

Chapter No. 2
Profile of Engineering Industry

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CHAPTER NO. 2

PROFILE OF ENGINEERING INDUSTRY

2.1 INTRODUCTION

'Engineering' is the discipline of acquiring and applying technical and scientific knowledge to design and implement structures, machines, systems and processes that safely realize a desired objective. It is a broad discipline which is often broken down into several sub-disciplines namely chemical, civil, electrical and mechanical engineering. With the rapid advancement of technology many new fields are fast gaining prominence and new branches are developing such as aerospace engineering, biomedical engineering, genetic engineering, nuclear engineering and robotics etc. The Engineering sector consists of companies engaged in Instrumentation and Process Control, Engineering - Heavy, Engineering - General, Engines, Castings or Foundry, Forgings, Electrodes - Graphite, Welding Equipment - Others, Pumps, Compressors, Machine Tools, Pollution Control Equipment, Textiles - Machinery, Hydraulics, Welding Equipment - Electrodes, Bearings, Fasteners, Abrasives and Grinding wheels etc.

The sector employs over 4 million skilled, semi-skilled, direct and indirect workers (Corporate Catalyst India's report on Indian engineering industry). The engineering industry has an enormous potential of creating new jobs. The engineering industry has been titled as the 'growth engines'. The tremendous impact and influence of this industry has on industrialization and consequently on the economy can be clearly seen from the economic scenario of the world over. Engineering sector has developed as a frontline industrial sector by many nations like Japan, Germany, USA, UK, etc. within a very short time.

India has found this industry very responsive and expects to take up any stimulus to growth. Importance of engineering industry in India can be considered from the fact that it accounts for nearly one-third each of productive capital, value added output in the organized sector that contributes substantially to both the production and exports of engineering goods.

2.2 HISTORICAL DEVELOPMENT OF ENGINEERING INDUSTRY

2.2.1 Industrial development in India before independence (1880-1947)

In the eighteenth and nineteenth centuries over all world private sector units were completely free of state interference. Even in India, private business houses in spite of many difficulties placed by the British government, increased and managed to earn huge profits. At the beginning of the First World War, Europeans managing agency houses enjoyed unchallenged dominance in the private corporate sector of the Indian economy.

At the end of the Second World War this dominance had been broken and Indian entrepreneurs improve their position in the business. At the end of the British rule, India had a larger industrial sector, with a stronger element of indigenous enterprise, than most under developed countries in the world. The Second World War cause the liquidation in India's sterling debt then ended this phase of British domination over India.

The diminishing inflow of British investment enabled Indian merchants and manufacturers to grab the initiative for developing new industries. A comparative study of tropical development between 1880 and 1913 shows that India had done better in organised industry than most other tropical countries such as Egypt, Kenya, Uganda, Nigeria, Indonesia, Philippines and Venezuela. India's annual rate of industrial growth from 1880 to 1913 was about four to five percent. During this twenty year period the early growth rate of manufacturing activities in India was 6.4 percent. (Center for Civil Society's study on Big Industry before Independence)

A typical instance was going for the beginning of a cotton-textile machinery industry by the Birlas on the eve of the Second World War. The cotton textile industry had established its dominance in the domestic market for piece goods and completed a substantial phase of import substitution; India seemed on the entrance of a new stage in industrial growth.

The occurrence of the Second World War accelerated the transition to the new phase of production. It implied a structural transformation of India's industrial economy, leading to production of heavy chemicals, sophisticated machinery, aircrafts, automobiles, locomotives, ships and a variety of other heavy capital goods. In the twenties and thirties, new industries such as cement, paper and sugar became very profitable.

The development of the following industries historically indicates certain well-marked phases of the process of industrialization in India.

1. Steel

Iron and steel industry had its origin in 1907 with the establishment of the Tata Iron and Steel Company (TISCO) at Sakchi in Bihar. Later on two more companies -one in 1908 established at Hirapur in Bengal called Iron and Steel Company and another in 1923 at Bhadrawati called Mysore State Iron Works.

2. Shipping and ship building

The Indian shipping and ship building industry was considerable at the beginning of the nineteenth century. On the eve of the Second World War, the share of Indian shipping in the coastal trade was 21 per cent.

In 1939 eight Indian concerns were operating in coastal trade. They were: the Scindia Steam Navigation Company Limited (1919), the Bengal-Burma Steam Navigation Company Limited (1928), the Indian Cooperative Navigation and Trading Company Limited (1905), the Ratnagar Steam Navigation Company Limited, the Malabar Steam Navigation Company Limited (1928), the Merchant Steam Navigation Company Limited (1921), the Eastern Steam Navigation Company Limited (1919) and the Haj Line Limited (1937). Of these, Scindia, Bengal-Burma, Indian Cooperative, Ratnagar and Haj Line were already in the Scindia group and in 1939 a British concern, the Bombay Steam Navigation Company Limited was taken over by Scindias. This premier Indian shipping company further acquired control of the Eastern Steam Navigation Company Limited in 1941.

3. Automobiles

In 1942, the Birla group formed the 'Hindustan Motors Limited' in Calcutta with a paid-up capital of Rs 4.96 crore. Also Walchand Hirachand in 1944 formed the Premier Automobiles Limited in Bombay with a paid-up capital of Rs 2.2 crore. Since in India only a nucleus of ancillary industries existed at the beginning of the fifties, the Premier Automobiles set up their own ancillary industries. The following ancillary industries had developed by the early fifties-

Pistons (India Piston started production in 1952), cylinder liners (started by India Pistons in 1952), leaf springs (started by Metropolitan Springs in 1951), electric bulbs (started by Pradip Lamp Works in 1951) and fuel pump diaphragms (undertaken by United Trading Company in 1944 for the Defense Department).

2.2.2 Growth of Indian houses

After that, Indian houses were emerges out. Professional service groups had exhibited the intense interest in industrialization among all classes of Indians in the 'Swadeshi' period. This is the process of transformation of traditional merchants' communities into modern entrepreneurial groups. In that prominent were the Gujarati Banias, Jain or Hindu, from those- Walchand Hirachand, Punjabi, Hindu Khattris, Aroras and Banias, Dalmia etc.

Some details of the origins and investment patterns of some growing Indian houses during this period can be as- Tata is emerged in the industrial field in the late nineteenth century, After 1914 Tata extend its business in trade, hotels, cotton manufacture, iron and steel and electricity. After that Tata, reflected in the Tata Chemicals (1940), Tata Tube (1940), Investa Machine Tools and Tata Locomotive.

2.2.3 Post independence period

After the Post independence, the Indian private sector began attempts to expand. In 1951, the government passed the Industries Act to control and guide the direction of private investment and also the growth and diversification of the private sector enterprises.

Mining and other energy industries pushed the industrial development of India since independence. The coal resources began in the mid-1960s. Evidence of this can be seen all across the country with huge coal mines, especially in the east.

India is involved in the production of many other fossil fuels such as oil and gas as of January 2007 India had 5.6 billion barrels of proven oil reserves. However the most interesting area of energy development in the country in recent years has been moved towards renewable and nuclear energy research and production.

India has recently developed many hydroelectric power stations in the north of country along the foothills of the Himalayas. Nuclear power is a very large source of electrical consumption in India. As of 2010, India has 19 nuclear power plants in operation generating 4,560 MW while four other are under construction and are expected to generate an additional 2,720 MW. This recent development has coincided with further industrialization and growth of many engineering firms in India.

2.3 STRUCTURE OF ENGINEERING SECTOR IN INDIA

The Engineering sector is the largest sector in the overall industrial segments in India.

It is a diverse industry with a number of segments and can be broadly categorized into two Segments:

- A) The Heavy Engineering Segment and
- B) The Light Engineering Segment

Table no. 2.3.1 Classification of the Engineering Sector in India

Heavy Engineering Sector		
Sr.No.	Sub segments	Number of Organized Players
1.	Cement Machinery	18
2.	Sugar Machinery	27
3.	Rubber Machinery	19
4.	Metallurgical Machinery	39
5.	Machine Tool	125
6.	Material Handling Equipment	50
7.	Mining Machinery	32
8.	Dairy Machinery	16
Light Engineering Sector		
Sr. No.	Sub-segments	Number of Organized Player
1.	Welded Steel Pipes and Tubes	123
2.	Process Control Instrument	26
3.	Antifriction Roller Bearing	19
4.	Plain Paper Copier	12

Source: Corporate Catalyst India A report on Indian Engineering Industry
http://www.cci.in/pdf/surveys_reports/indias_engineering_sector.pdf

(A) The Heavy Engineering Segment

The heavy engineering goods accounts for bulk of the engineering goods production in India. Most of the leading players are engaged in the production of heavy engineering goods and mainly produces high-value products using high-end technology. The major end-user industries for heavy engineering goods are power, infrastructure, steel, petrochemicals, mining, railways, automobiles and textiles etc. Requirement of high level of capital investment creates major entry barrier in this

sector. Consequently, the small and unorganized firms have a small market presence.

The heavy engineering sector can be classified into two broad segments –

- i) Heavy electrical machinery industry and
- ii) Heavy Non-electrical machinery and equipment industry.

i) Heavy Electrical Machinery Industry

This includes various machinery or equipments used for the purpose of power generation, transmission and distribution such as generators, motors, transformers and switchgears.

The fortunes of the heavy electrical industry have been closely linked to the development of the power sector in India. The heavy electrical industry is linked to power generation, transmission and distribution and utilization equipments. These include turbo generators, boilers, turbines, transformers, switchgears and other allied items. These electrical equipments (transformers, switchgears, etc) are used by almost all the sectors.

Some of the major areas where these equipments used are power generation projects, petrochemical complexes, chemical plants, integrated steel plants, non-ferrous metal units etc.

Classification of Heavy Engineering and Machine Tool Industry as per the Department of Heavy Industries and Public Enterprises-

1. Textile machinery industry

The textile machinery industry in India manufactures machinery needed for sorting, cording, processing of yarns or fabrics and weaving, along with the components, spares and accessories. As per the Ministry of Heavy Industries, there are over 600 units engaged in the manufacture of machinery and spares and out of these, about 100 units are manufacturing complete machinery.

2. Cement machinery industry

The Indian cement machinery industry manufactures complete cement plants, based on dry processing and pre-calcinations technology, for capacities up to 7500 TPD. The existing installed capacity of the industry is estimated to be Rs 6 bn/annum. According to the Ministry of Heavy Industries, presently there are 18 units in the organized sector for the manufacture of complete cement plant machinery.

3. Sugar machinery industry

As per the estimates of the Ministry of Heavy Industries, there are presently 27 units in the organised sector for the manufacture of complete sugar plants and components.

The industry's installed capacity is estimated to be Rs. 200 crore. The industry can manufacture sugar plants for a capacity up to 10,000 TCD (tonnes crushing per day).

4. Rubber machinery industry

The rubber machinery industry in India manufactures inters-mixer, tyre curing presses, tyre moulds, tyre building machines, turnet servicer, bias cutters, rubber injection molding machine, bead wires etc. According to the Ministry of Heavy Industries, currently there are 19 units in the organised sector for the manufacture of rubber machinery mainly required for tyre or tube industry.

5. Material handling equipment industry

The Indian material handling equipment industry manufactures a range of equipments including crushing and screening plants, coal or ash handling plant and associated equipment such as stackers, reclaimers, ship loaders or unloaders, wagon tippers, feeders etc. The industry caters to the requirement of a host of core industries such as coal, cement, power, port, mining, fertilizers and steel plants. The Ministry of Heavy Industries estimates the presence of 50 units in the organized sector for the manufacture of material handling equipments. Apart from the organized players, there are a number of units present in the small scale sector.

6. Oil field equipment industry

The oil field equipment manufacturing industry manufactures drilling rigs for on-shore drilling. Offshore drilling equipments like jack-up rigs, etc. are not manufactured indigenously. The industry however manufactures offshore platforms and certain other technological structures domestically. Bharat Heavy Electricals, Hindustan Shipyard and Mazagon Dock are some of the leading producers in this industry.

7. Metallurgical industry

According to the Ministry of Heavy Industries, currently there are 39 units in the organised sector. Metallurgical machinery includes equipments for mineral beneficiation, ore dressing, size reduction, steel plant equipments, foundry equipments and furnaces.

8. Mining machinery industry

The various type of mining equipments include long wall mining equipments, road header, side dischargers loader, haulage winder, ventilation fan, load haul dumper, coal cutter, conveyors, battery locos, pumps, friction prop etc. The Ministry of Heavy Industries estimates the presence of 32 manufacturers of mining machinery both in the

public and private sector for underground and surface mining equipments. Out of these, 17 units are manufacturing underground mining equipments.

9. Dairy machinery industry

The Indian dairy machinery manufacturers a range of equipments including stainless steel dairy equipments, evaporators, milk refrigerators and storage tanks, milk and cream deodorizers, centrifuges, clarifiers, agitators, homogenizers, spray dryers and heat exchangers (tubular and plate type) etc. As per the Ministry of Heavy Industries, presently there are 16 units manufacturing dairy machinery and equipment in the organised sector, both in private and public sector.

10. Machine tool industry

The Indian machine tool industry manufactures almost the entire range of metal-cutting and metal-forming machine tools. Apart from conventional machine tools and Computer Numerically Controlled (CNC) machines, the Indian industry also offers other variants such as special purpose machines, robotics, handling systems and TPM (Total Product Maintenance) friendly machines. The machine tool manufacturers in India produce general purpose machinery of international standards (in terms of quality, precision and reliability). However, they lag behind in terms of design and engineering capability so as to be able to undertake very high precision CNC (Computer Numerically Controlled) machines.

ii) Heavy Non-electrical Machinery and Equipment Industry

The Non-electrical machinery includes machines or equipments used in various sectors such as material handling equipments (earth moving machinery, excavators, cranes etc.)

(B) The Light Engineering Segment

The Indian light Engineering industry is highly diversified, comprising of a number of distinctive sectors and sub-sectors. The product range in this industry varies from highly sophisticated microprocessor based process control equipment and diagnostic medical instruments to low-technology items such as castings, forgings and fasteners. The sector also includes products such as bearings, steel pipes and tubes etc. Most of the products in the light engineering industry serve as inputs for the capital goods industry. The health of the light engineering industry is therefore dictated by the demand for capital goods. The light engineering goods segment uses medium to low-end technology. The Entry barrier in this industry is low as lower requirement of capital and technology. This segment is characterized by the dominance of small and

unorganized players which manufacture low-value added products. This segment is also characterized by small capacities and high level of competition among the players.

The major sub-segments of this industry are-

1. Medical and surgical instruments

The medical and surgical instruments segment includes a wide array of equipments and apparatuses. These include medical and surgical instruments, dental equipment, electro medical apparatuses, orthopedic appliances, physiotherapy equipments, X-ray machines etc.

2. Process control instruments

Process control instruments and systems are instruments and systems used for measurement and control of process variables. Process variables are physical or chemical parameters, the variations of which can affect the operation of a manufacturing process. These variables include humidity, pressure, temperature, liquid level, flow, vacuum, vibration, specific gravity and chemical composition. Use of process control instruments and systems is highly significant in large and sophisticated process industries. This include fertilizers, power plant, steel, cement plants, petroleum refineries and petrochemical industries. The industry is delicensed and 100% FDI is permitted in this sector. There are 26 units in the organised sector. Seven of these 26 units are capable of implementing the entire instrumentation system including software required by the process industries.

3. Antifriction roller bearing

Roller bearings are components used to reduce or eliminate friction between moving parts and thus reduce wear and tear of machines. They help to improve machine performance and thus are critical component of any equipment. It finds in various applications ranging from simple electric fans to complex space rockets. Depending on its usage, a bearing may have to withstand prolonged use, high-speed rotation, varied temperatures or a corrosive environment. The Indian bearing industry's product range comprises of around 500 types of bearings but do not produce special purpose bearings because of low demand and requirement of huge investment. There are around 20 units in the organized sector engaged in the manufacture of ball and roller bearings. The unorganized sector manufactures low quality small bearings.

4. Industrial fasteners

Industrial fasteners cover a wide range of products such as nuts, screws, bolts, studs, rivets, nails, washers, etc. Fasteners can be broadly classified into two groups, high tensile strength fasteners and mild steel fasteners depending on their tensile strength. Manufacturer of high tensile fasteners requires superior technology and are mainly manufactured in the organized sector, while, manufacturing of mild steel fasteners is concentrated in the unorganized sector. In fact, manufacture of all types of fasteners except high tensile fasteners and special purpose fasteners are reserved for the SSI sector. Fasteners are used in the assembly of engineering systems. The automobile industry is the largest consumer of fasteners. The other major user-segments are textile machinery, railway locomotives, construction, computer hardware and general engineering.

5. Ferrous castings

A ferrous casting constitutes essential intermediates for automobiles, industrial machines, power plants, chemicals and fertilizer plants and cement plants. The domestic industry is well established. As it is highly polluting industry, many of the developed countries have withdrawn this industry. This gives rise to a huge export potential for Indian manufacturers to capitalize export demand.

6. Steel forgings

The forgings industry has emerged as one of the major contributors to the manufacturing sector of the Indian economy. The industry consists of around 330 units; of which there are around 100 units in the medium and small sector and only around 9-10 units are present in the large scale. There are huge numbers of units functioning in the tiny sector. Increasing globalization has led to sharp rise in investments in the sector. The automotive industry is the major end user of the forging industry. The other user industries include industrial machines, railways, oil and gas, power plants and chemical plants.

7. Seamless Steel pipes and tubes

Seamless steel pipes and tubes find widespread usage in the hydrocarbon industries, processing and general engineering industries. The industry is delicensed and 100% FDI is permitted in this sector under the automatic route. The oil sector is the major end-user segment of seamless pipes and tubes. The other user segments include boilers, ball bearings, automobiles, chemical plants, fertilizers, Petrochemical plants and industrial machinery.

8. Electrical Resistance Welded (ERW) Steel Pipes and tubes

ERW steel pipes and tubes find widespread usage for water, oil and gas distribution, line pipes, fencing, scaffolding, agricultural purposes, drinking water supply, thermal power, hand pumps, deep boring wells and also as protection for cables (telecom). There are number of ERW steel pipes and tubes production units in the SSI sector. Higher demand from the oil and gas industry, infrastructure and automobile industries has lead to a healthy increase in production of ERW steel pipes.

9. Submerged-Arc Welded (SAW) pipes

SAW pipes are mainly used for oil and gas transportation and water distribution. SAW pipes are of two major types-longitudinal and helical welded SAW pipes. India has an installed SAW pipes capacity of 650 Thousand tonnes, with four major players. These are Jindal Saw Limited, Well Spun Gujarat Limited, PSL Limited and Man Industries. A huge export potential exists for SAW pipes. Exports and imports during FY05 were Rs.11.9 billion and Rs. 0.6 billion respectively.

10. Typewriters

Typewriters have largely replaced by computers. The manufacturers in the organised sector are capable of manufacturing the entire range of typewriters including electronic typewriters. Domestic producers are able to meet the demand for typewriters in the country. There exists a huge potential for exports of typewriters to the developing countries. During FY05, imports and exports of typewriters stood at Rs 3.2 million and Rs 77 million respectively.

11. Bicycle industry

The Indian bicycle industry can be categorized into two segments, those manufacturing bicycle parts and those manufacturing complete bicycles. Majority of bicycle parts and components are manufactured in the small-scale sector. Large units are permitted to manufacture bicycle frames, chains, rims etc. Complete bicycles are manufactured in the organised sector. Four companies account for over 90% of total bicycle production in the country. The Indian bicycle industry conforms to well-accepted quality standards in the international market. The industry is taking efforts to increase exports.

12. Sewing machines

In India, the manufacture of conventional hand operated sewing machines is reserved for the small-scale sector. Domestic demand for these is fully met by the Indian manufacturers. There exists a huge potential for exports of sewing machines to

developing countries. During FY05, exports and imports of sewing machines were Rs 0.6 billion and Rs 4.8 billion respectively.

13. Plain paper copier

Plain paper copier, a device used for reproducing copies of documents, typescripts, Photographs etc. It is a very important office automation device. At present, there are only 12 units in the country manufacturing this device and most of them have technical collaboration with foreign companies. The introduction of the low priced personal copier has altered the demand pattern for plain paper copiers. The personal copiers are more user-friendly.

2. 4 KEY GROWTH DRIVERS OF INDIAN ENGINEERING SECTOR

The Engineering industry in India has seen unprecedented growth in past three years due to increased investments in infrastructure development and industrial production. The heavy engineering segment forms majority of the engineering sector in India.

The key growth drivers in Indian engineering industry are as follows-¹

i) Increased investment in infrastructure: India is in the middle of a massive modernization in infrastructure, with large investments required to maintain its targeted GDP growth of 9% and above. The key driver of impending growth of this sector is expected flow in infrastructure spending to USD 23 billion by FY2009 from USD11 billion currently. The growth should largely be driven by power, accounting for 41% of the total investment and followed by roads, oil and gas and smaller sectors like ports and airports. This will drive growth in the engineering sector.

ii) Emergence of India as a manufacturing hub: India is being preferred by global manufacturing companies as an outsourcing destination due to its lower labour cost and better engineering and designing capabilities. Exports of engineering goods and services from India have reached about USD 20 billion in the year 2005-06 and registered a healthy growth of about 25%.

iii) New capacity additions: Tremendous growth in demand from domestic as well as overseas markets and the economy is experiencing in high capacity utilization across sectors. This has accelerated capacity additions across industries. This is captured USD 35 billion of capacity expansion that was under implementation as of January

¹ http://agileadvisory.com/asset/chapter_5_1_engineering.pdf

2007. As approximately 50% of the capital expenditure going into plant and machinery; it will good for the engineering industry.

2.5 OPPORTUNITIES AND PROSPECTS OF INDIAN ENGINEERING INDUSTRY

The economic crisis in 2008, result to a volatile year for the Indian engineering and capital goods industry. The credit crisis stimulates a liquidity crisis and adversely affected on growth of industrial and manufacturing industries. Though there has been a pickup in activities since March 2009, many companies still remain cautious in terms of making further capital investments until greater stability is achieved.

The growth potential of the Indian engineering industry can be described as follows-²

2.5.1 Growth potential of Indian engineering industry

India is increasingly being preferred by global companies as an outsourcing destination because of lower labor cost and better designing capabilities. Domestic demand growth in this sector is being increased by increasing expenditure in core sectors such as railways, private sector investments and the rapid speed at which the projects are implemented. In addition, the government's focus on investment and development in the power and infrastructure sectors is also having a strong impact.

For example, leading players ABB and BHEL receive 60%-75% of their revenues for supplying equipments to the power sector. With the government planning to add large-scale generation capacities in the eleventh (2007-12) five-year plan, the potential seems huge for the engineering majors. Finally, if India's nuclear deal with the US is executed, it will mean big business for companies which are planning to enter into nuclear power generation and consequently power equipment manufacturing.

2.5.2 Future outlook

The engineering sector's future outlook is promising. Drivers like infrastructure development, industrial growth and favorable policy regulations will ensure growth in manufacturing. Emerging trends such as outsourcing of engineering services can provide new opportunities for quantum growth. Engineering and design services such as new product designing, product improvement, maintenance and designing manufacturing systems are increasingly getting outsourced to countries like India.

² <http://info.shine.com/Article/Engineering/Industry-overview-Engineering/4469/cid937.aspx>

India's engineering sector has a significant potential for future growth, both in manufacturing as well as services.

Engineering Process Outsourcing (EPO) services from India would have an important impact on the Indian engineering industry as a whole. The EPO market in India has the potential to exceed USD 40 billion by 2020. To tap this EPO market all the important stakeholders, including the government, academic institutions, service providers and trade bodies will need to boost investments in infrastructure and improve marketing efforts³.

2.6 CONTRIBUTION OF ENGINEERING INDUSTRY TO INDIAN ECONOMY

Engineering industry has significance to the economic development of the country. Engineering goods industry constitutes the prime role of industrial growth in Indian economy as it has played a key role in industrial recovery of India since the beginning of independence, especially after the adoption of second five year plan.

The export leads to greater capacity utilization, economies of scale, incentive for technological improvement and efficient management due to competitive pressure abroad. The relationship between exports and economic growth is higher and export leads to higher economic growth. Though India has been following an import substitution strategy for long exports promotion, has always got the attention of the policy-makers and planners.

Export promotion strategy became more pronounced in India particularly after the New Economic Policy of 1991. It is a fact that although India's share in world exports is less than 1 % today, its share in total GDP of the country is more than 11 % which is a substantial percentage that can play an important role in leading faster economic development to the country.

Exports from India constitute agricultural and allied commodities (10.10%), ores and minerals (5.29%), manufactured goods such as engineering goods, gems, jewellery, chemical products etc. (73.40%), crude oil and petroleum products (8.5%) and others (2.64%).

The following facts highlight the significance of the Indian engineering industry in Indian economy.

³ http://www.cci.in/pdf/surveys_reports/indias_engineering_sector.pdf

The engineering goods industry enjoys 30.5 % weight in the index of industrial production, 29.9 % share of total investment in all industry, 33.5 % share in the value of output of all industry, 37.1 % share in value added by all industry. 30.6 % share in employment of all industry and 62.8 % share in number of foreign collaborations. Further more recently, it has emerged as a major exporting sector and also provides technical know-how and consultancy services to a number of African and Arabian states. As per the data available for the year 2004-05, engineering industry has emerged as the largest industry of total Indian export. Thus engineering industry is considered as an engine of economic development of Indian economy.

2.6.1 Average annual growth rate of engineering industry

Engineering exports have been registering a much higher annual average growth rate than total exports during the decades of 1960s, 70s and 90s. The average annual growth rate of engineering as well as all India's exports is depicted in following table-

Table no.2.6.1.1 Average Annual Growth Rate of Engineering Industry-

Period	Total Exports (%)	Engineering Exports (%)
1956-57 to 1960-61	1.15	19.3
1961-62 to 1970-71	4.64	29.71
1971-72 to 1980-81	16.36	23.99
1981-82 to 1990-91	17.10	16.8
1991-92 to 2000-01	20.083	29.35
2001-02 to 2004-05	17.00	25.59

Source: <http://www.gogama.org/engineering.doc>

From Table 2.6.1.1 it is clear that engineering exports had registered an impressive growth rate of 29.71 per cent during 1961-62 to 1970 - 71 which marginally declined during 1971-72 to 1980 - 81. However, engineering exports sharply declined to 16.8 per cent during 1981-82 to 1990-91. This slowdown in engineering exports is accounted for stagnation of engineering exports during the early 1980. The position improved and become faster during Economic liberalization of 1991 and was a major boost to the engineering exports.

A total export shows a sharp turn around since 1999-2000. This acceleration in exports shows floating global demand with improvement in world commodity prices in 2000 and the revival of world trade following the Asian crisis. Besides this, various export facilitating measures announced by the Government. Strengthening of export causes significant gains in selected sectors like textiles, engineering goods, electronics goods, chemicals, leather and leather manufactures, ores and minerals and petroleum

products. The exchange rate of Rupee remained relatively stable in real effective terms during 2000-01 and suggesting a broad retention of the competitiveness of India's exports in global market.

2.7 ENGINEERING INDUSTRY IN MAHARASHTRA

Maharashtra occupies an important place in both production as well as exports of engineering goods from the country. Engineering industry in this state are highly diversified and produces a large range of parts from machinery to industrial castings and forging. The state has a fairly large number of firms in the organized sector possessing world class manufacturing capabilities and cost structures, besides this a vast number of small and medium engineering firms.

The industry, which was initially concentrated in the Mumbai-Pune belt, has spread all over the State. The major production centers are at Nagpur, Aurangabad, Nasik, and Kolhapur. The major engineering items of production and exports in Maharashtra are textile mill machinery, machinery for sugar, cement and chemical plants, food processing machinery, construction machinery, tractors for agriculture purposes, electric power machinery, transmission line towers and accessories, fabricated steel like freight containers, automobiles, steel forging, steel castings, bright steel bars, stainless steel product, auto parts, cutting tools and files, internal combustion (IC) engines and compressors, machine tools, mechanical pumps and ship and ship buildings.

Total exports of engineering industry in Maharashtra have been estimated at USD 900 million during 1996-97. This accounts for over 21 % of total export of engineering products in the same year. However, the products which have high potential of exports from Maharashtra include industrial castings forging, complete vehicles including two or three wheelers automobile parts, machine tools, industrial machinery, steel tubes, diesel engines, pumps, valves, compressors, seamless tubes and switch gears.⁴

The major competing countries for most of the engineering products exported from this state are Japan, South Korea, Taiwan and China besides this, West European and North American countries. In overall, the export outlook for engineering products is bright in Maharashtra.

⁴ <http://www.dsir.gov.in/reports/mitcon/chap2.pdf>

2.8 INDUSTRIAL PROFILE OF SATARA DISTRICT

2.8.1 Introduction

Satara is one of the oldest city and place of 'Chhatrapati' Empire of Maharashtra. It is situated at the feet of the Sahyadri range; it has a glorious and ever inspiring past history, which dates back to 200 BC. Satara is the highest sugar producing district in the State and catering 12 cooperative sugar factories in its jurisdiction. The district has taken a quantum increase in dairy production and development. The massive Koyna hydroelectric project or the dams at Dhom, Kanheri, Urmodi and Tarali have made the district fertile, though some talukas are still awaiting irrigation. Satara is called the 'District of Power' due to a chain of windmills, which mark its mountain ranges. It has won success at the national level for attaining high adult literacy. Mahabaleshwar is a hill station which is famous due to its beauty and soothing weather.

2.8.2 Industrial area of Satara district

The various industrial areas of Satara district are as follows-

Table no.2.8.2.1 Industrial Areas of Satara District

Addl. Satara	C	Major industrial area
Karad	C/D	Growth Center
Kesurdi (KhandalaPh.I)	C	
Koregaon	C	Mini Industrial area
Lonand	D+	Mini Industrial area
Mhaswad	D	Mini Industrial area
Patan	D	Mini Industrial area
Phaltan		
Satara	C	Major industrial area
Satara IT park	C	Major industrial area
Wai	D+	Major industrial area

Source:

<http://www.midcindia.org/MIDCSite/investment/industrial/IndustrialDetails.asp>

Additional Satara(C)

1.Objectives and location details

MIDC has developed this industrial area with the main objective to promote industrial growth in the Satara District.

Additional Satara industrial area is situated on the National Highway No. 4 and it is just about 4 km. away from the Satara city. It is also well connected with almost all the big cities of India by a road network. The Ratnagiri port is 225 km. away from this area. Two major cities, Pune and Mumbai are well connected with national highway no.4 and equidistant with Bangalore city from this estate. Other major industrial areas- Additional Satara, Karad, Wai and Patan are developed in Satara district. Recently Koregaon Mini Industrial Area and Lonand Industrial Area have come under development.

2. land

MIDC has developed 152.40 hectares of total land for engineering units and allotted 408 plots for different uses amenity and commercial.

3. Electricity

A separate sub-station of 40 MVA capacities is available in the Estate.

4. Road

The industrial estate is located on Mumbai-Bangalore national highway no.4 and Kolhapur-Panji, Ratnagiri-Nagpur and many other state highways. This estate is well connected with a road network and Ratnagiri and Panji (Goa) ports are convenient for sea transport.

5. Water

MIDC has developed its own water supply scheme that caters 25 MLD of water, sourced from river Krishna three km away. Present consumption is 5 MLD.

6. Connectivity

An electronic exchange has been provided within the estate. The exchange is well connected with ISD, STD, Internet network and all other modern facilities.

2.8.3 History of industrial sector in Satara district

During the last century Satara was industrially backward, having only a few crafts. The chief crafts (Gazetteer of Bombay Presidency (Satara), Vol. XIX, 1885, pp. 220-23.) were making gold and silver ornaments, copper and brass pots, iron tools, stone-cutting, pottery, carpentry, cotton-weaving, dyeing, blanket-weaving, tanning, shoe-making etc. A few goldsmiths were well known for their skill in stone-setting. Copper and brass pot-making was one of the chief local industry.

History of industrialization in Satara dates back to 1916 when a glass manufacturing factory was established at 'Ogalewadi'. The year 1916 also gave birth to an electricity

generation plant in the district. The speed of industrialization was, however, very slow. New industries were not started during the period following the First World War. A groundnut decorticating factory was established in 1928. Increase of area under sugarcane cultivation gave rise to the starting of a sugar factory in 1933. The sugar factory was a landmark in the history of industrialization of the district. Two electricity generation plants were established in 1933 and 1940, respectively. The other industries like extraction of edible oil, copper and brass rolling and general engineering came into existence after India became politically free.

Sugar industry is one of the important large scale industry in this district. It gives employment to a large population of sugarcane cultivators, skilled, unskilled workers in factories and a number of technicians. There are at present, three sugar factories in this district. The 'Cooper' Engineering Works at Satara Road have established a countrywide reputation for the manufacture of engines, spare parts, machine tools, power looms and agricultural implements. In the small scale industries sector, general engineering, oilseeds crushing, weaving and pharmaceutical industries are important. It is difficult to indicate the extent of industrialization of Satara district in comparison with other districts of Maharashtra but district has not achieved a high degree of industrialization because of availability of resources.

2.8.4 Small and large scale industries in Satara

There are various small and large scale industries in Satara district including sugarcane, gul making, edible oil, ground nut decorticating, copper and brass work, glass manufacturing, plastic, printing and book binding, Aurvedic medicines, power loom weaving and brick manufacturing etc.

2.8.5 Engineering industries in Satara

There were four engineering units, two of which were small, repair equipment and manufacture trays, bolts, nuts, etc., and situated at Koynanagar. The third 'Kirloskar' was manufactures agricultural implements in Karad and the fourth 'Cooper' was manufacturing diesel engines, shaping machines, looms etc. and is situated near Satara Road railway station of the Southern Railway Line. The 'Kirloskar' which had Rs. 66,444 as fixed assets and Rs. 56,047 as current assets in 1957. The 'Cooper' which is a large scale unit had an investment of Rs. 1,21,33,565 including Rs. 72,48,698 as working capital in 1958.

The small-scale unit consumed raw materials like iron, steel, etc., worth Rs. 65,342

and produced implements like ploughs, soil scoopers, winnowing fans, chaff cutters, etc., worth Rs. 1,83,619. The total consumption of raw materials like iron, steel, brass, copper, aluminum and chemicals by the large unit was 4,465 tons, valued at about Rs. 70, 00,000 in 1958. It produced 8,135 oil engines, centrifugal pumps, shaping machines, looms and implements valued at Rs. 1, 38, 75,381 in the same year. Surrounding villages were the source of labor supply to these concerns. The products of the former were marketed all over India as well as to Middle Eastern and Far Eastern countries and of the latter in Maharashtra only.

There was furniture making concerns at Koynanagar and manufacturers of handlooms, Amber charkhas and Nutan Tel Ghans at Karad. The former units which were started in 1955 had an investment of Rs. 65,000 in 1957. The market for these products was Poona, Satara and Karad towns.

The two firms which repair automobiles are situated at Koynanagar. They were started in 1955 and 1956, respectively. One concern is owned by government of Maharashtra. The other is a private concern in which about Rs. 11, 00,000 were invested in 1957. Three depots, one each at Karad, Satara and Wai, owned by the Maharashtra State Road Transport Corporation, maintain and repair vehicles owned by the Corporation. Two were started in 1948 and one in 1949. An amount of Rs. 4, 27,000 was invested as fixed capital and a total of 330 persons were employed. They consumed raw materials and spare parts worth Rs. 2, 61,735 in 1957.

2.9 GOVERNMENT POLICIES AND INITIATIVES TOWARDS ENGINEERING INDUSTRY

Government of India reviews its Foreign Direct Investment (FDI) policy regularly, in a bid to attract more investment. India has opened up to private sector participation and FDI in infrastructure projects for power, roads, ports, mining sector, and pharmaceutical sector. Around 36 per cent of the total FDI is directed towards engineering industry through an automatic route, but subject to a limit of USD 2 million of lump sum payments. Royalty payment is restricted to 5 per cent and 8 per cent on domestic and exports respectively. Depreciation on general plant and machinery is proposed to be around 15 per cent. These initiatives of the government serve as a catalyst to further rise in the demand for engineering goods and machinery. Some specific initiatives by the government, which positively impact on engineering sector are-

1. Removal of tariff protection on capital goods.
2. Delicensing of heavy electrical industry and allowance of 100 per cent FDI.
3. Various initiatives focused on infrastructure development and construction.
4. Initiatives to increase power generation and improve quality of power supply.
5. The reduction of custom duties on various equipments.

These above initiatives are aimed at creating and facilitating environment in which the engineering sector can boom. It also helped the sector in becoming competitive. Following table shows FDI inflows in the engineering sector from August 1991 to December 2006.

Table no.2.9.1 FDI Inflows of Engineering Sector-

Following table indicate FDI inflows in engineering sector from August 1991 to December 2006

Sector	FDI (Rs mn)	% of Total Inflows
Electrical Equipments*	302,558.2	17.03
Miscellaneous Mechanical and Engineering	21,624.0	1.22
Industrial Machinery	9,423.3	0.53
Machine Tools	8,210.5	0.46
Earth Moving Machinery	3,397.9	0.19
Prime Movers~	1,055.7	0.06
Boilers and Steam generating plants	332.6	0.02

*Includes Computer Software and Electronics; ~Other than Electrical
Source: Department of Industrial Policy and Promotion

2.10 ENGINEERING EXPORT PROMOTION COUNCIL (EEPC)

Engineering Export Promotion Council (EEPC) was set up in 1955 under the sponsorship of Ministry of Commerce, Government of India, for export promotion of engineering goods, projects and services from India. Initially started with a few hundreds of engineering units as a small outfit and now it has grown as the largest Export Promotion Council. It has membership of nearly 12,000 from amongst large Corporate Houses, Star Trading Houses, Small and Medium Scale Units. Out of the total membership of the Council, 60% constitutes small and medium scale units.

EEPC right from its beginning has been maintaining the exporting community on the quality parameter and the Council itself has the distinction of achieving the ISO 9002 accreditation. This has further been upgraded to ISO 9001:2000 for designing and organizing exclusive Indian Engineering Exhibitions abroad.

Engineering exports from India has been steadily growing and the performance has probably exceeded all expectations ever since the birth of the Council, apart from being one of the largest stakeholders in the total exports out of India. The engineering exporters are the foremost net foreign exchange earner in the country. As the engineering sector is extremely diversified, the Council has set up different Product Panels with a view to ensure that all possible and potential Indian products reach out to the global markets. EEPC aggressively inspect a number of activities and services for its exporting community, with two objectives of facilitating exports of Indian engineering products and services to the global market and to provide abroad buyers true value.

The marketing activities of the Council are varied and in addition to direct marketing, structured promotional events are organized on a regular basis so as to create awareness on the capability of Indian engineering exporters. The various promotional activities carried out on a regular basis are product specific delegation to select countries, exclusive Indian Engineering Exhibition, country participation in Specialized Trade Fairs, Catalogue Show, Buyer-Seller Meets, Product Specific Seminars and Conferences - both in India and abroad.

During last five decades, EEPC has been playing a vital role in increasing country's engineering exports and as of date, engineering exports have crossed USD 20 billion in the year 2005-06 as comparison to USD 10 million in the year 1956-57. Engineering exports have been registering steady growth, it registered a growth of 27.50% during 2005-06 and it is notable factor that small and medium scale unit's contribution to total engineering exports is about 40%. This sector is the foremost net foreign exchange earner of the country.

Following are the activities of EEPC-

1. Publicity and Promoting the 'Made in India' brand
2. Organizing INDEE or INDIA TECH Exhibition
3. Participates in leading Exhibitions and Trade Fairs
4. Conducting Seminars and Conferences
5. Trade Delegations and Buyer-Seller Meet

6. Act as Trade Informatics Division (TID)
7. Act as Engineering Center
8. Export Related Services to Members
9. Providing Services to the Overseas Buyers

2.11 MAJOR PLAYERS OF INDIAN ENGINEERING INDUSTRY

The major leading players of the Indian engineering industry are listed as follows-

1. Bharat Heavy Electrical Ltd. (BHEL)

The company manufactures over 180 products under 30 major product groups and caters to core sectors of the Indian Economy viz., power generation and transmission industry, transportation, telecommunication, renewable energy, etc.

2. Engineers India Ltd.

Engineers India Limited provides engineering and related technical services for petroleum refineries and other industrial projects. The company manufactures highways and bridges, airports, mass rapid transport systems, ports and terminals, power projects, non-conventional or renewable energy sources, specialist materials and maintenance services, intelligent buildings, water and urban development projects.

3. Hindustan Aeronautics Ltd.

Hindustan Aeronautics Limited is a Public sector enterprise. The company provides services mainly to Indian defense services, coast guard and border security force. They supply transport aircraft and helicopters to airlines as well as state governments of India.

4. Crompton Greaves

Crompton Greaves business operations consist of 22 manufacturing divisions. The company has a customer base, which includes state electricity boards, government bodies and large companies in private and public sectors.

5. Elgi Equipments

The company's products have a range of applications in areas ranging from mining, defense, transport, pharmaceuticals, power, oil, railways, chemicals, textiles, printing, ship building, paper, electronics, telecommunications, medical, food, plastic and beverages.

6. HMT

The Public sector Enterprise HMT manufactures watches, tractors, printing machinery, metal forming presses, die casting and plastic processing machinery, CNC Systems and bearings.

7. Kirloskar Oil Engines Ltd. (KOEL)

Kirloskar Oil Engines Ltd. is a part of the century old Kirloskar group and manufacturing-engines, engine bearings and valves. They are also in business of manufacturing gray iron castings, trading in oil and power generation.

8. Larsen and Toubro Ltd. (L & T)

Larsen and Toubro Limited (L&T) is a part of L and T group. The company is India's largest engineering and construction conglomerate. It has four segments namely Engineering and Construction (E&C), Cement, Electrical and Electronics and Diversified business.

9. Thermax Ltd.

The company has its 6 core businesses - boilers and heaters, absorption cooling, water and waste Solutions, chemicals for energy and environment applications, captive power and cogeneration systems, air pollution and Purification. It has five manufacturing facilities, 12 sales and service offices, widespread franchisee and dealer network.

10. Cummins India Ltd.

Cummins India Limited is a part of Cummins Inc. one of the world's largest designer and manufacturer of diesel engines. The company was started in India at Pune in 1962 (as Kirloskar Cummins Limited) and deals in power generation, construction and mining, compressors, locomotives, marine, oilfields, fire pumps and cranes, automotive and special applications.

11. Alfa Laval (India) Ltd.

Alfa Laval (India) Ltd is a subsidiary of Swedish Multinational engineering company. The company manufactures and supplies a wide range of key components and systems in Separation, Heat Transfer and Flow Technology.

12. Asea Brown Boveri Ltd. (ABB)

Asea Brown Boveri Ltd. (ABB) is a Subsidiary of ABB Ltd – Zurich. ABB India caters to power and industry sectors. The company has its vast installed base, extensive local manufacturing at 8 units and a nationwide marketing and service presence.