CHAPTER 4
ENGINEERING INDUSTRY

Engineering industry can be considered as the mother of all industries. No sector of the economy develops in isolation. All sectors are interdependent as supplies of critical inputs to production and outlets for products that increase markets. The engineering sector is characterized by linkages with other economic sectors, since this sector is the supplier of their capital equipments. There are, literally, thousands of engineering products listed for pricing purpose by the Central Planning Organisation.

Micro-Engineering products are used extensively as inputs in the production of larger engineering blocks. Complex products like automobiles require a variety of sub assemblies or components. The engineering industry occupies a premier position as one of the major instruments of the economic development of the country. Since independence, this industry has achieved spectacular growth. Emphasis on industrialization during the plan periods have encouraged the establishment of thousands of large, medium and small engineering undertakings scattered all over the country.

The capital goods and engineering industry comprises mainly of machine tools, electrical machinery, industrial machinery, transport and agricultural equipments, control instruments, oil exploration, mining, earthmoving and construction equipments etc. These industries have crucial forward and backward linkages with the rest of the industry sector. So engineering industry is the backbone of all sectors -- whether primary, secondary or tertiary sector. Hence, one can believe that a strong base in engineering industry is needed for a growing industrial nation. For the growth of engineering sector basic raw materials like iron and steel, aluminum, and metals are needed sufficiently.
4.1 Primary Needs and Engineering Industry

A prosperous nation will have steady economic development fuelled by strong and steady growth in primary production sectors – agriculture and industry. The value addition in agriculture is possible only by the processing of agri commodities into various forms which the society needs. The processing is possible in large scale by the help of machinery and tools which are the products of general engineering sector. In modern times right from sowing seeds, till harvesting, some or other types of machinery and tools were used. The production of all these tools and equipments are the outcome of the engineering industries. The construction industry is also directly related to general engineering industry. A major part of the materials used, whether it is cement, tiles, paint, hardwares, or timber products are produced with the help of machinery and tools of one kind or other and again engineering industry plays a key role here. Every human being need clothing which is produced in textile mills and garment industry. The growth of textile industry is possible with the help of heavy instruments and textile machinery which again is the product of engineering industry. Hence, in short, the role of engineering industry is very important even in making available the primary and basic needs of man.

4.2 Light Engineering Industry: Meaning and Definition

Light Engineering Industry is a diverse group with a number of distinctive sectors including low-tech items like castings, forgings and fasteners, to the highly sophisticated microprocessors based processed control equipment and diagnostic medical instruments. This group also includes industries like bearings, steel pipes and tubes, etc. The products covered under the engineering industry are largely used as input to the capital goods industry. Hence the demand of this sector depends on the demand of the capital goods industry.
Small and medium sized engineering units are engaged in the manufacture of auto components, metal parts of electronic industries, machine tools, cutting tools, sheet metal products and fabrications, textile machineries, precision gauges and heat treatment and surface treatment instruments etc.

Department of Industries and Commerce, Govt. of Kerala defined light engineering as “Units such as machine shops, fabricating shop, assembly shop, forging and casting shop and such other manufacturing units using metals and plastics except steel re-rolling mills and iron casting units will be treated as light engineering”.

The small and medium units need support in technology upgradation and productivity improvement through consultancy services and training. R&D support for product development and testing are the immediate requirements of the engineering industry. Tiny and small engineering units are engaged in the manufacture of welded wire mesh, tier inflators, galvanized mild steel wire, wire nails, automobile leaf spring, mid steel bolt, castor wheels, grey cast iron components, soldering wire, aluminum utensils, aluminum fabrications, rolling shutters, mid steel welding electrodes, manhole covers, bill hooks and estate tools, hand tools, silicon steel stampings, shock absorbers, steel furniture, light duty industrial and automobile steel forged items, mid steel fabricated items, printed circuit boards, aluminum casting, forging, anodizing plant, aluminum paste and foil, steel structural fabrications, pressure vessels, roller bearings, coil springs, sponge iron, pipe fittings, drums, barrels, buckets, iron rolls, caps and closures, industrial fasteners, building hardware, doors and windows, water pumps, utensils, tracks and nails, agricultural implements, umbrella ribs, umbrella frames, spares, fire fighting equipments, hand tools, razor blades, weighing machines, steel pipes and tubes etc.
4.3 Origin

The emerging pattern of entrepreneurship in the small scale sector can be examined by studying the origin and growth of firms in the light engineering industry. In several countries, entrepreneurs have emerged from a particular socio-economic class. In Britain, U.S.A. and Turkey, the ranks of entrepreneurs were filled from commerce. In Japan, it was Samurai who turned industry and kept their social structure in tact by adopting vigorous young businessmen or taking them in to the family through marriage. The emergence of small firms in France is attributed to the social structure especially to their family pattern. It may be pointed out that revolutionary changes in England’s textile industry were spear headed by entrepreneurs who had risen from the ranks of craftsmen.

Industrial entrepreneurship is considered to be shy in Kerala. A study by Oommen says that one Asari started a hospital equipment and surgical instruments production unit in Trichur in 1958, after his ten years of experience in an engineering firm in Bombay. Though started as a single proprietorship, this has developed into a partnership concern. It has become famous in the field. This person and the helpers had no formal training. Their major asset has been their skill. The success of this unit in Trissur stimulated the growth of three new units in an around Trissur. They are formed by rural artisans especially Asaris--traditional blacksmiths, carpenters and goldsmiths. They could easily take up other unexplored fields in light engineering production through suitable changes in their technique and adaptation to the modern needs. They have a fund of skill and can attract a number of skilled apprentices to their shops.

Development of light engineering industry in Kerala dates back to 1956-‘57 when Industrial Training Institutes were established (in 1954) for training the students. A number of students, who were trained through the ITI,
started establishing light engineering units of their own. With the initiative of T.V.Thomas, the then Industries Minister, Steps were taken to develop Mini Industrial Estates during 1967-'69. They were established in 1970 in different parts of the state which gave strength to undertake new ventures in light engineering along with other small scale units. The first (registered) micro/small enterprise started in Kannur District was a light engineering unit. These Industrial estates helped a lot in developing small industries in the state where land and power is made available to the small entrepreneurs.

In 1969, when 14 commercial banks were nationalized, banks started opening up branches in rural and urban areas. This helped the small entrepreneurs to get credit to start the ventures under various self employment programmes. Development of National and State Highways in 1970s boosted transport facilities which contributed much to the industrial growth of the state. To work out the Central Government Schemes, in 1980 the then Commerce Minister George Fernandes declared the opening up of industry support centres and District Industries Centres were started in all districts, throughout India and they have been playing a very important role in the development of industries. Between eighties and nineties, for one or two years light engineering industries faced severe problem due to the quality of power (low voltage and voltage fluctuation). But with the commissioning of 440 KV substations at Kozhikode, this problem was overcome.

4.4 Engineering Industry in Global Scenario

The material comforts which the modern man enjoys are far beyond the imagination of his predecessors. He has access to a wide variety of goods which are instrumental in improving his living standards. They are the products of modern industry, which has grown in many parts of the world since the Industrial Revolution, which started in Great Britain and spread to the countries of Western Europe and North America within a short period.
Among the Asian countries, Japan could emerge as an industrialized nation towards the end of 19th century. Industrial development hasn’t made much headway in the third world countries except a few like Korea, Taiwan, Malaysia. Countries like Myanmar and Bangladesh could make very little progress. India is one of the countries which lag behind in industrial development, in spite of her long connection with the first industrialized nation of the world. Nevertheless, certain states in India like Tamil Nadu, Maharashtra, Gujrat have made remarkable progress in industrialization.

As already mentioned elsewhere, engineering is the backbone of the entire industry. It is against this background the developed nations in the world gave utmost importance in the past for development of engineering industry. USA, Germany, France, Switzerland and other European countries have very strong engineering industrial base and they excelled in one or more sectors. For example, the US and Russia excelled in military and space technology, Germany in machinery, Italy in Textile machinery etc. There are a number of international brands like Siemens, Suzuki, Ford, Volkswagen, Lambordini, Sulzor, Ruti etc. which are famous for their quality products. Hence the fact remains that without the growth of strong engineering sector, overall economic development is not possible.

4.5 National scenario

India has a strong engineering and capital goods base though it is not justifiable with the size of the country. The engineering sector is the largest segment of Indian Industry. The sector can be categorised into Heavy Engineering and Light Engineering segments. Heavy engineering constitutes over 80 percentage of the total industry, while light engineering contributes the rest.
The development of a strong and vibrant engineering and capital goods sector has been at the core of the industrial strategy in India since the planning process was initiated in 1951. The emphasis that this sector received was primarily influenced by the erstwhile Soviet Union model, which had made impressive progress by rapid state-led industrialization through the development of the core engineering and capital goods sector. The ‘Mahalanobis Model’, which was a ‘supply oriented’ model with a basic emphasis on increasing the rate of capital accumulation and saving, gave the engineering and capital goods sector a central place. Superimposed over this were the other objectives of balanced regional development, prevention of the concentration of economic power and the development of small-scale industries. One of the primary objectives was import substitution. Owing to these historical factors, today India has a strong engineering and capital goods base. The Indian capital goods sector is characterized by a large width of products (almost all major capital goods are domestically manufactured), a legacy of the import substitution policy.

Since India became independent, the then leaders were well aware that the development of the country was not possible without establishing strong heavy engineering sector. As a result big industries like Bokaro, Bhilai, Durgapur, Rourkela etc. were established which fuelled the growth of engineering sector in India by providing the basic raw material viz. iron and steel to the engineering sector. Even though transfer of technology was needed from developed countries for establishment of the above stated heavy industries, India became self sufficient and are now in a position to help other developing nations.

Among the Third World countries, India is a major exporter of heavy and light engineering goods, producing a wide range of items. The bulk of capital goods required for power projects, fertilizer, cement, steel and
petrochemical plants and mining equipments are made in India. The country also makes construction machinery, equipment for irrigation projects, diesel engines, tractors, transport vehicles, cotton textile and sugar mill machinery. The engineering industry has shown its capacity to manufacture large-size plants and equipment for various sectors like power, fertilizer and cement. Lately, air pollution control equipment is also being made in the country. The heavy electrical industry meets the entire domestic demand.

The engineering sector in India has been growing on the back of growth in the user industries and several new projects are being undertaken in various core industries such as railways, power, infrastructure, etc. Capacity creation in sectors such as infrastructure, oil & gas, power, mining, automobiles, auto components, steel, refinery, consumer durables, etc, is driving the growth of the engineering industry.

Automobile industry all over the world is growing at a very high rate. It is a fast emerging sector in India also. Indian automobile industry has grown significantly over the last ten years during which the production increased 3.2 times, from a level of 4.7 million numbers to 14.9 million. According to the SIAM, the domestic sale of vehicles increased by 26.4 % in 2009-10. ie. from 9.72 million to 12.29 million. The strong sales have made India the second fastest growing market after China (42 per cent), followed by Germany (23 per cent). Automobile growth is a key part of India’s economic growth. Passenger car sales are expected to grow by 4 million units by 2015 and then rise to 9 million a year by 2020. This will open up tremendous opportunities for the growth of light engineering units in the country especially in areas where large scale automobile activity is concentrated.

With the influx of multinationals like Suzuki, Honda, Mazda, Ford, Kawasaki, Daewoo, Mercedeze, Vespa, Wolks Vagon, Toyota, Piaggio, Cheverlet etc. in Indian automobile industry, a fleet of various vehicles i.e.
cars, motorcycles, scooters, tractors, & commercial vehicles with their different models and designs have come in the market. The production of all the parts and components by any automobile manufacture may not be feasible and viable. It has been observed that automobile manufacturers mostly manufacture major parts of the vehicles themselves whereas various small and ancillary parts or components are procured from outside sources including ancillary units. For the maintenance of these vehicles also, components are required. Since the demand of the automobiles vehicles – scooters, motor cycles, auto rickshaws etc. is increasing day by day in the country, there is large scope of ancillarisation of auto sector which can be done through micro and small scale engineering units.

4.6 Engineering Industry under Plans

The programme for the establishment of heavy engineering industries started from the Second Five Year Plan. Heavy engineering industries including heavy castings for railways, foundries, forge shops and structural shops were given more importance during the period. An amount of ₹ 150 crores were allocated for engineering industries (heavy and light engineering) during the period (1956-‘61)

In the Third Plan, production of machine building and heavy engineering industries increased substantially. During the first Annual Plan investment in heavy engineering and machine building industries were 98 crores, and it was 21 crores in the Second Annul Plan. [1967-’68] During the greater part of 1967-‘68, engineering industries in general continued to suffer from recessionary trend. But, during the latter part there had been a perceptible improvement in the situation. In 1968 -69, 71 crores were set apart for heavy engineering and machine building industry. Export orders helped the engineering industries to extricate themselves from recessions. During the
Fourth Plan, the reduced demand for industrial machinery, shortage of steel, power etc. adversely affected the level of output of engineering goods.

Sixth Plan envisaged a substantial increase in exports to add to the foreign exchange reserves. The Plan, with a view to improving the international competitiveness and technology of domestic engineering industrial units, followed a more liberal policy towards import of technology. The main thrust in the Seventh Plan on the engineering industries was towards facilitating the adaptation and absorption of technologies. Substantial expansion in manufacturing automobile ancillaries, light commercial vehicles, two wheelers etc. were carried out. Another important aim was to bring the automobile ancillary industry to the international standard and to develop internationally competitive oil field equipment industry.

The Eighth Plan accorded priority to qualitative up gradation and elimination of the weaknesses of engineering industries. Greater stress was given on import of drawings and designs than on import of equipments and on maintaining closer linkages between institutions, manufacturers and users of equipments, national laboratories and the Government. During the Ninth Plan period for inducing to reduce the cost of capital goods manufactured in home country, zero customs duty was offered on import items which were also manufactured in India. The thrust areas during the Ninth Plan were R&D and exports of capital goods.

Over the years, engineering industry in the country has registered a phenomenal growth to generate a strong base in a wide range of heavy and light engineering industries covering a broad spectrum of capital goods and consumer durable products. During 1970s, the growth rate of machinery and machine tools was moderate at 8.2 percentage and for electrical machinery it was 5.4 percentage. During 1980s, the growth rate of machinery and machine
tools sector was 6.5 percentage, while in electrical machinery it was 18.9 percentage.

After the major industrial reforms of 1991, the capital goods sector had negative growth during 1991-‘94 due to balance of payment crisis which necessitated import squeeze affecting availability of inputs and the tight monetary policy pursued by the Government and so on. However, the industry quickly responded to these challenges and showed positive results with a growth rate of 24.8 percentage in 1994-‘05 and 17.8 percentage in 1995-‘96. There has been a slight down-slide after 1996 as result of the overall industrial growth slowing down primarily due to the slowdown in electricity generation, crude oil generation, high cost of borrowings, slump in the primary capital market, low investment in infrastructure etc. The demand for capital goods being derived demand, the long term prospects of the industry would depend on continuous and sustained growth in overall industrial production. The machining technology plays a vital role in the output, quality, productivity, and competitiveness of the engineering industry. The future of this industry would depend to a large extent on its ability to update its technology in tune with the current international trends. On account of the Government’s increased thrust on infrastructure development, demand for the engineering sector will remain healthy. The continuing growth of the manufacturing sector and favourable regulatory policies would provide further boost to the sector’s growth. Fresh investments in the power equipment, metals, oil & gas, and petrochemicals industries, coupled with robust industrial activity is expected to drive the growth momentum in the capital goods industry in the near term. Investment projects worth ` 218.6 billion were outstanding, as at the end of January 2007, in the electrical and non-electrical machinery industry.
4.7 Classification of Engineering Industries

The engineering sector, being the largest in the overall industrial sectors in India, is a diverse industry with a number of segments, and can be broadly categorised into two segments, namely, heavy engineering and light engineering. The sector is relatively less fragmented at the top, as the competencies required are high, while it is highly fragmented at the lower end (e.g. unbranded transformers for the retail segment) and is dominated by smaller players. Heavy engineering dominates the sector accounting for nearly 80 percentage of the output.

The engineering industry in India manufacture, a wide range of products, with heavy engineering goods accounting for bulk of the production. Most of the leading players are engaged in the production of heavy engineering goods and mainly produces high-value products using high-end technology. Requirement of high level of capital investment poses a major entry barrier. Consequently, the small and unorganised firms have a small market presence. The major end-user industries for heavy engineering goods are power, infrastructure, steel, cement, petrochemicals, oil & gas, refineries, fertilisers, mining, railways, automobiles, textiles, etc.

The light engineering goods segment uses medium to low-end technology. This segment is characterised by the dominance of small and unorganised players which manufacture low-value added products. However, there are a few medium and large scale firms which manufacture high-value added products. 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 Indian engineering industry is highly competitive, with several companies having a presence in each of the segments. Several multinational
companies of the likes of ABB, Siemens, Honda, Cummins, etc have entered the industry.

1.8 Opportunities for light engineering industries

The engineering sector is the largest segment of the overall Indian industrial sector. The engineering industry accounts for 12 per cent of India's GDP. The Engineering Services Outsourcing (ESO) sector is another sector with great potential. ESO includes product design, research and development and other technical services across sectors like automotive, aerospace, hi-tech/telecom, utilities and construction/industrial machinery.

According to a study by NASSCOM and Booz Allen Hamilton (a strategy and technology consulting firm), the global engineering services market in 2020 is estimated to touch US$ 1,100 billion, of which the outsourced component is estimated to reach around US$ 200 billion. As per the report, India may capture around 25 per cent of the global ESO pie, worth around US$ 40 billion by 2020. India's engineering exports rose to US$ 5.5 billion in December 2010, growing by about 50 per cent on a year-on-year basis, on the back of increased demand from US and Middle East markets. Exports in engineering include heavy engineering goods, transport equipment, capital goods, other machinery/equipment and light engineering products like castings, forgings and fasteners.

Machine tools

- The demand for machine tools largely depends on the growth in the capital goods sector, especially in the automobile and textile industry.
- In keeping with the industry's demand for higher productivity, superior precision and accuracy, as well as low-cost manufacturing solutions, Computer Numerical Control (CNC) machine tools constitute a significant share of the Indian machine tools market.
The Material handling system

- Material handling equipments are expected to gain from the robust demand from steel, power, mineral and other infrastructure industries.
- These equipments cater to the needs of core industries such as cement, power, ports, mining, fertilizers, and iron and steel plants.
- The steel industry contributes close to 52 per cent, while power contributes 23 per cent to the demand for these equipments.
- The estimated market demand for material handling equipment is estimated at US$ 30 billion in 2007–2014.

Auto components

- Global auto majors are rapidly ramping up the value of components they source from India, steered by the country’s advanced engineering skills, established production lines, a thriving domestic automobile industry and competitive costs.
- The auto component sector generated sales worth US$ 18 billion in 2007–08, including exports valued at US$ 3.6 billion.
- Industry sales are expected to increase to US$ 40 billion by 2016, with about US$ 20 billion generated from exports.

4.9 Status of Engineering Industries in the State

The engineering industries in the country have registered phenomenal growth in setting up a strong base in a wide range of heavy and light engineering industries covering a broad spectrum of capital goods and consumer durables and some of them involve sophisticated techniques. Now the Indian engineering industry is in a position to meet the bulk of the requirements of capital goods for various sectors of the economy. The industry has begun to make a good contribution to the country’s export trade also.
Viewed against this background, the progress achieved by Kerala in the field of engineering industry is quite meager. H.M.T. Ltd. Kalamasseri, Cochin Shipyard Ltd. Cochin, Indian Telephone Industries Ltd. and Instrumentation Ltd. Palghat are few Central sector units in the State. In the state sector also there are only few engineering industries like Kerala Electrical and Allied Engineering, Mamala and Kasargod, Steel Industries Kerala Ltd. (SILK) Transformers and Electricals Kerala Ltd. (TELK), Chalakkudy Refractories Ltd., Kerala Premo Pipe Factory Ltd, Steel Complex Ltd. etc… are very small in size when compared to such units in other industrially developed states. Over several years, the engineering industry has grown several folds in quality and quantity in states like Tamil Nadu, Karnataka, Gujarat, Maharashtra, Punjab and Utter Pradesh. But, at the same time, there has not been much growth in states like Assam, West Bengal, Orissa and Kerala. These states are industrially backward.

4.10 Industry Associations and Development of Industries

The Industry Associations of a state have important role to play in the development and healthy running of industries. Their intervention will help a lot in framing industry friendly Industrial Policy of a state. They also actively involved in solving the general problems of industries. In our neighbouring States, Tamil Nadu and Karnataka, a number of general and sector specific Industries Associations are functioning. Few Associations connected with engineering industries are listed below:

1. Southern India Engineering Manufacturers Association (SIEMA)
2. Coimbatore District Wet grinder Manufacturers Association (COWMA)
3. Coimbatore District Small Scale Industries Association (CODISSA)
4. Tamil Nadu Small and Tiny Industries Association (TANSTIA)
5. Karnataka State Small Scale Industries Association (KASSIA)
6. Peenya Industries Association (PIA)

These associations are working extremely well for the development of industries in the state. By implementing a big Infrastructure Scheme and Common Facility Centre with the help of Govt. of India, under cluster approach, SIEMA and COWMA fuelled the growth of other ancillary industries as well.

In Kerala, the main engineering Industrial Associations are Kerala Small Scale Industries Association (KSSIA) and Kerala Tiny and Small Industries Development Council (KTSIDC). KSSIA and KTSIDC are not able to contribute as their counterparts in the neighbouring States.²

4.11 Light Engineering industry in neighboring States

Most of the products of light engineering units in Kerala are for house hold use or in connection with repairing and servicing of automobiles. In Tamil Nadu large number of automobile manufactures and machinery manufacturing units like wet grinder, pump set machine tools, dies etc. are working. In Karnataka also same circumstances prevails. But in Kerala such a growth is not seen though we have highly educated, technically qualified man power. The basic reason is that we have no business culture and most of us find it easy to work in some organization and get regular assured income rather than taking risk of running a business and making profit.

Co operative societies can be formed to manufacture components required for various heavy engineering industries. By having proper tie up with automobile manufacturers or other big engineering units forward linkage to the light engineering can be ensured. By assembling major parts and producing smaller components through MSEs some other products can also be manufactured within the State. Thus light engineering units can have backward linkage. Sufficient forward and backward linkage only can ensure
smooth and speedy growth of industries in general and this is applicable to light engineering industries as well.

**CONCLUSION**

Kerala is home to many medium and small light engineering industries manufacturing products like castings & forgings, steel, electrical and non-electrical machinery and engineering ancillary industries. Given Kerala's highly skilled workforce, high value, technology-driven light engineering manufacture is a natural choice.

The initiatives and measures taken by the Government for the overall expansion of light engineering industries, along with the establishment of new private units therein, has resulted in higher growth for the light engineering industry. This trend has been continuing due to the increased usage in almost all major industries in the country as well as initiation of many new projects for infrastructure development like power, railways, roadways, etc. by the Government. The light engineering industry is vital for manufacturing various final products and improving the quality of life of the people. It holds immense potential for accelerating the pace of development of the country and thus offers innumerable opportunities for the investors the world over.

Kerala, with its ‘land reforms’ developed in agriculture, with its strength on education, got many people employed in Gulf countries. When the standard of living improved, by 1980s people began to construct new concrete houses in which wood was replaced by metals, and the demand for light engineering products boosted and there was a tremendous growth in this field. Due to urbanization, from 1990s shopping complexes and flats were being constructed, resulting in greater demand for the light engineering products like grills, gates, trusses, shutters etc.
The unexpected increase in income from plantation sector also contributed much to construction as well as vehicle sales in Kerala. For example, in late nineties, the pepper fetched high prices which helped pepper growers in certain areas like Pulpally in Waynad and some parts of Idukki to get unimaginative income and this resulted in high sale of vehicles like Maheendra Jeep. Likewise, there was record sale of Maruthi vehicles in Kottayam when the rubber prices shot up to an all time high. These happenings had direct linkage in the growth of light engineering and allied industries in the form of vehicle repair and maintenance.

The post LPG regime resulted in the tremendous growth of industries in India especially in IT sector offered high income jobs to educated youths. Keralites who give much importance to the higher education of their children were benefited from this. Savings from highly paid jobs also contributed in changing the life style of an average Keralite. The above rate of growth of light engineering sector is likely to get a boost further on account of multifold increase in the prices of cardamom which recorded an all time high price of ` 1,300 per kilo in May 2010, from ` 150 to ` 250, four years back. Thus, the improved standard of living, changing life style, propensity to spend more on houses and other luxury items including vehicles will pave the way for the growth of light engineering industries at an increased pace.
End note

1. Industries handbook