

# Industries in India

## Mineral-Based Industries in India

Industries which use minerals as raw materials are known as mineral-based industries.

## Iron and Steel Industry

The opening of the Tata Iron and Steel Company in Jamshedpur in 1907 was an important event in the history of industrialisation in India. At present, India is the fifth largest producer of crude steel in the world.

### Raw Materials

Iron ore, manganese, limestone, silica, feldspar, scrap iron and flux are important raw materials used in the iron and steel industry. Coking coal for the industry is obtained from Jharia, Raniganj, Bokaro, Giridha and Korba. Manganese is used for hardening the steel and for removing impurities.

### Steel Making

Iron ore exists with impurities such as sulphur, silica and lime. These impurities have to be removed to obtain pure iron for manufacturing steel. The following process is used for converting iron ore to steel.

### Ore Reduction

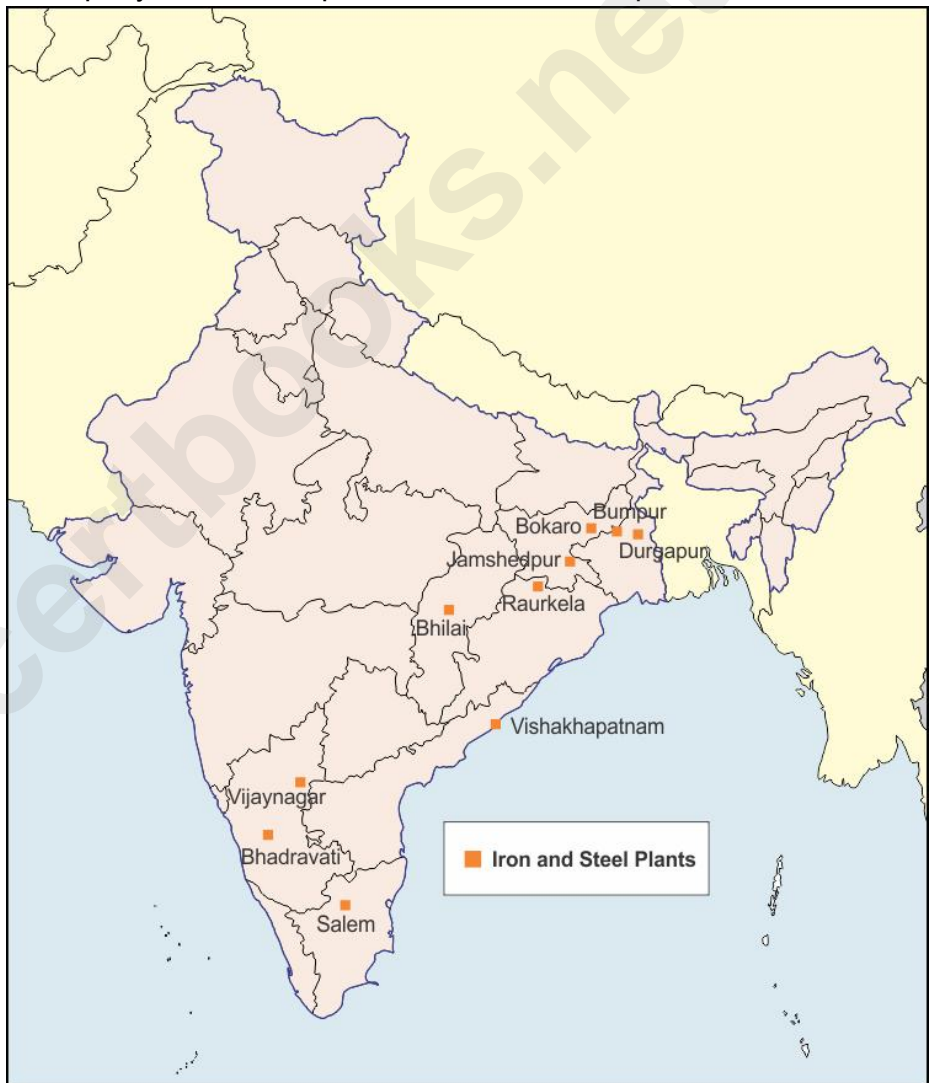
- The process of ore reduction is carried out in the blast furnace. Coke, limestone and dolomite are added to combine impurities in the ore.
- These impurities combine to form slag which floats on the molten iron and can be separated from it.
- Molten iron is then collected at the base of the furnace which is removed at regular intervals.
- This product is known as pig iron which can later be converted to wrought iron, steel and cast iron.

### Steel Melting Furnace

- To convert pig iron into steel, impurities are removed by deoxidation.
- Hardening material such as carbon is then added.

### Rolling Mills

- The steel is cast into ingots and rolled into different sizes.



Map of India showing some major iron and steel plants in India

## Tata Iron and Steel Plant at Jamshedpur

Tata Iron and Steel Company (TISCO) is located at Jamshedpur about 240 km northwest of Kolkata.

### Availability of Raw Materials

- The plant gets iron ore from the Gurumahisani mines in Mayurbhanj district of Odisha and from the Noamundi mines in Singhbhum district of Jharkhand.
- The plant obtains manganese from Joda in Keonjhar district and limestone, dolomite and fire clay from the Sundargarh district of Odisha.
- Coal is received from Jharia and Bokaro coalfields which are located at a distance of about 177 km.

**Power Supply:** Coal, the main source of power supply, comes from Jharia and Bokaro coal fields.

**Water Supply:** Water from the rivers Kharkai and Subarnarekha is used in the plant.

**Labour Force:** Most labour force comes from the densely populated states of Bihar, West Bengal, Jharkhand, Chhattisgarh and Uttar Pradesh.

**Markets:** Kolkata is an important market of finished steel.

**Transport Facilities:** Jamshedpur is well-connected with roads and railways to the other parts of the country. It is connected with Eastern Railways and Kolkata Port for exporting steel.

**Products:** High-grade carbon steel and acid steel are used for making railway wheels, axles, bars and rods. The plant also produces special alloy steel.

### Other Large Iron and Steel Plants

Name of the Plant	Location	Availability of Raw Materials	Power Supply	Water Supply	Products
Bokaro Steel Plant (set up in assistance with Russia)	Hazaribagh District	Coal: Bokaro and Jharia Iron ore: Kiriburu mines in Keonjhar (Odisha) Limestone: - Bhavantapura Dolomite: Palamau district of Jharkhand	Damodar Valley Corporation (DVC)	Reservoirs across River Damodar	Pig iron, crude steel and saleable steel. Its sludge and slag is used for making fertilisers at Sindri.
Durgapur Steel Plant (set up in assistance with UK)	Burdwan district of West Bengal	Iron ore: Singhbhum (Jharkhand) and Keonjhar (Odisha) Coal: Jharia (Jharkhand) and Raniganj (West Bengal)	Coal for power supply is obtained from Jharia coalfields and Damodar Valley Corporation	River Damodar	Alloy steel and railway items such as wheels. Also produces crude coal tar and crude benzol.
Bhilai Iron and Steel Plant (set up in assistance with Russia)	Durg district of Chhattisgarh	Iron ore: Dalli Rajhara mines (Chhattisgarh) Limestone: Nandini Manganese: Balaghat mines in Madhya Pradesh	Coal is obtained from Bokaro, Karagati and Jharia	Reservoir located at Tendula	Heavy rails, billets, rolled wires, structural beams and plates for the shipbuilding industry. It also

			coal fields in Jharkhand and Korba in Chhattisgarh		produces by-products such as ammonium sulphate, benzol, coal tar and sulphate acid.
Rourkela Steel Plant	Sundargarh district of Odisha	Iron ore: Sundargarh and Keonjhar (Odisha) Manganese: Barajmda Limestone: Bhiritrapur Dolomite: Baradwar	Coal is obtained from Jharia, Talcher and Korba fields. Electricity is obtained from Hirakud Project.	Mandira dam across River Sankha and River Mahanadi	Hot rolled sheets, galvanised sheets and electrical steel plates. Also produces nitrogen which is used as fertiliser.
Indian Iron and Steel Company	Burnpur, Hirapur and Kulti near Asansol in northwest Kolkata	Iron ore: Singbhum and Mayurbhanj Limestone and dolomite: Sundargarh district in Odisha Manganese: Jharkhand	Coal: Jharia coal fields, Damodar Valley Corporation	River Damodar	Pig iron and iron and steel
Visvesvaraya Iron and Steel Limited	Bhadravati in Shimoga district in Karnataka	Iron ore: Kemmangundi mines (Chikmagalur district) Limestone: Bhudiguda Manganese: Shimoga and Chitradurga	Charcoal is obtained from nearby forests of Malnad area. Electricity is obtained from Shravati Power Project.	-	Alloy steel, ferro silicon, cement, mild steel and casting
Vijayanagar Steel Plant	Torangal near Hospet in Bellary in Karnataka	Iron ore: Hospet Limestone and dolomite: Gulbarga and Bijapur	Coal fields of the Kanhan Valley (MP) and Singareni coalfields (Andhra Pradesh)	Tungabhadra reservoir and Tungabhadra project	Ingot steel
Vishakhapatnam Steel Plant	Vishakhapatnam in Andhra Pradesh	Iron ore: Bailadila in Chhattisgarh Limestone, dolomite and manganese: Mines of Andhra Pradesh and Odisha	Coal fields of Damodar Valley		Liquid steel, saleable steel
Salem Steel Plant	Salem in Tamil Nadu	Iron ore: Salem, iron ore mines of Karnataka Coal: Neyveli			Stainless steel, electrical steel

## Mini Steel Plants

Mini steel plants use ferrous scrap, pig iron or sponge as their raw materials. The government is encouraging the establishment of mini plants because they have the following advantages:

- These plants use scrap iron which is cheap and easily available.
- They use electric power and thus do not cause pollution.
- They do not require heavy investments.
- As these plants meet the demands of the local markets, they reduce the pressure on large plants.

## Heavy Engineering Industries

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Heavy engineering industries are important industries as they provide machinery for industries and equipment for the agriculture, transport, mining and construction sectors.

These industries require the following:

- Bulky raw materials
- Advanced technology and large capital resources
- Huge workforce

Iron and steel industries, shipbuilding industries and automobile industries are heavy industries.

## Shipbuilding Industry

Factors favouring the development of the shipbuilding industry in India are

- Because the shipbuilding industry requires bulky raw materials, it is located near the source of raw materials.
- It requires skilled labour force.
- It is also located near deep waters which can be used for navigation.
- It needs large tract of level land.

## Major Shipyards

Name of the Company	Features
Hindustan Shipyard Limited	Located in Vishakhapatnam, it was the first shipyard to obtain ISO-9001 accreditation. It builds cargo vessels, passenger vessels and small craft for ports and customs.
The Cochin Shipyard	Located in Kochi, it has large docks to construct and repair ships. It has repaired more than 1200 ships so far.
The Garden Reach Workshop	Located in Kolkata, it is one of the leading shipyards in India. It constructs ships, floating dry docks, passenger and other types of vessels, and fishing trawlers.
The Mazagaon Dock Limited	Located in Mumbai, it builds frigates, cruisers and other ships for the Indian navy. It also builds cargo ships, passenger vessels and dredgers.

## Automobile Industry

Four requirements of the automobile industry are

- Raw materials such as iron, steel and paint
- Tools and machinery for running and maintaining factories
- Finished goods such as tyres, tubes and batteries
- Coal and hydropower

India has several automobile units. It is the sixth largest passenger car and commercial vehicle manufacturing country in the world.

## Railway Locomotives

Railways are an important means of transport in the country. Units producing locomotives and coaches for the railways come under the Ministry of Railways. These are

**The Chittaranjan Locomotive Works:** it is located at Chittaranjan in West Bengal. It manufactures electric railway engines, broad gauge and metre gauge and diesel locomotives.

**The Diesel Locomotive Works (DLW):** It is located at Varanasi. It produces broad gauge and metre gauge diesel engines.

**The Integral Coach Factory:** Located at Perambur near Chennai, it manufactures fully furnished passenger coaches.

**The Rail Coach Factory:** It is located at Kapurthala in Punjab and produces high-speed lightweight railway coaches.

Other plants producing diesel electrical engines are located at Jamshedpur and Patiala.

## Aircraft Industry

Hindustan Aeronautics Limited was set up in 1964 with its corporate office at Bengaluru. It was the first aircraft industry to be set up in India. Its main functions are

- To design, manufacture, repair and overhaul various types of aircraft, aero engines, avionics, instruments and accessories.
- Design and develop advanced light helicopters and light combat aircraft.

## Heavy Electrical Industry

This industry consists of the equipment used for generation, transmission, distribution and use of power. It includes items such as generators, boilers, turbines and cables. Three main heavy electrical industries in India are

- The Heavy Electrical Limited at Bhopal in Madhya Pradesh
- The Bharat Heavy Electricals Limited at New Delhi
- The Hindustan Cables Factory at Rupnarainpur in West Bengal

## Heavy Machinery and Tools

This industry provides machines to all sectors of the economy.

**The Hindustan Machine Tools at Bengaluru:** It is a major manufacturer of machine tools in the country. It also manufactures watches, tractors, printing machinery and lamp-making machinery. Some of its units are also located at Ajmer, Mohali, Ranibagh and Pinjore. Some other heavy industries are the **Heavy Machine Tools Plant** at Ranchi, **Machine Tool Corporation** of India and **National Instruments Factory**.

Iron Implements for Agriculture is an important industry which makes agricultural implements in India. Units of factory dealing with the manufacture of iron implements in India are set up at Ajmer, Pune, Satara and Bhiwandi.

## Electronics

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The electronic industry developed in India about 1950. It is the fastest growing industry.

**The Indian Telephone Industry** was set up at Bengaluru in 1950. It manufactures equipment to meet the requirements of post and telegraph departments, railways, defence and electricity boards. It also manufactures automatic telephone switching systems and teleprinter exchanges.

The Electronic Corporation of India at Hyderabad produces modular systems for nuclear applications and for use in medical, agricultural and industrial fields.

**The Bharat Electronics Limited (BEL)** at Bengaluru caters to the requirements of the defence sector, All India Radio and the Meteorological Department.

### Space Technology

It is supported by the electronic industry. The Indian Space Research Organisation at Bengaluru, the Satellite Launching Station at Sriharikota and the National Remote Sensing Agency at Hyderabad are important industries dealing with space research and satellite launching. India has launched various indigenous satellites such as the Apple and INSAT series. ISRO has developed rockets for putting satellites into polar orbits. Recently, India has also undertaken a Mars orbital mission.

### Software Industry

The software industry has emerged as one of the fastest growing industries in India. India has achieved the capability of designing super computers. Indian industries also provide their expert IT services to global markets. Bengaluru and Hyderabad are two leading centres of software industries.

### Entertainment Products Industry

As a result of progress made by the electronic industry, the television and audio industries boomed in the 1990s. *BPL*, *Videocon*, *Onida* and *Philips* specialise in the sales of televisions. Many audio systems have also captured the vast Indian markets. Mumbai, Pune, Kolkata and Chennai are the main centres of production.

## Petrochemical Industry

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Petrochemical industries use raw materials which are generally the products of petroleum, LPG and coal. These industries are located near oil refineries which can supply the basic requirements of naphtha and benzene.

Petrochemical industries manufacture synthetic fibres, dyestuffs, synthetic rubber, plastics, drugs and pharmaceuticals. They also produce fertilisers and insecticides. They also manufacture adhesives and resins for industries.

Advantages of petrochemical products are that they are cheaper and can be produced on a large scale. Raw materials are easily available. Many traditional materials have been replaced by the products of petrochemical industries; for example, jute fibre has been replaced by synthetic fibre, steel pipes have been replaced by PVC and jute bags have been replaced by polythene bags.

### Main Petrochemical Plants

**Herdillia Chemicals Limited** at Chennai manufactures acetone, phenol and diacetone alcohol.

**National Organic Chemicals Industries Limited** is located at Thane near Mumbai. It is the first plant which is based on latest technology. It produces ethylene, benzene and PVC.

**Petrofils Cooperative Limited (PCL)**, a joint venture between the Weavers' Cooperative Societies and the Government of India, has plants located at Vadodara and Naldhari. It manufactures polyester filament, swim suits and yarn.

**India Petrochemical Cooperation** near Vadodara manufactures organic chemicals and fibres.

**Reliance Industries** is located at Hazira in Gujarat.

**Indian Oil Corporation** has set up one petrochemical plant in Gujarat and two at Panipat (Haryana).