CHAPTER IX

CONCLUSION

The principle of import substitution and the closed economy had gathered respectability by the beginning of the 1950s. Influenced primarily by Raul Prebisch and Hans Senger, both of whom promoted the thesis of a secular decline in the terms of trade of the developing countries, inward looking protectionist policies began to be pursued with increasing vigour by a number of developing countries during the decade. This was the genesis of the Import-substitution Industrialization (ISI) strategy of growth - a strategy laying emphasis not only on the use of protective tariffs but also on quantitative restrictions on imports.

The 'Import substitution - Industrialization' philosophy influenced much of the early planning of the Indian economy, and the foreign exchange crisis of the 1956-57 speeded up the introduction of wide-ranging inward-looking and highly restrictive policies in India. In any case, the Mohalanobies planning model, with its orientation to the development of heavy industries, assumed a closed economy and import substitution policy as part of its essential logic. Its implicit objective was to bring about self-reliance in the long run. It has been observed from the study that trade and industrialisation policy in India was subject to plan priorities as
the country launched its industry oriented development programmes in 1956. A general lack of direction in official policy during the first decade after independence was thus replaced, by specific targets and priorities during the second plan. A goal was set to maximise the rate of growth of the economy by speeding up investment in the basic goods sector of the domestic economy (which included industries producing capital goods and intermediate). Clear priorities were laid down, in favour of the basic goods sector which commanded a significant proportion of the planned investment allocated among different sectors. Emphasis placed on the basic industries, as the means to set up growth to its maximum feasible rate, was advocated keeping in view the situations.

(a) Foreign currency earnings through exports were likely to be stagnant in the near future - given the nature of output and the market faced by them - the official attitude to sources of external assistance made it unlikely that exchange earnings would be supplemented by a large flow of net aids from outside.

(b) The short possibility of substituting the imported machinery (and intermediate goods) by domestic production were rather limited. The two aspects taken together, however, provided a plea for stepping up
capital goods production in the domestic economy. The plan strategy for a stepping up of investment in heavy industries, it was argued would bring in saving in foreign exchange as output from such industries replaced their imports in the long run.

The process was also considered to be desirable as it contained the future potential for a reduction in the country's dependence on the outside world. The sequence can be characterised as one of import substituting strategy over the long run.

At a policy level, attempts to induce industrialisation in the country during the late fifties and the early sixties generated a climate where both capital goods (including intermediate products) and consumer goods production could effectively substitute imports. Assumption about the possibilities of import substitution and export promotion however continued to influence policy decision till the mid sixties, when a distinct change took place in the government's attitude to the state of control and liberalisation measure in the economy.

On the whole, the strategy of import substituting programme of industrialisation implied that productivity in the domestic economy was expected to improve as a result of industrialization.
It has been observed that, the import substitution in Indian economy has assumed different meaning at different time. In the 1950's and in the early 1960's when the Indian industry went in for a whole range of new products which were not manufactured within the country, import substitution meant producing indigenously what was imported. It was during this period that industries like textile machinery, diesel engines, bicycles, fertilisers and mechanical and electrical heavy engineering etc. came to be established.

Again the concept came to acquire another dimension when the emphasis was placed on substitution. For instance, aluminium was substituted for copper. This kind of change in the production pattern became pronounced when the imported commodity became rather expensive. In a sense such substitution is currently undertaken when coal and gas is used as a feedstock for energy in place of oil.

In recent years with the import of a variety of commodities which are predominantly manufactured indigenously, import substitution has come to mean merely expansion of production capacity to make up domestic shortages. The following conclusion has been drawn from the above study:

(a) It has been observed from this study that Import substitution permitted an initial spurt in growth
of manufacturing industry. Indigenous producers moved in rapidly to take over the existing domestic markets that had previously been created by imports, and the national income was observed to increase relatively rapidly until the mid 1960's, when the limits of import substitution were reached. Industrial development proceeded at an increasing pace through the period 1951-65.

Once the limits of import substitution were reached, however, and Indian industry had to find new and mass markets for their products and generate investible resources once on a competitive basis, the whole production drive ran out of stream. Capital goods industries suffered a substantial setback reflected in a negative rate of growth during the remainder of 1960's and a substantial fall in their capacity, utilisation. General index of industrial production fell sharply during 1965-70 and in the seventies. Industrial growth had thus effectively lapsed into stagnation.

(b) The decline in industrial growth cannot be blamed only due to import substitution itself, but it was due to faulty implementation of policies and indigenous causes. Otherwise, import substitution in Indian economy
has been successful in altering the economic structure through bringing structural changes in Indian economy. Structural changes has been observed in composition of exports and imports. India is a major exporter of engineering goods which indicates rapid growth in import substitution of engineering goods industries during the last thirty years. The import availability ratio in several manufacturing goods like, fertilizers, domestic machines, agricultural machines, engineering goods, cement, paper and paper products, transport equipment, paper and paper products etc has come down substantially in comparison to fifties. Which shows a reduction in import dependence in manufacturing goods. It has been observed that India's exports has become more diversified due to the diversification of indigenous manufacturing commodities. The structural change in exports and imports have been observed, as the now exports constitutes more of non traditional and new commodities. Imports which constituted mostly of consumer goods and intermediate goods during fifties, now comprised mostly of capital goods. Concentration of imports has increased and exports has declined which shows exports diversification.
(c) It has been observed that the one of the objective of import substitution, i.e., to reduce trade gap and conserve foreign exchange has not been fulfilled yet. The establishment of import-substitution industries itself required heavy imports of capital equipment. The foreign exchange cost of import substitution is still high.

(e) Import substituting industrialisation have been instrumental in increasing growth rate of income and employment in the economy. The import substituting industries generated sufficient employment in country during period covered under study. It is also observed that growth of employment generation in seventies has declined. It may be due to the increasing capital intensity in import substituting industries. One of the observation made in this study is that import-substitution help in capital formation. But it has been observed that output is not increasing in proportion to the capital formation in manufacturing sector which is responsible for slow industrial growth rate and increasing cost of production in manufacturing industry.

(e) It has been observed that import substitution has helped in reducing Indian economy at the mature and advanced
stage of industrialisation. But despite of the fact, it is also observed that the growth variables like output, value added, capital and employment has registered a remarkable growth during period 1960-65 in comparison to other period in which these growth variables rates declined. It was import substitution initial spurt in industrial growth. After a initial success, import-substitution was resulted in negative growth in comparision to 1960-65, thereby reducing the industrial growth in later periods.

(f) It is observed that import substitution brought structural change in industrial production. In 1950, the most of the industrial production constituted the traditional industries, but now non-traditional industries are in first rank in industrial production.

It is observed from various studies referred in this study that India export earnings are not increasing due to its uncompetitiveness in international market. It is due to its reliance on inferior quality domestically produced inputs and capital equipment acted as a further constraints on its export efforts in the highly competitive international market. Therefore, it is observed that rigorous import substitution has a distinct tendency to involve a bias against exports.
The bias against exports to the result of principally
of the distortions arising in the domestic cost-price
structure. Excessive and continuous protection to
industry leads to establishment of inefficient firm
in the absence of any serious competition in domestic
market which produce inferior quality of product at
higher cost. Even a casual look at the Indian manu-
factoring sector suggests that scarce domestic resour-
ces have not been utilised as efficiently as possible.
In fact scarce domestic resources have been diverted
into inherently capital intensive industry, offering
a low direct employment potential.

(g) It have been observed from various studies that Domestic
resource cost of import substituting industry are exces-
sively high. These sector, which included, iron and
steel, paper and paper products, synthetics, fibres
inorganic heavy chemicals and motor vehicles accounted
for as much as one third of the total manufacturing
output. The lack of systematic cost benefit analysis
of many important import substituting projects suggests
that such wasteful planning methods have probably been
quite widespread over the years.
(i) From the analysis of measurement of import substitution and sources of the output growth in Indian manufacturing sector, the following observation has been made from the study:

1. It has been observed that import substitution is prominent relatively and absolutely in the non-traditional industries. Even here share of import substitution in the growth of output is rather smaller than the share due to domestic and external demand. However, this latter influence is less prominent in the non-traditional industries in comparison to traditional industries.

2. In many traditional as well as non-traditional industries, the import substitution acted as a stimulus of growth till 1970. After 1970 it is nearing saturation because import-availability ratio are nearing zero in some industries.

3. The negative magnitude of import substitution during seventies intend to show that it is responsible for retarding the growth in industrial sector. (the measures of import substitution does not take into consideration the other factors for retarding the growth which have
itself retarded the pace of import substitution in Indian economy. These factors are the liberalisation of trade policy led to competitive imports, capacity underutilisation, and other indogenous factors).

4. Contribution of exports in output growth have been slightly growing after 1960 over the period of 1960-80. It has been observed that contribution of traditional industries in export expansion is still significant in comparision to non-traditional industries. The export expansion seems to be played a positive role during seventies in comparision to import substitution.

5. Domestic demand expansion emerged as a potential factor for industrial growth in India. It dominated over the whole period of 1960-80. It was realized that indogenous factors are more growth oriented relative to exogenous factors.

6. In the light of the above observation, the role of import substitution should not be underestimated. The import substitution undertaken during the fifties has been able to transform the traditional nature of economy into a industrial economy. Structural change has taken place in Indian imports and industrial production at large.
Finally study as a whole, underlines the fact that the major stimulus behind the acceleration of the process of industrialisation has been provided by the autonomous and endogenous growth of the Indian economy during the period. So in this period the structure of imports has undergone drastic changes largely in response to changes in the structure of industry at home. This study shows that the acceleration and diversification of industrialisation is largely due to the emergence of new, modern, dynamic and growth oriented industries, like machinery and chemicals, as against the traditional ones like textiles and footwear. Lastly the study notes the possibility of economic stagnation because of saturation of import substitution potential. However, it does not support the view that the wholesale trade liberalisation and pro-trade policies can relieve this stagnation problem. What is needed instead is pushing along a broad front of core industries thereby expanding the market and permitting imports that are necessary.

SUGGESTIONS AND RECOMMENDATIONS

Import substitution presumes (a) use of unutilised capacity and (b) creation of new capacity in specific lines. Towards meeting these objectives the following suggestions and recommendations are offered in order to make import substitution a success.
- Effective utilisation of established capacity:
  For effective capacity utilisation, the basic infrastructure and inputs should be ensured to industries according to their needs.

- Government should ensure a good industrial relation to avoid strike and lock-out. A situation must be created in which strikes and lockout are rendered unnecessary. All disputes must be settled through arbitration.

- Credit policy should be such to give incentive to producers for investment and expansion of the industries.

- The administrative procedures with regard to industrial licensing, import of capital goods, MRAP etc. must be simplified. The Government should have a single-window clearance for the different types of permits and licences required.

- The capacity licensed for each item must take into account estimated domestic demand, potential for exports, gestation period.

- Besides the above, the following measures are suggested:

  - Import substitution must be accorded the same priorities as export promotion. In this respect targets
must be fixed in each major import items in consultation with industry on a time bound basis.

The development councils need to be activated. It is necessary to establish Development Councils in all industries where import substitution is taking place.

The import substitution cell in the DGTD must be made to function in coordination with the respective ministries. This cell should review the extent of import substitution achieved in the country and suggested measures to speed up the process.

Every effort should be made to assure quality and to reduce cost of production of import substitution which has been the subject of criticism for the long time. Import of technology and equipment should be allowed for modernization and rationalisation of the import substituting industries in India.
APPENDIX

RECENT DEVELOPMENTS IN INDIA MANUFACTURING SECTOR

There has been recent developments in manufacturing industries particularly in engineering and chemical industries involving latest technology and product development of the international standard. Due to these developments in late seventies industrial production is expected to grow more in near future which will promote import substitution not only in existing industries but also in new products which are still being imported in India.

ENGINEERING INDUSTRIES:

Automotive Industries:

The transport industries dealt with in the DTP include commercial vehicles, passenger cars, two wheelers, tractors and auto ancilleries. Important developments in the various sectors have been as follows:

Commercial Vehicles:

The production of commercial vehicles has increased substantially from a level of 57,441 in 1979-80 to 91,150 in 1981-82. With this sharp increase in production, the vehicles are now readily available.

Steps have been taken to induct new vehicle technology inclusive of fuel efficient engines. One of the significant developments in the commercial vehicles sector was the induction of multi axle vehicles, as well as turbo charging of
engines. Currently, all the buses are made of truck type chassis. Steps have been taken to introduce buses with integral construction which will result in better safety and driving comforts.

Considering the anticipated demand during the Sixth and Seventh Plan periods, steps have been taken to create substantial additional capacity for all ranges of commercial vehicles. In almost all the areas, technology induction of improved vehicles.

**Passenger Cars:**

The most important development in this sector was the setting up of a public sector passenger car project with a contemporary international technology. The new Maruti vehicle has much improved fuel efficiency and is of modern international design. The existing manufactures have also undertaken modernisation of their vehicle designs.

**Two Wheelers:**

The production of two wheelers has shown phenomenal growth during the recent years. The production rose from a level of nearly 3 lakh numbers during 1979 to nearly 6 lakh numbers during 1982. Two wheelers being popular and economical mode of transport, steps have been taken to induce the latest technology in this field and a number of technology induction proposals have been approved. Many of these will come to fruition in the next two to three years.
Tractors and Other Agricultural Machinery:

In the field of agricultural tractors also, there has been a healthy growth in production which rose from about 60,000 numbers in 1979 to 85,000 numbers in 1981. With this growth, the production level now match the demand. The off-take tapered off during the year 1982 due to instructional credit constraint, which has since been removed.

Auto Ancillary:

In steps with the growth of the original equipment sector, the auto ancillary production has also kept pace and taken rapid strides both in terms of production as well as induction of new technology. Proposals have been approved for the introduction of a number of modern ancillaries like turbo charges, synchromesh gear boxes fuel injection equipment etc.. All round efforts have been made not only to create additional capacity for the various items but also to incorporable technology to match the new range of vehicles being introduced in the near future.

Earth Moving Equipments:

Earthmoving equipment industry constitutes heavy and large sophisticated machines designed for specific operations of earth removal and transportation the mining, irrigation and construction works. The major items covered under this industry are excavators (rope and hydraulic type), Crawler tractors, Crawler or wheeled dozers, Off
Highway dumpers. Loaders (wheeled or crawler type), Motorised scrapers and Motorised Graders. The production of these equipments in the past three years has been as under:

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>1981</th>
<th>1982</th>
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<tbody>
<tr>
<td>1. Excavators</td>
<td>234</td>
<td>302</td>
<td>345</td>
</tr>
<tr>
<td>2. Crawler tractors</td>
<td>308</td>
<td>352</td>
<td>678</td>
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<tr>
<td>3. Dumpers</td>
<td>489</td>
<td>556</td>
<td>742</td>
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<tr>
<td>4. Tr. dozer</td>
<td>287</td>
<td>315</td>
<td>399</td>
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<tr>
<td>5. Scrapers</td>
<td>65</td>
<td>14</td>
<td>64</td>
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<tr>
<td>6. Motor Graders</td>
<td>20</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1373</td>
<td>1451</td>
<td>2229</td>
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**Excavators:**

M/s. Heavy Engineering Corporation Ranchi have recently taken up the manufacture of to Cu. Mtr. Shovels. They are also introducing large sized walking draglines for meeting the requirements of open cast mines. In the field of Hydraulic excavators one of the existing manufacturers has introduced an excavator of 7.5 cu.mt.m buckets capacity.

**Off Highway Dumpers:**

These equipments are designed specifically for transportation of earth materials over rough terrain. A dumper of 85 carrying capacity has recently been introduced in the open cast mines, matching the 10 cu.mt. shovels.
Loaders:

Wheeled loaders up to 7 Cu. Yd. bucket capacity are being manufactured indigenously. A new model of 2 Cu.mt. capacity has recently been introduced by one of the manufacturers. This loader has versatile features with articulated steering and rear axle oscillation, enabling the equipment to be operated in rough terrain without difficulty.

Motorised Scrapers:

Till now only single engine scrapers were being manufactured indigenously. One of the units has now introduced double engine scrapers which leads to better operation in difficult terrain.

Motor Graders:

As against 115 H.P. Motor graders which were being produced so far, heavier grader of 145 H.P. capacity has been introduced recently. This equipment has added features like hydraulic operation, etc.

Electrical Industry:

This Industry covers a number of products like generation, transmission and distribution of equipment, as well as other electrical appliances. The products could be broadly classified in two categories namely, Heavy Electrical Equipments used mostly for industrial applications and Light Electrical Equipments used by a wider cross-section of the society.
In the field of power generation equipments, the activity is primarily in the public sector. Generating Sets for thermal plants for ratings upto 210 MW are being manufactured, at present, and this is being increased to 500 MW in the near future. Allied equipments like transformers and switchgears including products like Sulphur hexafluoride circuit breakers in 66 to 420 KV ratings and vacuum circuit breakers in distribution voltage range are also being manufactured.

In the field of electric motors, the industry is now well established. The range of HT Electric motors manufactured indigenously now includes special motors for Atomic energy applications. A wide range of Electric controls and machinery for Steel plants, Cement plants, Fertilizers etc. is now being manufactured locally. A no. of units in the private sector are increasing their range of manufacture to include motors upto 2000 HP.

So far as the power and distribution transformers are concerned, the industry is capable of manufacturing these upto 400 KV ratings. The industry is also in the process of acquiring know-how for aluminium foil wound transformers. Various components like bushings and special core steel material are also being manufactured in the country.

In the case of Electrical Cables and Wires, the Indian manufacturers have taken up the manufacture of Cross-linked polyethylene cables in 11 KV ratings.
The industry is also manufacturing a wide range of Synthetic Rubber Insulated Cables to meet the requirement of Defence establishment and Hindustan Shipyard. Special types of cables like Teflon Insulated Wires used by the Electronic Industry are now manufactured in substantial quantities. Enamelled wires for application in refrigeration industry are also being manufactured.

In the field of switchgear and control gear in the distribution voltage ratings upto 33 KV, the bulk oil and minimum oil circuit breakers are being replaced by vacuum circuit breakers and Sulphyr hexafluoride circuit breakers. The industry has acquired the know-how for the manufacture of these products and facilities have been established. In the case of protective relays and systems, the static protective relays and systems, the static protection systems are replacing conventional electro mechanical systems. The product quality has improved with the use of higher class insulating materials and moulding compounds. New products like HT Flame proof Circuit Breakers for Mines, HRC Fuses for Rectifiers, High Tension HRC Fuels and Moulded case Circuit Breakers of higher rupturing capacity have been introduced in the recent years.

As far as Light Electrical items are concerned, production of GLS Lamps and Fluorescent Tubes is increasing. Manufacture of energy saving lamps, like Mercury Vapour Lamps, has also been established in the country. Produc-
tion of Sodium Vapour Lamps useful for street and high-way lightinf rds, ports, shipyards, petro-chemical and large industrial complexes has been taken up. Lead-in-wires, which were being imported hitherto, will be manufactured in the country shortly.

Production of Button Type Cells to be used in Electronic watches, calculators etc., has been taken up recently. In the case of electric fans exports are increasing, particularly for ceiling fans.

Domestic Refrigerators:

At present, there are four units in production for the manufacture of domestic refrigerators with a total licensed capacity of 5.5 lakh Nos./annum. Additional Capacity covered through letters of intent/registration for the manufacture of domestic refrigerators is 2.55 lakh Nos./annum.

Considerable improvement in the manufacturing technology of domestic refrigerators has been made by the indigenous firms in line with the technology developed in advanced countries. The use of polyurethane foam in place of glass wool mat as insulation has increased the storage capacity of a refrigerator in addition to higher insulation. Most of the refrigerator manufacturers are using the liquid paint for the cabinet in which the consumption of paint is quite high. Some of the units have switched over to the
use of paint in powder form which has resulted in the saving of material to the extent of 22 to 25% and the problem of pollution has also been minimised. There has been significant improvement in the design of the sealed compressors. Some manufacturers have provided water tap on the cabinet thereby avoiding the use of door time and again. This system saves energy and helps in increasing the efficiency of the refrigerator.

**Electronics Industries:**

In the field of Electronics during the last three years various promotional measures have been initiated for faster growth. Recognising the need for increasing investment and production in the area of Electronic components, so as to produce quality components on International prices, an Inter-Departmental Task Force has been set up by the Department of Electronics. Fresh capacities and expansion of the existing units are being considered with a view to set up larger size units for an economic viability. Import of technology is permitted on merits.

Colour T.V. Transmission has started in India Concurrently the production of Colour T.V. indigenously has been planned to meet the rising demand.

During 1982, manufacture of two new items, namely, Imag Converter Tubes and professional grade Microphones was established for the first time. A number of new units have commenced the production of various Electronic components like
Metal Film Resistors, Audit Magnetic Taps, printed Circuit Boards, Professional grade Electronic and Plastic Films Capacitors.

The production of Computer Hardware and allied items has been established in the recent years. The Industrial Licensing Policy in respect of Computers was enunciated in 1979 and since then a number of organised sector units have launched their production programmes. These systems have been well received by the consumers and user organisations. The systems being manufactured cover the entire gamut of the user area, but for some intricate and on-line applications. The types of Computers being manufactured can be classified into 4 categories as under:

1. Stand Alone Systems
2. On-line Systems
3. Off-line Systems
4. Dedicated Systems

The units producing the computer systems have also geared themselves up for the adequate and sufficient software support. Wherever required, this has been supplemented through the import of operating software to cut down the development time. The units are providing adequate maintenance and after sales service the support. Efforts are afoot to achieve matching production of peripheral Equipments so as to reduce their imports. Good progress has been made in this direction.
The total production of all Electronic items including Components in the organised sector during 1981 was around Rs. 720 crores.

Industrial Machinery:

The manufacture of industrial machinery is now well established. The range of manufacture covers machinery for industries like cement, sugar, paper as well as equipments used in the metallurgical, mining, chemical and other industries. In addition, rubber machinery, printing machinery and other types of equipments used in general industry are also being manufacture. A notable feature during the period was the scaling up of unit sizes in a number of user industries like cement, sugar, paper, fertiliser etc., creating a demand for larger size industrial machinery. This challenge is being increasingly met by the domestic industry through diversification and induction of modern technology on selective basis. Some of the highlights of development in this industry as as below:

Cement Machinery:- Hitherto, the cement plants were more or less standards in 500 and/or 1200 tonnes per day capacities. Many of the existing plants were based on the wet process. With the established capability to execute large size plants, machinery for cement plants of unit size upto 3000 tonnes per day is now being manufactured. Modern technology like dry process based pre-calcination, vertical roller mills, and
electronic process control instrumentation has been inducted in the new plants. Apart from meeting the domestic requirements, the industry is increasingly participating in the execution of turnkey cement plants abroad.

Sugar Machinery: As in the case of cement machinery there has been a considerable scaling up in the unit sizes and the domestic machinery industry is now handling large size plants upto 6000 tonnes of crushing per day. A number of turn-key projects abroad have been successfully executed, and the country is now an important source of machinery supply in the international market.

Printing Machinery: The manufacture of printing machines of modern designs has been established in recent years. With the demand for printing machines simultaneously adopted by the Government, new types of printing machines like Single colour sheet Web offset, web offset, automatic letter press and platen machines are now being manufactured in the country.

Other Industrial Machinery:

There has been a steady growth in respect of other types of industrial machinery. Through the deliberate policy of the Government, considerable diversification has taken place. The domestic industry now covers a very wide range of equipments used in chemical, metallurgical, mining and rubber industries. In the area of boilers, apart from expanding the range to large size thermal power station boilers, consider-
able diversification incorporating the use of multiple fuels heat recovery systems and improved combustion equipment has taken place.

**Metal Industries:**

The DGTD deals with all types of Metallurgical Industries excluding Iron & Steel and its alloys. The Foundry industry products like Castings, Cast Iron Pipes as well as Forgings are also looked after by the DGTD. These items from the basic input materials for almost the entire Engineering sector.

In the recent past a number of foundries have installed modern equipment such as high pressure moulding, flaskless moulding system etc. This would enable them to produce intricate thin-walled casting of consistent quality at a considerable reduction in manufacturing costs. Manufacturing of cast iron upon pipes primarily required for supply of drinking water, an essential basic need covered in the 20 point programme is also being accorded high priority. The industry was facing difficulty due to inadequacy of raw material availability. The DGTD took initiatives towards solving the problem and this has resulted in a substantial pick up of production in 1992 vis-a-vis the earlier years.

Chilled iron, cast iron rolls and forged steel rolls are now being manufactured indigenously in increasing quantity leading to substantial saving in foreign exchange for use
in the Steel plants which were imported earlier are now being exported not only to Asian countries but also to Europe. The export of forged rolls during 1981-82 was of a level of Rs.2.4 crores.

Grinding media balls are one of the major consumables used by cement plants. Power plants and the mineral industries. A unit has recently been established for manufacture of superior quality high chrome high hardness grinding media balls.

Special Alloys:

Some of the special metals for critical applications such as for Nuclear Power Stations, Instrumentation etc. have been imported. As an effort to meet the requirement of such specialised metals, the Government has set up an integrated manufacturing unit for the entire range of special metals and alloys. The Mishra Dhatu Nigam has been set up in the public sector to manufacture specialised alloys of wide range, notably the following:-

1. Super Alloys.
2. Titanium and Titanium Alloys
3. Special Purpose Steel.
4. Electrical and Electronic Alloys.
5. Power Metallurgy Products.

The production has already commenced in this unit and it is expected that it may not be in a position to meet a substantial part of the requirements of the country in these areas.
Welding Electrodes:

Welding Electrodes is a feeder industry to the engineering sector and, as such, its production is directly related to the activities in the engineering sector. There are at present 22 units manufacturing welding electrodes, with a total capacity of 742 million running meters. The production during 1981 was of the order of 620 million running meters.

The industry is now well-established and electrodes covering a wide range of applications are being manufactured in the country. The indigenous manufacturers are now in a position to offer joint ventures and export of technical know-how to other developing countries.

The capacity already created together with the schemes, which have been approved, would be adequate to meet the expected demand over the next 3 to 4 years.

Wire Ropes:

Wire ropes are being manufactured by 10 units on the list of MIB, with a total capacity of 46,200 tonnes p.a. The production during 1981 was of the order of 31,000 tonnes. Majority of the requirements of the country are being met
Iron indigenously manufactured wire ropes. The product is also being exported and the indigenous manufacturers are capable of offering joint venture to the developing countries in this field.

**Mobile Cranes:**

Mobile cranes of the following types are being manufactured indigenously in the range of 3 tonnes to 100 tonnes capacity:

1. Truck mounted
2. Self-propelled for rough terrain
3. Self-propelled, for recovery use.

Manufacture of Rough terrain cranes which have ease of mobility on all types of terrain, has been taken up recently.

**Chemical and Miscellaneous Industries**

**Alkalies and Other Inorganic Chemicals:**

Caustic Soda and Soda Ash are important heavy Inorganic chemicals which are basic materials used in a large no. of chemical processes. Their manufacture is capital intensive and requires substantial quantities of fuel and electricity. While production of these chemicals has been established for quite sometime the effort during the period has been to eva
luate and adopt new and improved processes for their manufac-
ture.

The existing manufacturers in the country are producing
caucic Soda by the Mercury, and Diaphragm Cell Processes.
During the last one year, three new projects have been approv-
ed for manufacture of caustic soda by the Membrane Cell
technology, which is less polluting and energy efficient.

For a number of years there have been four units manu­
facturing Soda Ash with a capacity of 6,18,000 tonnes/annum.
During the period three new units with a total capacity of
1,2000 tonnes/annum have been established.

Hitherto, the total requirement of Sodium Cyanide in the
country was met through imports. Two new plants have started
production in 1982. With the establishment of these two units
the total requirement will be met indigenously.

For a long time there was one unit manufacturing STPP/
phosphoric Acid in the country through the conventional Shul­
phuric Acid route. During the period three new units have
been set up, two with the conventional process and one using
the Hydrochloric Acid route.

Man Made Fibres:

This Industry which produces the basic raw material for
synthetic textiles, comprises of fibres and yarns made of
viscose, nylon, polyester, polypropylene and acrylic. In
order to increase the availability of man-made fibres, in
consonance with the new Textile Policy, steps have been taken to augment the capacity in this industry. Production during the recent years has increased steadily and a substantial part of the domestic demand is being met from local output. Manufacture of partially oriented filament yarn and acrylic fibre has been well established and a number of new units for the manufacture of polyester filament yarn, nylon tyre yarn and filament yarn have commenced production in the period.

**PAINTS, ENAMELS AND VARNISHES:**

These industries cover a wide range of consumer products used for different applications in the domestic, industrial and chemical sectors. The indigenous manufacturing range covers a wide variety of paints and surface coatings for different applications. The product quality of this industry is largely dependent on the raw materials viz., powder bases, synthetic emulsions and pigments. Emphasis has been given in the recent past to the development of material inputs to this industry, in order to improve quality as well as reduce costs and minimise imports. Some of the important developments in this industry have been as under:

Titanium Dioxide is an important white pigment base used in the Paints industry. In addition to the existing unit, a second unit is being established based on domestic
mineral resources. Moreover, a large futile processing plant based on Orissa sands is under commissioning, which will enable the establishment of a number of down-stream industries including manufacture of titanium dioxide. This will enable the replacement of a number of inorganic pigments such as lead oxide, zine oxide etc. In the automotive industry hitherto the use of nitro-cellulose paint was common but now stoving enamels have become almost a standard material for painting. These enamels which result in better and durable surface finish are now produced in the country.

**PAPER AND PAPERBOARD:**

This industry meets the vital demand of cultural and educational paper (printing and writing), as well as that of newsprint. There are other varieties like paper board, speciality papers, wrapping and insulation paper etc. having little to do with conventional paper manufacture by this industry. In recent years have been in respect of larger sized integrated plants of 100,000 to 200,000 tonnes/year and above on the one hand, and mini-paper plants of 10 and 20, 30 tonnes per day capacities on the other, to meet localised and speciality demands. The domestic machinery manufacturing industry has been in a position to meet much of the demand for machinery arising out of this changing pattern in the user industry. Some of the important projects under implementation include the large integrated plants of Hindustan Paper Corporation.
at Nowgong, Cachar and Cochin. The production of newsprint has practically doubled to one lakh tonnes during 1982, as compared with that in the previous year. The range of speciality papers has likewise diversified to include light tissue paper, inscription paper, superior types of coated papers etc. An important development in this industry has been the increasing use of bagasse—a waste from sugar cane production as raw material. With the successful trials conducted in the existing plants to increase the percentage of bagasse in the paper furnish, independent plants utilising bagasse as the main raw material are now being set up. The increasing use of bagasse in paper making will reduce the pressure on forest resources.

Rubber Industry:

Rubber processing Industry covers various types of items such as tyres, tubes and their components, rubber footwear, conveyor belting and transmission belting, fan and industrial V belts, various types of hoses, cots and aprons, rubber contraceptives, moulded and extruded rubber goods.

2. The growth of rubber industry can be judged by the consumption of all types of rubber (natural rubber, synthetic rubber and reclaimed rubber) since it is the basic raw material in the manufacture of rubber goods. The consumption of all types of rubber during the last three years has been as...
Year | Consumption (In Tonnes)
--- | ---
1930-31 | 2,41,305
1931-32 | 2,63,025
1932-33 | 1,77,945

(April, 32 - November, 32)

3. A number of new undertakings, new units were established during the period for the manufacture of various goods.

During the recent years a number of new automotive tyres and tube manufacturing units have been set up. Some of these will manufacture steel cord belted and other radial tyres and tyres for off highway vehicles for earth moving equipment. Other speciality rubber products like Silicon rubber used in oil seals, high pressure hydraulic hoses, synthetic rubber moulded products have also been introduced. With the increased production in the new units the supply of tyres and tubes have considerably eased.

Advance planning has been done to meet the demand for tyres and tubes during the next decade. With the scaling up of production and increased availability of domestic raw material the industry will be fully geared to exploit the export potential also.

**Synthetic Polymers:**

The domestic range of synthetic polymers covers PVC,
LDPE/HDPE, polypropylene, polystyrene and moulding resins. There has been a significant growth in this industry during the period. Some of the new items manufactured for the first time include ABS resins, nylon moulding powder, polyster resins and plasticizers. In the cable industry, a gradual change is taking place for replacing PVC compounds with cross linked polyethylene compounds. Technology for the manufacture of such compounds has been established in the country. Considerable progress has been made in developing a number of engineering plastics.

Other Chemical Industries:

Fertilizers:

Fertilizers are invaluable inputs to modern farming and have a bearing on the output of foodgrains and other agricultural produce. There are 29 major fertilizer units in India manufacturing a wide range of nitrogenous, complex and phosphatic fertilizers. The technology of manufacture of fertilizers has undergone change consistent with the availability of feedstock. While in the past plants were based on kynetha, coal and furnace oil, due to substantial availability of natural gas the new plants being established are based on this feedstock. The plant size has also undergone changes in as much as the plants in operation have a capacity of up to 900 tonnes per day of ammonia, while the plants proposed to be established in future would have a capacity of around 1400 tonnes per day.