably:

- Railway electrification saved approximately **180 crore litres of diesel** in 2024–25, reducing the need for crude oil imports.
- Electric traction is environment friendly and about **70% more economical** than diesel traction.
- Electrification has resulted in savings of approximately **₹6,000 crore**, with diesel consumption steadily declining.



This places **India ahead of several major rail networks worldwide**. The country's electrification levels are higher than those in the UK (39%), Russia (52%), and China (82%).

Track Renewal and Speed Enhancement

Track infrastructure has witnessed strategic strengthening over the past decade. A total of 54,600 kilometres of railway tracks were renewed during 2014–26, improving reliability and operational performance. The length of track capable of supporting speeds of 110 kmph and above increased from **31,445 kilometres** (40% of the network) in 2014 to over **85,000 kilometres**, (over 80% of the network) as of February 2026. This has enabled faster and more efficient train operations.

Expansion of Passenger Reach Through Modern Train Services

The Vande Bharat Network

Indian Railways has enhanced passenger travel through the introduction and expansion of the **Vande Bharat Express**. It is India's first indigenously designed and manufactured semi-high-speed train. Launched in February 2019, the service represents a major step towards modern, comfortable, and technology-driven rail travel under the Make in India initiative.

- Approximately **3.98 crore passengers** travelled on the Vande Bharat Express network in **FY 2025–26**, demonstrating strong growth in passenger usage.
- Since its inception, the Vande Bharat Express has carried **over 9.1 crore passengers** through **1 lakh trips.**
- The **Vande Bharat Sleeper service**, launched in **January 2026**, carried **1.21 lakh passengers** across **119 trips** in its first three months of operation.

Amrit Bharat Express

To provide affordable transportation for low- and middle-income families, Indian Railways has introduced the **Amrit Bharat Express**. They are a new generation of fully non-AC modern trains designed to improve comfort and safety while maintaining economical travel options. These trains consist of **11 General Class coaches**, **8 Sleeper Class coaches**, **1 Pantry Car**, and **2 Luggage-cum-Divyangjan coaches**. This ensures adequate facilities for passengers across different travel needs. As of **18th March 2026**, a total of **60 Amrit Bharat Express services** are being operated across the Indian Railways network.

Development of High-Speed Rail in India

The **Union Budget 2026–27** allocated a record capital outlay of **₹2,78,000 crore** for Indian Railways, the highest ever in the history of the sector. This highlights the strategic importance accorded to rail

development. As part of this vision, the development of **seven high-speed rail corridors** has been announced as growth connectors. These corridors are intended to integrate major cities and regions, facilitate efficient movement of people, and support economic interaction across states. Proposed routes include **Mumbai–Pune, Delhi–Varanasi, and Hyderabad–Bengaluru**, among others. Together, these planned corridors span nearly **4,000 kilometres**.

The **Mumbai–Ahmedabad High-Speed Rail (MAHSR) Corridor** represents India's first concrete step towards introducing high-speed rail systems in the country. Conceived as a dedicated high-speed passenger corridor, it covers a total length of approximately **508 kilometres**. The corridor has been designed for high-speed operations at a maximum speed of **320 kilometres per hour**.

These developments signal India's transition into the era of high-speed rail, setting the foundation for faster and more efficient inter-city travel.

Strengthening Digital Infrastructure and Passenger Safety

Indian Railways has strengthened its telecom and digital infrastructure to enhance safety, operational efficiency, and passenger services. The adoption of advanced technologies and integrated communication systems during the year 2025-2026 marks a significant step toward building a digitally connected railway network.

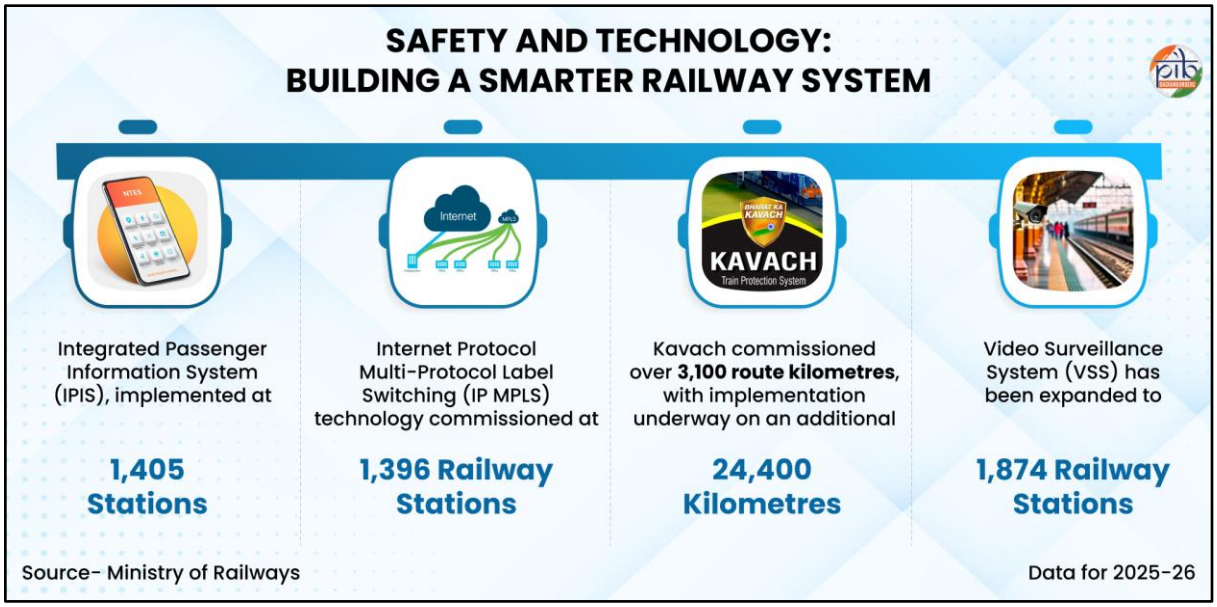
- **Unified Telecom Backbone Infrastructure:** Railways have upgraded the telecom backbone through **Internet Protocol Multi-Protocol Label Switching (IP MPLS)** technology to support high-capacity, mission-critical railway applications. The system enables centralized video surveillance and supports core operational systems such as **Mobile Train Radio Communication (MTRC), Passenger Reservation System (PRS), Supervisory Control and Data Acquisition (SCADA)**, etc. The IP MPLS network has been successfully commissioned at **1,396 railway stations**, strengthening the foundation for a digitally integrated railway ecosystem.

- **KAVACH:** Safety initiatives have been further strengthened with the expansion of the indigenous **Kavach Automatic Train Protection System**. This has been commissioned over **3,100 route kilometres**, with implementation underway on an additional **24,400 kilometres**. It aims to prevent train collisions and enhance operational safety.

- **AI-Enabled Video Surveillance:** The **Video Surveillance System (VSS)** has been expanded to **1,874 railway stations**, using AI-based analytics and facial recognition technology to strengthen passenger safety and monitoring.

- **Real-Time Passenger Information:** The **Integrated Passenger Information System (IPIS)**, linked with the **National Train Enquiry System (NTES)**, has been implemented at **1,405 stations**, ensuring timely announcements and better passenger communication.

- **Tunnel Communication Systems:** Communication systems have been introduced in key projects, including the **Udhampur–Srinagar–Baramulla Rail Link (USBRL)**, to ensure uninterrupted connectivity and safer operations in tunnel sections.



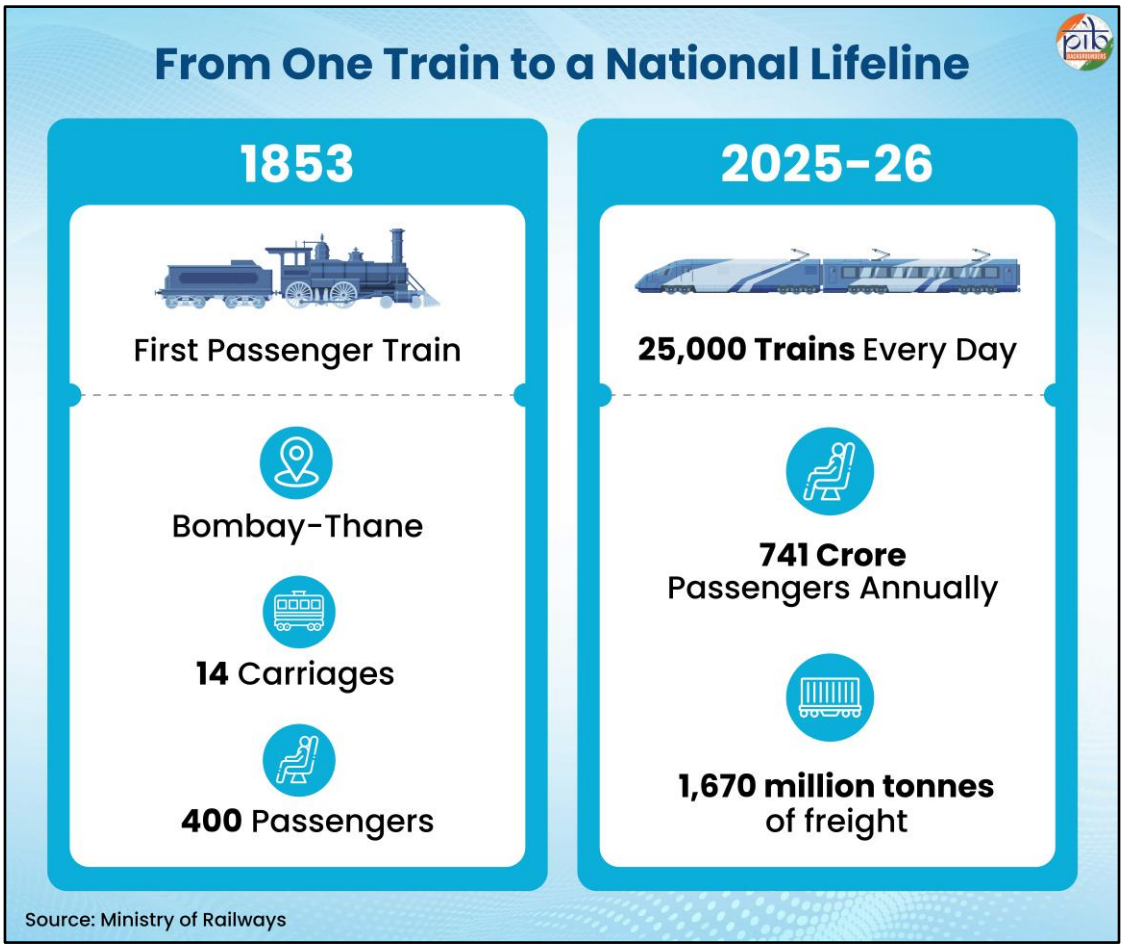
These initiatives highlight the continued commitment to building a **safe and technology-driven railway network**. It is aligned with the broader vision of digital transformation and improved passenger services.

Operational and Infrastructure Achievements in 2025–2026

Building on decades of modernization, the achievements recorded during FY 2025–2026 represent the most recent phase in this continuing progression.

- Rail operations remained strong throughout **2025–2026**, with approximately **25,000 trains running daily**, ensuring reliable and widespread connectivity across the country.
- To meet increasing passenger demand, additional special train services were introduced during peak travel periods, improving convenience and accessibility for passengers. These operate during festivals like Diwali, Chhath, etc. In the year 2025-26 (till December 2025), approximately **65,000 special trains** have been operated.
- Indian Railways strengthened its domestic manufacturing capacity under the **'Make in India'** initiative by producing **1,674 locomotives during 2025–2026**, reflecting growing self-reliance in railway production.
- Passenger services entered a new digital phase with the launch of the **RailOne App in July 2025**, providing a unified platform for ticket booking, train enquiries, and grievance redressal.

- Freight and logistics infrastructure expanded with the commissioning of **35 Gati Shakti Cargo Terminals**, supporting improved logistics efficiency and multimodal connectivity.
- Passenger infrastructure advances, with **119 railway stations redeveloped under the Amrit Bharat Station Scheme**, offering modern amenities and an enhanced travel experience.



Conclusion

Over more than a century and a half, Indian Railways has steadily adapted to changing needs, technologies, and expectations. What began as a modest steam-powered service covering a short distance has grown into a vast and complex transport system. Today, it is capable of moving millions of passengers and large volumes of goods every day. Each phase—**from steam locomotives and early engineering innovations to electrified networks, advanced safety systems, and digital platforms**—has added new capabilities. At the same time, every advancement has built upon the foundations laid in earlier decades. Today, the railway network stands as a reflection of sustained engineering effort, operational discipline, and continuous improvement. Its ability to **combine scale with efficiency, affordability with innovation, and tradition with new technology** demonstrates how a historic institution can remain relevant in a rapidly changing world. As the nation moves forward, the railways will continue to serve not only as a mode of transport but as a dependable system that supports daily life, strengthens industry, and contributes to national development.

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