ROADS

NATIONAL HIGHWAYS DEVELOPMENT PROJECT

The NHDP is a project to upgrade, rehabilitate and widen major highways in India to a higher standard. The project was implemented in 1998 under the leadership of Atal Bihari Vajpayee. It is managed by NHAI

The project is composed of the following phases:

Phase I: The Golden Quadrilateral, funded largely by the government's special petroleum product tax revenues and government borrowing. In January 2012, India announced the four lane GQ highway network as complete

Phase II: North-South and East-West corridors. It also includes Port connectivity and other projects

Phase III: The government recently approved NHDP-III to upgrade 12,109 km (7,524 mi)of national highways on a Build, Operate and Transfer (BOT) basis. 4-laning of 10,000 km. An accelerated road development programme for the North Eastern region.

Phase IV: Considering widening 20,000 km (12,000 mi) of highway that were not part of Phase I, II, or III. Phase IV will *convert existing single lane highways into two lanes with paved shoulders*

Phase V: As road traffic increases over time, a number of four lane highways will need to be upgraded/expanded to six lanes. The current plan calls for upgrade of about 5,000 km (3,100 mi) of four-lane roads

Phase VI: Constructing expressways that would connect major commercial and industrial townships. It has already identified 400 km (250 mi) of **Vadodara (earlier Baroda)-Mumbai** section that would **connect to the existing Vadodara (earlier Baroda)-Ahmedabad section**. The World Bank is studying this project. The project will be funded on BOT basis. The 334 km (208 mi) Expressway between **Chennai—Bangalore** and 277 km (172 mi) Expressway between **Kolkata—Dhanbad** has been identified and feasibility study and DPR contract has been awarded by NHAI.

Phase VII: This phase calls for improvements to city road networks by adding ring roads to enable easier connectivity with national highways to important cities.

NHDP SUMMARY

NHDP Phase	Particulars
NHDP-I & II	Balance work of GQ and EW-NS corridors
NHDP-III	4-laning
NHDP-IV	2-laning
NHDP-V	6-laning of selected stretches
NHDP-VI	Development of expressways
NHDP-VII	Ring Roads, Bypasses, Grade Separators, Service Roads etc.

NATIONAL HIGHWAYS DEVELOPMENT PROJECT
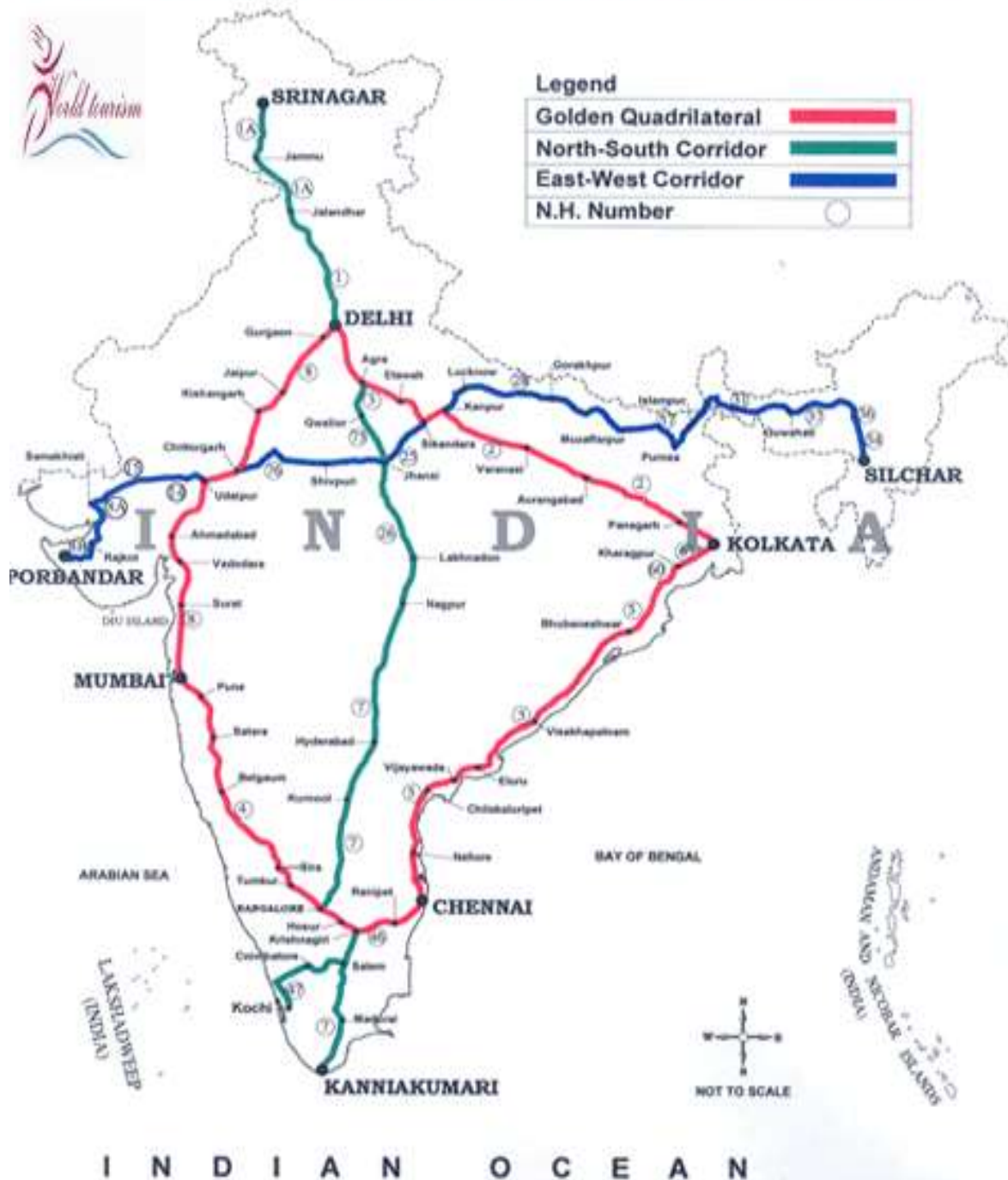
THE GOLDEN QUADRILATERAL

The Golden Quadrilateral is a highway network connecting many of the major industrial, agricultural and cultural centres of India. A quadrilateral of sorts is formed by connecting Chennai, Kolkata, Delhi and Mumbai, and hence its name. Other metropolises also connected by the network are Ahmedabad, Bengaluru, Bhubaneswar, Jaipur, Kanpur, Pune, Surat, Guntur, Vijayawada, and Visakhapatnam.

The largest highway project in India and the fifth longest in the world, started by NDA Government led by then Prime Minister Atal Bihari Vajpayee, it is the first phase of the National Highways Development Project (NHDP), and consists of building 5,846 km (3,633 mi) four/six lane express highways

NORTH–SOUTH AND EAST–WEST CORRIDOR

The North-South–East-West Corridor (NS-EW) is the largest ongoing highway project in India. It is the second phase of the National Highways Development Project (NHDP), and consists of building 7300 kilometers of four/six lane expressways connecting **Srinagar, Kanyakumari, Porbandar and Silchar**

Jhansi is the junction of North–South and East–West Corridors

The following four stretches are common between the Golden Quadrilateral and the NS-EW Corridors.

- Delhi–Agra: Golden Quadrilateral & North–South Corridor
- Bengaluru–Krishnagiri: Golden Quadrilateral & North–South Corridor
- Akbarpur–Kanpur: Golden Quadrilateral & East–West Corridor
- Udaipur–Chittorgarh: Golden Quadrilateral & East West Corridor

National Highway	Connecting Cities
NH1	Delhi-Ambala-Amritsar-IndoPak Border
NH2	Delhi – Agra – Kanpur – Varanasi - Kolkata
NH3	Agra – Gwaliar – Indore – Nasik - Mumbai
NH4	Junction with NH3 near Thane – Belgaum – Bangalore – Ranipat – Chennai
NH7	Varanasi – Jabalpur – Nagpur – Hyderabad – Bangalore – Madurai – Kanyakumari
NH8	Delhi – Jaipur – Ahmedabad – Vadodara - Mumbai
NH9	Pune – Solapur – Hyderabad – Vijayawada
NH15	Pathankot – Amritsar – Bhatinda – Ganganagar – Bikaner – Jaisalmer - Kandla
NH22	Ambala – Kalka – Shimla – Rampur – Indo-Tibet border near Shipki La
NH24	Delhi – Bareilly - Lucknow
NH39	Numaligarh – Imphal – Palel – Indo-Myanmar Border
NH44	Shillong – Passi Badarpur – Agartala
NH47	Salem – Coimbatore – Trichur – Ernakulum- Thiruvananthapuram - Kanyakumari
NH48	Bangalore – Hasan - Mangalore
NH49	Kochi – Madurai - Dhanushkodi
NH55	Siliguri – Darjeeling
NH80	Makamah - Farakka
NH102	Chapra - Muzaffarpur
NH205	Ananthpur - Chennai

PORTS

Indian Ports are classified either as Major Ports or as Non-Major Ports. India has **12 major** ports which **handle 58%** of total traffic and about **200 non-major** ports which handle **42% of traffic**. Major Ports are mentioned under the Union List of subjects while Non Major Ports are mentioned under the Concurrent List of the Indian Constitution. The administration of non major ports falls under governance of their respective Maritime State Governments. Major Sea Ports have been defined by the **Indian Ports Act, 1908** – "any port which the Central Government may, by notification in the Official Gazette declare".

The 12 major ports are spread out in **all nine coastal states**. **Six ports are located each on eastern and western coastline.**

Ports on Western Coast	Ports on Eastern Coast
1. **Kandla** (formed after Karachi given to Pakistan, child of partition)	1. **Kolkata-Haldia** (riverine port, Indian coast guard base)
2. **Mumbai**	2. **Paradip** (exports raw iron to Japan)
3. **Jawahar Lal Nehru/ Nhava Sheva** (largest container port)	3. **Vishakhapatnam** (oldest shipyard & natural harbour)
4. **Marmugao** (natural harbour)	4. **Chennai** (oldest and artificial harbour)
5. **Mangalore/Panambur** (Kudremukh iron-ore exports)	5. **Ennore** (most modern-in private hands)
6. **Cochin** (Natural Harbour)	6. **Tuticorin** (southernmost & artificial deep sea harbour)

All **these ports are administered by the respective Port Trusts**, **except the newly constructed Ennore port** which is under the Ennore Port Ltd. Company.

RAILWAYS

The companies involved in building the earliest railways include:

- **East Indian Railway Company, (introduced railways to eastern and northern India)**
- **Great Indian Peninsular Railway**
- **South Indian Railway, Central India Railway**
- **North-Western Railway**

The country's first railway, built by the Great Indian Peninsula Railway (GIPR), opened in 1853, between Bombay and Thane (A stretch of 34 km). The railway bridge over Thane creek, first in India, was completed in 1854. The portion of the line from Thane to Kalyan was opened on May 1, 1854

The second train ran between Howrah and Hooghly in 1854.

The line from Kanpur to Allahabad was opened in 1859. In 1860, the Kanpur-Etawah section was opened to traffic and between 1862 and 1866 all gaps between Howrah and Delhi were filled and the connection to Agra was built. The bridges over the Yamuna at Allahabad and at Delhi were completed in 1865 and 1866 respectively. In June 1867 the Allahabad-Jabalpur branch was completed and a connection made at Jabalpur with the Great Indian Peninsula Railway, thus

completing the rail connections between Calcutta and Delhi and Calcutta and Bombay. It served as an inspiration for French writer Jules Verne's book Around the World in Eighty Days.

The first electric train in India was 'Deccan Queen' between Bombay and Poona. It was introduced in 1929.

In 1905, an early Railway Board was constituted, but the powers were formally vested under Lord Curzon. In 1907 almost all the rail companies were taken over by the government.

Indian railway system is the largest in Asia and the fourth largest in the world. It is the biggest departmental public undertaking in the country. Indian Railways has the second biggest electrified system in the world after Russia. The Indian Railways celebrated its 150th anniversary on April 16, 2003. To commemorate the occasion, 16 January – Shatabadi inter – city express trains were announced to be inducted.

Gatimaan Express is a proposed semi-high speed train that will run between New Delhi and Agra at a speed of about 160 km/h (99 mph), and the fastest train in India. The train will take a travel time of 105 minutes to cover 195 KM journey. It will be faster than Delhi-Bhopal Shatabdi, whose top speed is 150 km/h (93 mph) between Delhi-Agra stretch.

Diamond Quadrilateral is a proposed project of NDA-2, which would connect via high-speed rail the cities of Chennai, Delhi, Kolkata, and Mumbai

The total length of track used by Indian Railways is about 115,000 km (71,000 mi) while the total route length of the network is 65,000 km (40,000 mi)

The total number of railway stations in India is 7,100.

The longest railway platform in India is at Kharagpur (W.B.).

Mumbai is the destination where maximum number of trains in India head for.

The longest train route is of 'Himsagar Express' from Jammu Tavi to Kanyakumari. It covers a distance of 3,726 km and passes through ten states.

The first Metro Rail was introduced in Kolkata (W.Bengal) on October 24, 1984. The two stations connected were Dumdum and Belgachhia.

Indian railways use four gauges:

- **Broad** (5 ft 6 in)   (94% of entire track length of all the gauges)
- **Standard** (4 ft 8 1⁄2 in)   (Used by suburban railways and metro)
- **Metre** (3 ft 3 3⁄8 in)   (4% of entire track length of all the gauges)
- **Narrow** (2 ft 6 in and 2 ft)   (2 % of entire length/Used in Hill railways)

Project Unigauge is an ongoing exercise by Indian Railways to standardise most of the rail gauges in India to broad gauge. Metro railways are independent corporations not under the jurisdiction of Indian Railways and therefore Project Unigauge does not apply to them. A broad-gauge network allows bigger trains, higher speeds, and more stability. However, it costs more than smaller gauge.

For India, which has one of the world's highest population densities, broad-gauge allows comfortable travel for high volumes of travellers, and is deemed to be economically feasible in the long term. Adopting Broad-gauge has helped India to have one of the lowest ticket prices in the world. Cheap train travel cost is achieved with more tickets per train. Heritage railway systems are not included in the project.

Name of heritage railway line	Gauge mm	Track km	State	from (plains)	to (hills)
Nilgiri Mountain Railway	1,000 mm	46	Tamil Nadu	Mettupalayam/MTP	Udagamandalam (Ooty)/UAM
Kalka–Shimla Railway	762 mm	94	Himachal Pradesh	Kalka/KLK	Shimla/SML
Kangra Valley Railway	762 mm	164	Himachal Pradesh	Pathankot/PTK	Joginder Nagar/JDNX
Darjeeling Himalayan Railway	610 mm	79	West Bengal	New Jalpaiguri/NJP	Darjeeling/DJ
Matheran Hill Railway	610 mm	20	Maharashtra	Neral/NRL	Matheran/MAE

There are two **UNESCO World Heritage Sites on Indian Railways**

- The Chatrapati Shivaji Terminus
- Mountain Railways of India

The latter consists of three separate railway lines:

- Darjeeling Himalayan Railway, a narrow gauge railway in West Bengal.
- Nilgiri Mountain Railway, metre gauge railway in the Nilgiri Hills in Tamil Nadu.
- Kalka-Shimla Railway, a narrow gauge railway in the Shivalik mountains in Himachal Pradesh. The railway was featured in the Guinness Book of World Records for offering the steepest rise in altitude in the space of 96 kilometre

The apex management organisation is the Railway Board, also called the Ministry of Railways. The General Managers of the zonal railways and the production units report to the board.

	Name	Abbr.	Headquarters
1	Northern Railway	NR	Delhi
2	Central Railway	CR	Mumbai
3	Eastern Railway	ER	Kolkata
4	Southern Railway	SR	Chennai
5	Western Railway	WR	Mumbai
6	North Central Railway	NCR	Allahabad
7	North Western Railway	NWR	Jaipur
8	North Eastern Railway	NER	Gorakhpur
9	South Central Railway	SCR	Secunderabad
10	South Western Railway	SWR	Hubli
11	South Eastern Railway	SER	Kolkata
12	South East Central Railway	SECR	Bilaspur, CG
13	East Central Railway	ECR	Hajipur
14	East Coast Railway	ECoR	Bhubaneswar
15	Konkan Railway	KR	Panvel
16	Northeast Frontier Railway	NFR	Maligaon(Guwahati)
17	West Central Railway	WCR	Jabalpur
18	Kolkata Metro	KMR	Kolkata

Divisional organisation

The Divisional Railway Manager (DRM) heads the organisation at the division level. There are currently 71 divisions on the system nationwide. The divisions are primarily involved with train running but may have loco **sheds coaching depots** (repair home bases for passenger trains) and **wagon depots** (repair and maintenance points for freight stock).

RAILWAY MANUFACTURING UNITS:

- **Chittaranjan Locomotive Works:** Located in Chittaranjan (W.B) and manufactures electric engines.
- **Diesel Locomotive Works:** Located in Varanasi (U.P) and manufactures diesel engines.
- **Integral Coach Factory in India:** Located in Perambur (TN) and manufactures rail coaches.
- **Wheel and Axle Plant:** Locatedat Yalahaka (Bangalore, Karnataka) and manufactures wheels and axles.
- **Diesel Component Works:** Located at Patiala (Punjab) and manufactures components of diesel engines.
- **Rail Coach Factory in India:** Located at Kapurthala (Punjab) and manufactures rail coaches.

AIR

Air transportation in India made a humble beginning in 1911 when air mail operation commenced over a little distance of 10 km between Allahabad and Naini. **Indian National Airways was formed in 1933** and it introduced air service between Karachi and Lahore. By the end of the World War II, major cities like Karachi, Mumbai, Delhi, Kolkata, Lahore and some other places were provided with air services. **At the time of partition of the country in 1947, there were four companies** namely Tata Sons Ltd./Air India, Indian National Airways, Air Services of India and Deccan Airways. **By 1951, four more companies**' viz. Bharat Airways, Himalayan Aviation Ltd., Airways India and the Kalinga Airlines also came up. In 1953, the air transport was nationalised and two corporations were formed: **Air India International and the Indian Airlines.**

Vayudoot was set up in 1981 to augment the air transport in the country. It provided links with remote and inaccessible areas which were not covered by Indian Airlines. Merged with Indian Airlines after 1992.

Pawan Hans Limited was established in **1985**. It provides helicopter services to the petroleum sector including ONGC, Oil India Ltd. and Enron Oil and Gas, Mumbai High and connects remote and inaccessible areas. The company has a strong presence in North-East.

The Government repealed the **Air Corporation Act 1953 on March 1, 1994,** thereby ending the monopoly of Indian Airlines and Air India on the scheduled operations.

The Civil Aviation Centre in Fursatgarh near Allahabad provided, among other things, ground training to the pilots.

There are 23 International Airports in India

The Airports Authority of India (AAI) under the Ministry of Civil Aviation is responsible for creating, upgrading, maintaining and managing civil aviation infrastructure in India. It provides Air traffic management (ATM) services over Indian airspace and adjoining oceanic areas. It also manages a total of 125 Airports, **including 18 International Airports (5 Airports vis-à-vis Delhi(Consortium led by GMR), Hyderabad(GMR),Mumbai(GVK led consortium), Cochin(Cochin Intl. Airport Pvt. Ltd) and Bangalore (BIAL) are managed by private operators)**7 Customs Airports, 78 Domestic Airports and 26 Civil enclaves at Military Airfields. AAI also has ground installations at all airports and 25 other locations to ensure safety of aircraft operations. AAI covers all major air-routes over Indian landmass via 29 Radar installations at 11 locations along with 89 VOR/DVOR installations co-located with Distance Measuring Equipment (DME). 52 runways are provided with Instrument landing system (ILS) installations with Night Landing Facilities at most of these airports and Automatic Message Switching System at 15 Airports.

Sl.No.	City	Name of the Airport	Owned by
1	Ahmedabad	Sardar Vallabhbhai Patel International Airport	Airports Authority of India
2	Amritsar	Sri Guru Ram Dass Jee International Airport	Airports Authority of India
3	Bengaluru	Bengaluru International Airport	Bengaluru International Airport Ltd
4	Chennai	Chennai International Airport	Airports Authority of India
5	Cochin	Cochin International Airport	Cochin International Airport Ltd
6	Goa	Goa International Airport	Airports Authority of India
7	Guwahati	Lokpriya Gopinath Bordoloi International Airport	Airports Authority of India
8	Hyderabad	GMR Rajiv Gandhi International Airport	GMR Hyderabad International Airport (P) Ltd
9	Kolkata	Netaji Subhash Chandra Bose International Airport	Airports Authority of India
10	Mumbai	Chatrapati Shivaji International Airport	GVK led consortium and Airports Authority of India
11	Delhi	Indira Gandhi International Airport	GMR Group (54%), Airports Authority of India (26%), Fraport & Eraman Malaysia (10% each).

12	Thiruvananthapuram	Trivandrum International Airport	Airports Authority of India
13	Port Blair	Vir Savarkar International Airport	Airports Authority of India
14	Calicut	Calicut International Airport	Airports Authority of India
15	Nagpur	Babasaheb Ambedkar International Airport	Airports Authority of India
16	Jaipur	Jaipur International Airport	Airports Authority of India
17	Lucknow*	Chaudhary Charan Singh International Airport	Airports Authority of India
18	Varanasi*	Lal Bahadur Shastri International Airport	Airports Authority of India
19	Mangalore*	Mangalore International Airport	Airports Authority of India
20	Tiruchirappalli*	Tiruchirappalli International Airport	Airports Authority of India
21	Coimbatore*	Coimbatore International Airport	Airports Authority of India
22	Bhubaneshwar#	Biju Patnaik Airport	Airports Authority of India
23	Imphal#	Imphal Airport	Airports Authority of India

*Five airports were granted international status in October 2012
#Two airports were granted international status in October 2013