CHAPTER - II

BHEL - CORPORATE PROFILE WITH SALIENT FEATURES
CHAPTER-II
BHEL – CORPORATE PROFILE WITH SALIENT FEATURES

1. INTRODUCTION
In the past independence era when India was moving towards Industrialization, the measure thrust of the Government was in the core sector and this sector was given to Public sector. With this objective, Heavy Electricals (I) Limited was set up in Bhopal in August 1956, with a view to reach self-sufficiency in Industrial Products and Power Equipments. This Plant was set up under collaboration of M/S AEI, U.K.

Three more plants were subsequently set up at TIRUCHY, HYDERABAD AND HARDWAR with CZECHOSLOVAKIAN and SOVIET Assistance in May 1965, Dec. 1965 and Jan. 1967 respectively.

As there was a need for an integrated approach to development of power equipment manufacture in India, Heavy Electrical (I) Ltd. Bhopal merged in to BHEL in 1974.

The end of the 5th five-year plane envisaged it envisaged by the planning commission that demand for power transformer would rise in the coming years. Anticipating the country’s requirements, BHEL decided to set up a new plant, which would manufacture power and other type of transformers in addition to the capacity available at BHEL Bhopal. The Bhopal plant was engaged in manufacture of transformers of large rating and Jhansi unit would concentrate on power transformers up to 50 KVA, 132 KV class and other transformers like Instrument transformers, Traction transformers for Railway etc.

This unit of Jhansi was established around 14 km from the city on the National Highway – 26 on Jhansi – Lalitpur road. It is called the second-generation plant of BHEL, set up in 1974 at an estimated cost Rs. 16.22 cores inclusive of Rs. 2.1 cores for Township. Late Mrs. Indira Gandhi, the Prime Minister of India on 9th Jan. 1974, laid its foundation. The commercial production of unit began in 1976 – 77 with an output of Rs. 53 lakes since then there has been no looking back for BHEL Jhansi.

The plant of BHEL is equipped with most modern manufacturing, processing and testing facilities for the manufacture of power and special transformers, instrument transformers, Diesel shunting locomotives and AC/DC locomotives. The layout of the plant is such that it is well stream Lind to enable smooth material flow from raw material stages to finished goods. All the feeder days have been laid perpendicular to main assembly by and in each feeder bay raw material from the extreme smoothly get converted to subassemblies, which after inspection are seen to main assembly to day.

The raw materials that are produced for manufacture are used only after through material testing in the lab and with strict quality checks at various stages of productions. This unit of BHEL is basically engaged in the production and manufacture of transformers of various type and capacities with the growing competition in the transformer section. In 1985-88 BHEL it under took the empowering of DESL’s but a year their total manufacture begin. In 1987-88 BHEL has progressed a step further in undertaking the production of A/C Locomotives, and
subsequently it is manufacturing AC/DC Locomotives also.

1.1 CORPORATE PROFILE

Established in 1956, Bharat Heavy Electrical Limited (BHEL) is the largest engineering and manufacturing enterprise of its kind in India today. The company is engaged in engineering, development and manufacture of wide variety of electrical and mechanical equipment for generation, transmission and utilization of energy and electrical power.

Placed among the top 12 manufactures of power plant equipments of the world, BHEL provides products, systems and services for ENERGY, INDUSTRY and TRANSPORTATION, OIL & GAS and TELECOMMUNICATION SECTORS. In each of these sectors, BHEL offers total service to its customers on turnkey basis.

The first plant of BHEL was set up in Bhopal, which singled the dawn the heavy electrical industry in India. In the early sixties there more major plants were set up in Hardwa, Hyderabad & Tiruchirapali.

BHEL’s business broadly covers conversions, transmission, utilization and conservation of energy in core sectors of economy that fulfills vital infrastructure needs of the country. Its products have established an enviable reputation of high quality and reliability, which is largely due to emphasis placed all along on contemporary technology. BHEL has consistently upgraded its design and manufacturing facilities to International standards acquiring and assimilating some of the best technologies of the world from the leading companies in USA, EUROPE & JAPAN together with technologies from its own R&D Centers.

With Corporate Headquarters at New Delhi, The company now has 14 Manufacturing divisions, 9 Service centers and 4 power sectors regional centers besides project sites spread all over India and abroad to provide prompt and effective service to customers in India and abroad. BHEL has 53,000 employees comprising trained engineers, technicians & skilled artisans and supporting technical staff. The Company registered a turnover of Rs.72,870 millions during the year 2001-2002 and an increased Turnover of Rs.75,100 millions during the year 2002-2003 (Provisional basis).

1.2 COMPANY OVERVIEW

Established in the late 50’s BHARAT HEAVY ELECTRICALS LIMITED (BHEL) is a name which is recognized across the industrial world. It is one of the largest engineering and manufacturing enterprises in INDIA and is one of the leading international companies in the power field.

BHEL offers a wide spectrum of products and services for core sectors like power transmission, industrial transportation, oil and gas telecommunication etc. Besides supply of non conventional energy systems. It has also embarked into other areas including defense and civil aviation.
A dynamic 63000 strong team embodies the BHEL philosophy excellence through continuous striving for state of the art technology. With corporate headquarters in NEW DELHI, fourteen manufacturing units, a wide spread regional services network and projects sites all over India and even abroad, BHEL is India’s industrial ambassador to The world with export presence in more than 50 countries.

BHEL’s range of services extent from project feasibility studies to after sales services, successfully meeting diverse needs through turnkey capability.

BHEL has had a consistent track record of growth, performance and profitability. The World Bank in its report on the India Public Sectors, has described BHEL as “one of the most efficient enterprises in the industrial sector, at par with international standards of efficiency”. BHEL has acquired ISO 9000 certificate for most of its operations and has taken up Total Quality Management (TQM).

1.3 B.H.E.L. IN INDIA

A. REGIONAL OFFICES (POWER SECTORS)

1. NEW DELHI (NORTHERN REGION)
2. CALCUTTA (EASTERN REGION)
3. NAGPUR (WESTERN REGION)
4. CHENNAI (SOUTHERN REGION)

B. BUSINESS OFFICES

BANGLORE
BARODA
BHUBANESHWAR
MUMBAI
CALCUTTA
CHANDIGARH
GUWAHATI
JABALPUR
JAIPUR
LUCKNOW
CHENNAI
NEW DELHI
PATNA
RANCHI
SECUNDRABAD
C.  MANUFACTURING UNITS

BANGLORE
BHOPAL
GONDWAL
HARDWAR
HYDERABAD
JAGDISHPUR
JHANSI
RUDRAPUR
RANIPET
TIRUCHIRAPALLY

D.  SERVICE CENTRES

1. BANGLORE
2. BARODA
3. CALCUTTA
4. CHANDIGARH
5. SECUNDRABAD
6. NEW, DELHI
7. NAGPUR
8. PATNA
9. VARANASI

1.4  BOARD OF DIRECTORES

K.G. RAMACHANDRAN

Chairman and Managing Director
Bharat Heavy Electrical Ltd.
BHEL House, Siri Fort, New Delhi-10049

V.K. MALHOTRA

Additional Secretary & Financial Adviser
Ministry of Commerce and Industry,
Deptt. Of Industrial Policy and Promotion,
Udyog Bhavan, New Delhi-110011

A.C. WADHAN

3, Kautilya Marg, Chanakya Puri,
New Delhi-110021
Dr. ANAND PATKAR

53, Jayant Apartment, Marathe Marg,
Prabhadevi, Mumbai-400025

G.P. GUPTA

Flat No. 101, Kaveri, B Wing,
Neelkanth Valley, 7th Road, Rajawadi,
Ghatkopat(East), Mumbai-400077

SHARAD UPSANI

412, Shalaka Housing Society,
Maharishi Karve Road, Mumbai-400021

ISHAN SHANKAR

Director (HR)
BHEL, BHEL House Siri Fort,
New Delhi-110049

H.W. BHNATAGAR

Director (IS&P)
BHEL, Integrated Office Complex,
Lodhi Road, New Delhi-110003

R.C. AGGARWAL

Director (Power)
BHEL, BHEL House, SIRI Fort
New Delhi-110049

C. SRINIVASAM

Director (Finance)
BHEL, BHEL House, Siri Fort
New Delhi-110049

VERENDRA KUMAR

Director (R&amp;d)
BHEL, BHEL House Siri Fort
New Delhi-110049
1.5 COMPANY BUSINESS MISSION AND OBJECTIVES

1. BUSINESS MISSION
To maintain a leading position as suppliers of quality equipment, systems and services in the field of conversion of energy, for application in the areas of electric power transportation, oil and gas exploration and industries. Utilize company’s capabilities and resources to expand business into allied areas and other priority sectors of the economy like defiance, telecommunications and electronics.

2. BUSINESS OBJECTIVES
1. GROWTH :-

To ensure a steady growth by enhancing the competitive edge of BHEL defence, telecommunication and electronics in existing business, new areas and international operations so as to fulfill national expectations from BHEL.

2. PROFITABILITY :-

To provide a reasonable and adequate return on capital employed, primarily through improvements in operational efficiency, capacity utilization, productivity and generate adequate internal resources to finance the company’s growth.

3. CUSTOMER FOCUS :-

To build a high degree of customer confidence by providing increased value for his money through international standards of product quality, performance and superior services.

4. PEOPLE ORIENTATION :-

To enable each employee to achieve this potential, improve capabilities, perceive his role and responsibilities and participate and contribute positively to growth and success of the company. To invest in human resources continuously and be alive to their needs.

5. TECHNOLOGY :-

Achieve technological excellence in operations by development of indigenous technologies and efficient absorption and adaptations of imported technologies to suit business need and priorities and provide the competitive advantage to the company.

6. IMAGE :-

To fulfill the expectations which stakeholders like government as owner, employees, customers and the country at large have from BHEL.
1.6 BUSINESS SECTORS :-

BHEL’s operations are organized around three business sectors, mainly power, industry and international operations. This enables BHEL to have a strong customer’s orientation, to be sensitive to his needs and respond quickly to the changes in the market.

1. POWER SECTORS :-

Power is the core sector of BHEL and comprises of thermal, nuclear gas, diesel and hydro business. Today BHEL supplied sets, accounts for nearly 66% of the total installed capacity in the country as against nil till 1969-70.

BHEL manufactures boilers auxiliaries, TG sets and associate controls, piping and station C & I up to 500 MW rating with technology and capability to go up to 1000 MW range. The auxiliary products high value capital equipment like bowl and tube mills, pumps and heaters, electrostatic precipitators, gravimetric feeders, valves etc.

BHEL has contracted so far around 240 thermal sets of various ratings which includes 14 power plants set up on turn key basis. Nearly 85% of world bank tenders for thermal sets floated in India have been won by the company against international competition.

BHEL has adopted the technology to the needs of the country and local conditions. This has led to the development of several technologies in house. The fluidized bed boiler that uses low graded high-ash abrasive India coal is an outcome of such an effort. With large scale availability of natural gas and the sudden increase in demand, BHEL began to manufacture gas turbines and now possesses two streams of gas turbine technology.

It has the capability to manufacture gas turbines up to 200 MW rating and custom built combined cycle power plants. Nuclear steams generators, sets and related equipment of 235 MW rating been supplied to most of the nuclear power plants in India. Production of 500 MW nuclear sets, for which orders have received.

BHEL has developed expertise in renovation and maintenance of power plant equipment besides specialized know how of residual life assessment, health diagnostic and life extensions of plants. The four power sectors regional centers at New Delhi, Chennai, Kolkata and Nagpur will play role in giving a thrust to this business and focus BHEL’s efforts in this area.

2. INDUSTRY SECTORS :-

BHEL is a major producer of large size thyristor devices. The products include centrifugal compressors, high speed industrial drive turbines, industrial boilers and auxiliaries, waste heat recovery boilers, gas turbines, electric motors, drives, and control equipments, high voltage transformers, switch gears and heavy castings and forgings.
Company in India with the capability to make simulators for power plants, defense industrial process plants and other applications. An entry has been made in aviation industry for which BHEL has set up facilities and is now producing two sweater aircraft.

### 1.7 TECHNICAL COLLABORATIONS

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>COLLABORATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Sets, Hydro Sets, Motors &amp; Control Gears.</td>
<td>Prommash expert RUSSIA</td>
</tr>
<tr>
<td>Bypass &amp; Pressure Reducing Systems SWITZERLAND</td>
<td>Sulzer Brother Ltd.</td>
</tr>
<tr>
<td>Electronic Automation System for</td>
<td>Semen’s AG.</td>
</tr>
<tr>
<td>Steam Turbine &amp; Generators</td>
<td>GERMANY</td>
</tr>
<tr>
<td>Francis Type Hydro Turbines CANADA</td>
<td>General Electric</td>
</tr>
<tr>
<td>Moisture Separator Reheaters GERMANY</td>
<td>Baloke Duerr</td>
</tr>
<tr>
<td>Christmas Trees &amp; Conventional Well Head Assemblies</td>
<td>National Oil Well USA</td>
</tr>
<tr>
<td>Steam Turbines, Generators and Axial Condensers</td>
<td>Semen’s AG. GERMANY</td>
</tr>
<tr>
<td>Cam Shaft Controllers and Traction’s Current Control Units</td>
<td>Semen’s AG. GERMANY</td>
</tr>
<tr>
<td>HDVC SWEDEN</td>
<td>ABB</td>
</tr>
<tr>
<td>Programmable Controls SWITZERLAND</td>
<td>ABB</td>
</tr>
<tr>
<td>Gas Turbines USA</td>
<td>General Electric Co.</td>
</tr>
<tr>
<td>Tube Mills FRANCE</td>
<td>Stien Industries</td>
</tr>
<tr>
<td>Dry Type Transformers GERMANY</td>
<td>May &amp; Christie</td>
</tr>
</tbody>
</table>
1.8 DIVISIONS OF BHEL
There are 20 Divisions of BHEL, they are as follows:
1. HEEP, Hardwar
2. HPEP, Hyderabad
3. HPBP, Tiruchy
4. SSTP & MHD, Tiruchy
5. CFFP, Hardwar
6. BHEL, Jhansi
7. BHEL, Bhopal
8. EFDP, Bangalore
9. ISG, Bangalore
10. ED, Bangalore
11. BAP, Ranipet
12. IP, Jagdishpur
13. IOD, New Delhi
14. COTT, Hyderabad
15. IS, New Delhi
16. CFP, Rudrapur
17. HERP, Varanasi
18. Regional Operations Division ARP, New Delhi
19. TPG, Bhopal
20. Power Group (Four Regions and PEF)

1.9 MAJOR COMPETITORS OF BHEL
1. Ansaldo Italy
2. Asea Brown Boueri Switzerland
3. Beehtel USA
4. Block & Neatch USA
5. CNMI & EC China
6. Costain U.K.
7. Electrim Poland
8. Energostio Russia
9. Electro Consult Italy
10. Framycop Tosi France
11. Fuji Japan
12. Gec Alsthom U.K.
13. General Electric USA
14. Hitachi Japan
15. LMZ Russia
16. Mitsubishi Japan
17. Mitsui Japan
18. NEI U.K.
19. Raytheon USA
20. Rolls Royce Germany
21. Shanghai Electric Co China
22. Siemens Germany
23. Skoda Czechoslovakia
24. Technopromoshexport Russia
25. Toshiba Japan
26. Westinghouse USA
1.10 **CUSTOMER OF BHEL's PRODUCTS:**

1. **DOMESTIC:**

PUNJAB ATATE ELECTRICAL BOARD (PSEB)
UTTAR PRADESH STATE ELECTRICITY BOARD (UPSEB)
NATIONAL THERMAL POWER CORPORATION (NTPC)
APPOLO TYRES
ABB
NATIONAL HYDEL POWER CORPORATION (NHPC)
ANDHRA PRADESH STATE ELECTRICITY BOARD (APSEB)
WEST BENGAL STATE ELECTRICITY BOARD (WBSEB)
BIHAR STATE ELECTRICITY BOARD (BSEB)
INDIAN OIL CORPORATION (IOC)
MADHYA PRADESH STATE ELECTRICITY BOARD (MPSEB)
SAIL
BCCL
ORRISA STATE ELECTRICITY BOARD (ORSEB)
KARNATAKA STATE ELECTRICITY BOARD (KSEB)
BIRLA CEMENT
BIRLA TYRES BPKARO STEEL PLANT
GRASIM INDUSTRIES GOA SHIP YARD
HARYANA STATE ELECTRICITY BOARD (HSEB)
HIMACHAL PRADESH STATE ELECTRICITY BOARD (HPSEB)
DLW, VARANASI
INDIAN NAVY
DELHI VIDYUT BOARD
DEPTT. OF ATOMIC ENERGY
ASSAR OIL
SIEMENS, NEW DELHI
ONGC
L&T
KIRLOSKAR
JK CEMENT
SCOOTER INDIA LTD

2. **INTERNATIONAL:**

M/S EBARA CORPORATION, JAPAN
M/S ZEECO INCORPORATION, USA
SIMMCO INTERNATIONAL
SIEMENS, GERMANY
SIEMENS, SINGAPORE
BAJU PROJECT, IRAQ
KYCR COIL INDUSTRIES LTD, BANGLADESH
3. **AWARDS WON:-**

(i) NATIONAL EXPORT AWARD 1993-94

By Ministry of Commerce for Excellence Export performance.

(ii) ALL INDIA TOP EXPORTERS SHEILD

By Engineering export Promotion Council For Outstanding Export Performance.

(iii) DSIR AWARD 1994

For Engineering Works.

(iv) PM’S SHRAM VEER AWARD 1994

To Shree R.C. Malhotra of BHEL Hardwar

(v) SUMAN SHARMA AWARD 1994

By Institution of Engineers (India) for Outstanding Women’s Design Engineer- To Smt. Parul Bala of BHEL, Hardwar.

1.11 **SWOT ANALYSIS OF BHEL**

-S-T-R-E-N-G-T-H-S-

➢ Low cost producer of quality equipment due to cheap labour and fully depreciated plants.

➢ Flexible manufacturing set up.

➢ Big entry barrier due to high replacement cost of its manufacturing facilities.

➢ Comprehensive turn key experience from product design to commissioning.

-W-E-A-K-N-E-S-S-E-S-

➢ High working capital requirement due to its exposure to cash starved SEBs.

➢ Inability to provide project financing.
High expected growth in power sector (7000MW annum needs to be added).

High Growth forecast in India’s index of industrial production would increase demand for industrial equipment such as motors & compressors.

Technology suppliers are becoming competitors with the opening up the Indian economy.

Fall in Global power equipment prices can effect profitability.

BHEL today has become the largest engineering plant employing total 72,000 employees. Its headquarters is located at Delhi and there are 14 manufacturing units.

1.12 MANUFACTURING UNITS OF BHEL

1. MAIN UNITS

<table>
<thead>
<tr>
<th>City</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhopal</td>
<td>Heavy Electrical Plant.</td>
</tr>
<tr>
<td>Hardwar</td>
<td>Heavy Electrical Equipment Plant.</td>
</tr>
<tr>
<td>Hyderabad</td>
<td>Heavy Power Equipment plant.</td>
</tr>
<tr>
<td>Tiruchy</td>
<td>High pressure Boiler Plant.</td>
</tr>
</tbody>
</table>

2. SECOND GENERATION UNITS

<table>
<thead>
<tr>
<th>City</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhansi</td>
<td>Transformer Plant &amp; Locomotive Plant.</td>
</tr>
<tr>
<td>Hardwar</td>
<td>Central Foundry and Forge Plant.</td>
</tr>
<tr>
<td>Tiruchy</td>
<td>Seamless Steel Tube Plant.</td>
</tr>
</tbody>
</table>

3. UNITS THROUGH ACQUISITION AND MERGER

<table>
<thead>
<tr>
<th>City</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore</td>
<td>Electronics Division.</td>
</tr>
<tr>
<td>Tiruchy</td>
<td>Electro Porcelain Division.</td>
</tr>
</tbody>
</table>

4. NEW MANUFACTURING UNITS

<table>
<thead>
<tr>
<th>City</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipet</td>
<td>Boiler Auxiliaries Plant.</td>
</tr>
<tr>
<td>Jagdishpur</td>
<td>Insulator Plant.</td>
</tr>
<tr>
<td>Goundwal</td>
<td>Industrial Valve Plant.</td>
</tr>
<tr>
<td>Rudrapur</td>
<td>Component &amp; Fabrication Plant.</td>
</tr>
<tr>
<td>Varanasi</td>
<td>Heavy Equipment Repair Plant.</td>
</tr>
<tr>
<td>Bombay</td>
<td>Electrical Machine Repair Shop.</td>
</tr>
</tbody>
</table>
BHEL’s growing concern to meet the challenging needs of the nation has taken it beyond power into the total gamut of energy, industry and transportation. In each of these fields BHEL is able to offer a total service. Its manufacturing capability is supported by a corporate R&D divisions at Secunderabad that works closely with the R&D cells at various units and a welding Research Institute at Tiruchirapalli.

A dynamic organization is one which keeps its aim high and adopts itself quickly to changing environment. So here we are in BHEL. The objectives of the company have been redefined in the corporate plant for the 90’s.

5. **BUSINESS MISSION**

To maintain a leading position as supplier of quality equipments, system and services in the fields of conversion, transmission, utilization and conservation of energy for application in the areas of electric, power, transportation, oil, gas exploration and industries.

6. **GROWTH**

To ensure a steady growth by enhancing the competitive edge of BHEL in existing business new areas and international market so as to fulfill national expectations from BHEL.

7. **PROFITABILITY**

To provide a reasonable and adequate return on capital employed, primarily through improvements in operational efficiency, capacity, utilization and productivity and generate adequate internal resources to finance the companies growth.

8. **FOCUS**

To build a high degree customer confidence by providing increased value or his money through international standards of product quality performance and superior customer service.

9. **PEOPLE ORIENTATION**

To enable each employee to achieve his potential, improvements his capabilities, perceive his role and responsibilities and participates and contribute positively to the growth and success of the company. To invest in human resources and continuously and be alive to heir needs.

10. **TECHNOLOGY**

To achieve technological excellence in operations by developments of indigenous technologies and efficient absorption and adaptation of imparted technologies to suit business and priorities and provide competitive advantage to the company.
11. IMAGE
To fulfill the expectation which stock holders like Government as owner, employees, customers and the country at large have from BHEL

1.13 BUSINESS AREAS
Production in BHEL is very wide. All areas are covered in the following details.

1. POWER
Provide a gamut of equipment for Thermal, Hydro and Nuclear Power plant range includes products and systems for power generation, transmission and utilization.

2. TRANSMISSION
BHEL manufactures transmission equipment for all voltage rating including the 400 kv class transformer, switchgear, control and relay panel, insulators, capacitors and other substation equipment.

3. INDUSTRY
Offers a comprehensive range of electrical, electronic and mechanical equipment for a host of industries like fertilizers, refineries, paper, sugar, rubber, cement, coal aluminum and mining.

4. TRANSPORTATION
BHEL offers a variety of transportation to meet the growing needs of the country. 56% of Indian railways are equipped with BHEL manufactured traction equipment. Underground metro also runs on drives and controls supplied by BHEL. Locomotives manufacture has also been taken up for pollution free transportation.

5. OIL AND GAS
Equipment for oil and gas exploration and transportation is manufactured by BHEL. Range covers super deep drill rigs, Mobile and desert rigs with matching draw works and hoisting equipment.

6. NONCONVENTIONAL ENERGY
A vital role in helping to harness the vast renewable source of solar, wind and biogas energy. BHEL has supplied several water heating systems, wind mills, biogas generators and photo voltaic systems.

7. TELE COMMUNICATION
BHEL entered the fields of telecom with electronic PABX system based on indigenous technology from C-DOT.
8. MANUFACTURING TECHNOLOGY
Manufacturing plants spread over different parts of the country, have unique manufacturing and testing facilities. CNC machines, turbine blade shapes, system banner, 8000-ton Hydraulic press, Heavy duty lathe milling machines and many more.

9. RESEARCH AND DEVELOPMENT
A highly talented and experienced teams of scientists form the back done of BHEL R&D. A few accomplishments are
- Direct ignition of pulverized coal (DIPC).
- Magnetic Hydro Dynamics.
- Aerostatic Bearing.

10. AFTER SALES SERVICE
BHEL has 9 organized service centers geographically distributed throughout the country. It also undertakes power plants renovation and rehabilitation jobs.

11. EXPORTS
The organization commitment to quality has earned recognition from over 50 countries export order range equipment to turn key projects to consultancy services.

1.14 ACTIVITY PROFILE OF BHEL
1. POWER SECTOR PRODUCT
❖ Thermal sets and auxiliaries.
❖ Steam generators and auxiliaries.
❖ Industrial fans.
❖ Electrostatic precipitators.
❖ Regenerative Air pre heaters.
❖ Nuclear power equipment.
❖ Hydro sets and auxiliaries.
❖ Simulators for power plant.
❖ Motors.
❖ Transformers.
❖ Rectifiers.
❖ Pumps.
❖ Heat exchangers.
❖ Capacitors.
❖ Porcelain/ ceramics insulators.
❖ Seamless steel tubes.
❖ Castings and forgings.
❖ Waste heat recovery boilers.
❖ Bowl mills & Tube Mills
❖ Gravimetric feeders.
❖ Distributed Digital Control for Power Stations.
❖ Valves.
❖ Switch gear.
❖ Control gear.
❖ Bus Ducts.
2. **SYSTEMS/SERVICES**
   - Turn key utility power stations.
   - Data acquisition systems.
   - Power system.
   - HVDC Transmission systems.
   - Erection and commissioning.
   - Modernization rehabilitation and operation.
   - Maintenance Services.
   - Consultancy Services.
   - Switch yards & Sub Stations.
   - Shunt & Series compensation systems.
   - Combined cycle power plants.

3. **TRANSPORTATION SECTOR**
   - Diesel Electronic generator.
   - AC/DC locomotives.
   - DC locomotives and loco shunters.
   - Traction system railway
   - Electric trolley buses.
   - Trainer air craft
   - Battery operated passengers vans.

4. **INDUSTRY SECTOR**
   - Boilers
   - Industrial valves
   - T.G. sets
   - Power devices
   - Solar cells
   - Photo-voltaic panels
   - Gas turbines
   - Centrifugal compressors
   - Drive turbines
   - Oil rigs
   - Blow out preventers
   - Wind mills
   - Control system for electric drives
   - EPABX
   - Marine turbines
   - Solar water heating systems
   - Industrial fans
   - Energy meters
   - Rural automatic exchange
   - Bio gas operated engines
   - Defence equipments

1.15 **VISION, MISSION & VALUES**

A world class, innovative competitive and profitable engineering enterprise providing total business solutions.
1. MISSION
To be the leading Indian engineering enterprise providing quality products, system
and services in the fields of energy, transportation, Industry, infrastructure and other
potential areas.

2. VALUES
❖ Meeting commitments made to external & internal customers
❖ Foresters learning, creativity and speed of response
❖ Respect for dignity and potential of individuals
❖ Loyalty and pride in the company
❖ Team playing
❖ Zeal to excel
❖ Integrity and fairness in all matters

1.16 BHEL’s CONTRIBUTION TO INDUSTRY

<table>
<thead>
<tr>
<th>Industry</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refinery</td>
<td>Since inception in 1982 the Industry Sector business has grown at an impressive rate and today contributes over half of BHEL’s turnover.</td>
</tr>
<tr>
<td>Petrochemical</td>
<td>BHEL today supplies all major equipment for the industries. AC/DC machines, alternators, centrifugal compressors, special reactor columns,</td>
</tr>
<tr>
<td></td>
<td>heat exchanges, pressure vessels, gas turbine based cogeneration plants, steam turbines and generators, complete range of steam generators for</td>
</tr>
<tr>
<td></td>
<td>process industries, diesel power plants, solar water heating systems, photovoltaic systems etc.</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>In the transportation field BHEL range covers AC locomotives, AC/DC dual voltage locos, diesel electric shunting locos, traction motors &amp;</td>
</tr>
<tr>
<td></td>
<td>transformers, electrics for AC, DC and dual voltage EMUs, diesel power car and diesel electric locos. BHEL is the leader in the power transmission</td>
</tr>
<tr>
<td></td>
<td>field with equipment up to the highest system voltage, power &amp; instrument transformers, shunt reactors, insulators, energy meters, substations,</td>
</tr>
<tr>
<td></td>
<td>static compensation schemes as well as high voltage DC transmission system (HVDC).</td>
</tr>
<tr>
<td>Cement</td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steel</td>
</tr>
<tr>
<td></td>
<td>Aluminum</td>
</tr>
<tr>
<td></td>
<td>Mining</td>
</tr>
<tr>
<td></td>
<td>Railways</td>
</tr>
<tr>
<td></td>
<td>Urban Transport</td>
</tr>
<tr>
<td></td>
<td>New Business</td>
</tr>
</tbody>
</table>
1.17 **QUALITY**

Quality in fact of life in BHEL hardware. It is a watch work whether in coming material in process, machining, assembly or testing. Quality assurance system, quality plant, and field quality assurance are aids to tool quality concept. A large number of sophisticated testing and measuring instruments including CNC-3-D coordinate measuring machine, non-destructive testing facilities like X-ray, gamma ray, ultrasonic, magnetic particle inspection are being extensively used. As a part of its journey in attaining excellence in quality management BHEL (HEEP) hardware has also received global recognition with the award of ISO-9001 certificate by bureau varieties quality international for all its products and services.

The product, which had received ISO-9001 recognition, include steam turbine and turbo generators, hydro turbines, hydro generator, gas turbine, condensers heat exchangers, AC/DC motors and associated control panels.

1.18 **BHEL’s Performance Highlights 2002-03**

Press conference address by Mr. K.G. Ramachandran, Chairman & Managing Director, BHEL, on the company’s performance during 2002-03: 1st April 2003.

<table>
<thead>
<tr>
<th>Particulars</th>
<th>2001-2002</th>
<th>2002-2003 (Provisional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>Rs. 72870 Million</td>
<td>Rs. 75100 Million</td>
</tr>
<tr>
<td>Profit before tax (PBT)</td>
<td>Rs. 6630 Million</td>
<td>Rs. 7600 Million</td>
</tr>
<tr>
<td>Net profit (PAT)</td>
<td>Rs. 4680 Million</td>
<td>Rs. 5110 Million</td>
</tr>
<tr>
<td>Orders Inflow</td>
<td>Rs. 98550 Million</td>
<td>Rs. 112480 Million</td>
</tr>
<tr>
<td>Value added per employee</td>
<td>Rs. 6.47 lakhs</td>
<td>Rs. 6.90 lakhs</td>
</tr>
<tr>
<td>Earning per Share (EPS)</td>
<td>Rs. 19.12</td>
<td>Rs. 20.88</td>
</tr>
</tbody>
</table>

- Highest-ever order inflow of Rs. 112480 Million in a single year, despite intensely competitive national & international markets.
- Spectacular successes in overseas business.

Single largest export order of Rs. 11280 Million for a 600 MW turnkey Gas Based power plant from Libya-the highest value overseas order on any capital goods manufacturing company in India.

- First ever overseas order for Advanced class Gas Turbines from Oman.
- First ever contract from South East Asia (Indonesia) for Co-generation project. Maiden order for Hydro power equipment from Taiwan.

New benchmark created in execution of power project: Synchronization of a 500 MW set a Talcher STPS in just 38 months.

1000Mw Simhadri TPS commissioned in turnkey basis, in just 45 month-A National Record.

210MW set at Ralchur TPS commissioned in a record time of 25 months.
Best ever Equipment Performance.

- All-time high PLF of BHEL thermal sets at 74% more than the national average.
  75% of the total power generated in the country was contributed by BHEL sets.

R&D Efforts.

India's first series compensation for reducing transmission losses and enhancing power availability of highest rating (400KW) transmission systems. Successfully commissioned.

Other Milestones:

## 1.19 FIVE YEARS SUMMARY

(Rs. In million)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EARNING SALES OF PRODUCT &amp; SERVICES TO CUSTOMERS.</td>
<td>72866</td>
<td>63478</td>
<td>66340</td>
<td>67947</td>
<td>64713</td>
</tr>
<tr>
<td>OTHER INCOME.</td>
<td>5046</td>
<td>5350</td>
<td>4959</td>
<td>5824</td>
<td>3785</td>
</tr>
<tr>
<td>CHANGE IN STOCK</td>
<td>(-373)</td>
<td>2507</td>
<td>(-237)</td>
<td>823</td>
<td>(-133)</td>
</tr>
<tr>
<td>TOTAL EARNING MATERIALS</td>
<td>77539</td>
<td>71335</td>
<td>71062</td>
<td>74594</td>
<td>68365</td>
</tr>
<tr>
<td>PERSONAL PAYMENT.</td>
<td>33068</td>
<td>30496</td>
<td>28120</td>
<td>30495</td>
<td>28382</td>
</tr>
<tr>
<td>OTHER mfg. Adm. &amp; selling</td>
<td>14446</td>
<td>21702</td>
<td>11330</td>
<td>12416</td>
<td>9525</td>
</tr>
<tr>
<td>OPERATING PROFIT.</td>
<td>20735</td>
<td>14180</td>
<td>21206</td>
<td>20595</td>
<td>18403</td>
</tr>
<tr>
<td>DEPRECIATION GROSS PROFIT</td>
<td>68249</td>
<td>66378</td>
<td>60656</td>
<td>63506</td>
<td>56310</td>
</tr>
<tr>
<td>INTEREST PROFIT</td>
<td>1692</td>
<td>1578</td>
<td>1535</td>
<td>1432</td>
<td>1242</td>
</tr>
<tr>
<td>BEFORE TAX. PROFIT</td>
<td>7598</td>
<td>3379</td>
<td>8871</td>
<td>9656</td>
<td>10813</td>
</tr>
<tr>
<td>PROVISION FOR TAX.</td>
<td>970</td>
<td>438</td>
<td>217</td>
<td>333</td>
<td>596</td>
</tr>
<tr>
<td>AFTER TAX. DIVIDEND</td>
<td>6628</td>
<td>2941</td>
<td>8654</td>
<td>9323</td>
<td>10217</td>
</tr>
<tr>
<td>(Incl. Dividend Tax)</td>
<td>1949</td>
<td>(-185)</td>
<td>2660</td>
<td>3877</td>
<td>3022</td>
</tr>
<tr>
<td>RETAINED</td>
<td>4679</td>
<td>3126</td>
<td>5994</td>
<td>5446</td>
<td>7195</td>
</tr>
<tr>
<td>2. WHAT THE COMPANY OWNED GROSS BLOCK INCL. CAPITAL WIP. LESS ACC-</td>
<td>979</td>
<td>809</td>
<td>855</td>
<td>679</td>
<td>673</td>
</tr>
<tr>
<td></td>
<td>32387</td>
<td>30652</td>
<td>28833</td>
<td>27306</td>
<td>24871</td>
</tr>
<tr>
<td></td>
<td>20054</td>
<td>18614</td>
<td>17230</td>
<td>15948</td>
<td>14651</td>
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</tbody>
</table>
UMLATED DEPRECIATION & LEASE ADJ
NET BLOCK (Incl. capital WIP).
INVESTMENTS.
CURRENT RENT ASSETS & LOANS AND ADVANCES

<table>
<thead>
<tr>
<th></th>
<th>12333</th>
<th>12038</th>
<th>11603</th>
<th>11358</th>
<th>10220</th>
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<tr>
<td></td>
<td>103</td>
<td>103</td>
<td>103</td>
<td>151</td>
<td>241</td>
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<td></td>
<td>80538</td>
<td>75762</td>
<td>70190</td>
<td>65385</td>
<td>60282</td>
</tr>
</tbody>
</table>

TOTAL NET ASSETS.

3. WHAT THE COMPANY OWNED
BORROWED WINGS
CURRENT LIABILITIES AND PROVISIONS

<table>
<thead>
<tr>
<th></th>
<th>6658</th>
<th>10256</th>
<th>2407</th>
<th>1701</th>
<th>3896</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47159</td>
<td>41630</td>
<td>45911</td>
<td>44368</td>
<td>40897</td>
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</tbody>
</table>

4. NET WORTH OF THE COMPANY
SHARE RESERVE & SURPLUS.
DEFERRED REVENUE EXPENDITURE

<table>
<thead>
<tr>
<th></th>
<th>2448</th>
<th>2448</th>
<th>2448</th>
<th>2448</th>
<th>2448</th>
</tr>
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<tr>
<td></td>
<td>42248</td>
<td>35856</td>
<td>33539</td>
<td>28400</td>
<td>23633</td>
</tr>
<tr>
<td></td>
<td>-2493</td>
<td>-2286</td>
<td>-2409</td>
<td>-23</td>
<td>-131</td>
</tr>
</tbody>
</table>

NET WORTH (Less-DRE)

|            | 42203 | 36018 | 33578 | 30825 | 25950 |

5. VALUE ADDS.

|            | 30740 | 26603 | 28320 | 29810 | 28867 |

6. CAPITAL EMPLOYED

|            | 45815 | 46274 | 35985 | 32526 | 29846 |

7. RATIO OPERATING PROFIT TO NET ASSETS(%) 

|            | 10.3% | 5.8%  | 13.1% | 15.0% | 17.1% |

GROSS PROFIT TO CAPITAL EMPLOYED(%) 

|            | 16.5% | 8.2%  | 25.9% | 30.9% | 37.5% |

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1.20 SECTIONS OF BHEL JHANSI UNIT

BHEL has many departments. Production departments are separate and the Administrative/ departments are separate.

Broadly BHEL Jhansi has two production categories :-
   1. Transformer Section
   2. Locomotive Section

1. TRANSFORMER SECTION

Manufacturing of the various types of Transformers takes place in number of shops which are termed as days.
   1. Traction Transformer
   2. Alternating Current Electric Multiple unit.
   3. Rectifier Transformer.
   4. Furnaces.
   5. Electrostatic Precipitation Transformer.
   6. Freight Transformer.
   7. Dry type transformer :- The Unique modern machine used in this section are :-
      ✤ Milling Machine.
      ✤ Radial & Drilling Machine.
      ✤ CNC Flame cutting machine.
      ✤ Hydraulic cutting machine.
      ✤ Lathe machine.
      ✤ Horizontal boring machine.
      ✤ Universal type facing machine.

In the transformer plant there are ten days.

Bay-0, 1 & 2 These are fabrication shops established in 1978 and mainly deals with fabrication of transformers & locomotives.

Bay-3 It is split into two parts one half is the machine shop and the second half is for the bus ducts. Bus duct are used as connections between generator and transformers. There are two types of bus duct manufacturing there.

1. Segregated Phase Bus duct: All the three phases are combined. It is used for small rating.
2. Isolated Phase Bus duct: All the three phases are isolated. Used un
Thermal power plant to remove carbon from the smoke coming out of chimney.

3. Instrument Transformer: There are two types of instrument transformers:-
   b. Voltage Transformer.

Bay-9 This is one of the largest bay in the unit engaged in the assembly of power and rectifier transformer. Time taken to assemble a transformer is approximately 45 days.

1.21 THE PRODUCT PROFILE OF BHEL JHANSI UNIT

1. Power transformer up to 220 kv class 250 mva.
2. Special transformer up to 110 kv rating.
3. ESP transformer 80 kv 1200 ma.
4. Freight loco transformer 3460 to 5400 kva.
5. ACEMU transformer up to 1000 kva 25 kv.
6. Dry type transformers up to 3150 kva ratings.
7. Busduct up to 15.75 kv generating voltage.
8. Instrument transformer up to (VT & CT) up to 220 kv class
9. Diesel electric locomotive up to 2600 HP rating.
10. Broad guage AC electric locomotive ( WAG-5 HB model) 25 KV 4000 HP.
11. AC/DC locomotive of 5000 HP.

1.22 GROWTH OF PRODUCTION AND MILESTONES

<table>
<thead>
<tr>
<th>YEAR</th>
<th>OUTPUT</th>
<th>MILESTONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. (CRORES)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976-77</td>
<td>0.53</td>
<td>Start of instrument transformer production.</td>
</tr>
<tr>
<td>1977-78</td>
<td>3.49</td>
<td>Start of traction transformer and power ( up to 132 kv)</td>
</tr>
<tr>
<td>1978-79</td>
<td>7.56</td>
<td>Start of HFTT type freight loco trfr.</td>
</tr>
<tr>
<td>1979-80</td>
<td>7.02</td>
<td>Commissioning of 2+500 kv DG set (due to power cuts)</td>
</tr>
<tr>
<td>1980-81</td>
<td>15.74</td>
<td>Start of ESP transformer.</td>
</tr>
<tr>
<td>1982-83</td>
<td>28.54</td>
<td>Achieved breakeven.</td>
</tr>
<tr>
<td>1983-84</td>
<td>37.42</td>
<td>Start of Bus duct.</td>
</tr>
<tr>
<td>1984-85</td>
<td>38.61</td>
<td>Start of Dry type transformer.</td>
</tr>
<tr>
<td>1985-86</td>
<td>43.67</td>
<td>Repowering of DESI started.</td>
</tr>
<tr>
<td>1986-87</td>
<td>51.87</td>
<td>Start of new DESI manufacturing.</td>
</tr>
<tr>
<td>1987-88</td>
<td>65.29</td>
<td>Manufacturing facilities for AC.</td>
</tr>
<tr>
<td>1988-89</td>
<td>109.41</td>
<td>Crossed 100 crore target.</td>
</tr>
</tbody>
</table>

49
<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989-90</td>
<td>109.41 Crossed 100 crore target.</td>
</tr>
<tr>
<td>1990-91</td>
<td>128.10 Successful designing and manufacturing of 450 HP 3 Axel DESI CCI.</td>
</tr>
<tr>
<td>1991-92</td>
<td>155.82 Manufacturing of first 2600 HP DESI for NTPC.</td>
</tr>
<tr>
<td>1992-93</td>
<td>215.61 Successful design and development of 5000 HP thyristor control locomotive.</td>
</tr>
<tr>
<td>1993-94</td>
<td>225.05 Unit has been awarded ISO 9001.</td>
</tr>
<tr>
<td>1994-95</td>
<td>215.00 240 MVA transformer produced first time.</td>
</tr>
<tr>
<td>1995-96</td>
<td>238.00 AC/DC locomotive first time in India.</td>
</tr>
<tr>
<td>1996-97</td>
<td>328.43 100(^{th}) loco manufactured.</td>
</tr>
<tr>
<td>1997-98</td>
<td>435.60 250 MVA transformer produced first time.</td>
</tr>
<tr>
<td>1999-2000</td>
<td>219.00 { \begin{align*} P &amp; \text{ &amp; D} \ 2000-2001 &amp; 121.00 \ 2001-2002 &amp; 168.00 \ 2002-2003 &amp; 216.00 \end{align*} }</td>
</tr>
</tbody>
</table>
1.24  COMPETITORS & CUSTOMERS OF BHEL, JHANSI

COMPETITORS
1.  Of Transformer Commercial
    GEC, Crompton Greaves Ltd., EMCO, TELK, ABB, etc.
2.  Of Locomotive Commercial
    Chittaranjan Locomotive Works (CLW)

CUSTOMERS
1.  Public Sector
    National Thermal Power Corporation (NTPC), all State Electricity Boards (SEBs) and
    Indian Railways.

2.  Private Sector
    Ispat Industries Ltd., Ahmedabad Electricity Board, BSES, Crompton Greaves Ltd.,
    Hindustan Aluminum Company (Hindalco), Indian Aluminum Company (Indalco),
    Bihar Caustics, Kirloskar Electric, Essar, Siemens etc.
1.26 ORGANIZATION STRUCTURE OF BHEL HARDWAR

The following chart shows the diagram of the organizational structure of BHEL Hardwar. The various units the Hardwar organization is divided into.

BHEL, HARDWAR

- HEEP
  - Generator Manufacture
  - Turbine Manufacture
  - Electronics Machines & Control panels
  - Condensers Manufacturing Fabrication & services
  - Engineering & Commercial coordination
    - Productivity Service & computerisation
    - Management service
    - Planning & development
    - Quality management

- CFFP
  - Steel costing Manufacture
  - Steel forcing Manufacture
  - Water pollution
  - Commercial
    - Noise pollution
    - Solid & waste pollution
    - Technical service & Quality management

- PCRI
  - Air pollution
2. Labour Welfare

Labour welfare has been defined in several ways and is, therefore, understood in various ways in various countries. A precise definition of the term is thus somewhat difficult as Mr. Arthur James Todd remarks aptly: "A series of sharply diverse opinions exist on the motives and merits of industrial welfare work." Broadly speaking, measures and activities undertaken by the State, employers and associations of workers for the improvement of workers' standards of life and for the promotion of their economic and social well-being are labeled as welfare work. Thus welfare work may be defined as work for improving the healthy safely, general well being and the industrial efficiency of the workers beyond the minimum standards laid down by the Factories Act and other labour legislation. According to a report of the International Labour Organization. Workers, welfare should be understood as meaning such services, facilities and amenities which may be established in or in the vicinity of undertaking to enable the persons employed in them to perform their work in healthy, congenial surroundings and provided with amenities conducive to good health and high morale. As a matter of fact, The whole field of welfare is one in which much can be done to combat the sense of frustration of the industrial worker, to relieve him of personal and family worries, to improve his health, to afford him a means of self-expression, to offer him some sphere in which he can excel all others, to help him to a wider conception of life. It will thus be seen that the term Labour Welfare or Welfare Work is one which lends itself to various interpretations. As observed by the Royal Commission on Labour in India much earlier, It is a term which must necessarily be elastic, bearing a somewhat different interpretation in one country from another, according to the different social customs, the degree of industrialization and the educational development of the worker. The significance of the term welfare thus varies from country to country.

A distinction is sometimes drawn between Welfare work and Social Work. In a note on Welfare work in the Encyclopedia of the Social Science it has been stated that The term is used to describe the Voluntary efforts of an employer to establish, within the existing industrial system, working and sometimes living and cultural conditions of his employees beyond what is required by law, the customs of industry and the conditions of the market. It has therefore, been pointed out by H.L. Herring, that Welfare work has one very fundamental distinction from social work. The latter implies no relation between employer and employee, but rather suggests the activities of a State department or a volunteer organization. Welfare work is always the work of an employer. Social work means to most people advice in the solution of individual or family problems through any possible adjustment. Thus welfare work is distinguished from social work in so far as the former relates to work done by an employer voluntarily for the moral and material betterment of his employees whereas social work done by the State or any social organization for the welfare of the workers. It is, however, unnecessary to draw and distinction between these two terms. The capitalist employers are often so deeply influenced by the profit-motive that it is rather difficult to believe that they can, in general, of their own accord, spend considerable or any amount of money for the betterment of the lot of their employees. Under such conditions it is the prime concern of the State and social organizations to make an effort for the weak, poor and exploited section of the society. Welfare work may, therefore, be considered to include anything done for the intellectual physical, moral and economic betterment of the workers whether by employers, by Government or by other agencies over and above what is laid down by law or what

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is normally expected as part of the contractual benefits for which the workers may have bargained. Thus, as suggested by the Labour Investigation Committee, 1946, under this definition we may include housing, medical and educational facilities, nutrition (including provision of canteens), facilities for rest any recreation, co-operative societies, day nurseries and crèches, provision or sanitary accommodation, holidays with pay, social insurance measures undertaken voluntarily by employers alone or jointly with workers, including sickness and maternity benefit schemes, provident funds, gratuities and pensions, etc. The term welfare is thus, very flexible as well as comprehensive.

2.1 Evolution of Labour Welfare:

Workers welfare, as a movement, began in the early years of the Industrial Revolution, especially in the Western countries. In the present century the growth of labour welfare is to a great extent due to the growth of industrialization and acceptance of modern techniques. Considerable impetus was given to the movement by the two World Wars, as part of industry's efforts to maximize production. Thus modern welfare may be said to have been the outcome of the movement for better and more efficient management in industry including the human angle. According to an ILO publication, the all-round acceptance that the concept of labour welfare has been mainly due to:

1. The need to provide a better life for the workers was dictated by the necessity to maintain the goodwill of the large and rather freshly recruited war-time labour force and to gear them to increased production.

2. The industrial expansion in the advanced countries of the world and the concomitant process of mass production and mass-selling and lead to the working classes as a source of power. Steps to promote labour welfare were a direct recognition of the new situation.

3. There was also the influence of the researches into scientific management and industrial psychology, which presented abundant evidences on the importance of worker as a human being and a total presented abundant evidences on the importance of worker as a human being and a total personality.

4. It has been a matter of public and government concern, especially in the economically less developed countries, over the amelioration of the working and living conditions of industrial workers, and measures in this regard, were being taken in many countries as an aspect of national policy. The general acceptance that labour welfare has found at the present time has been preceded by a gradual evolution in different directions in different countries. Organized labour was suspicious of it as evidence of paternalism and welfare work obtained the sympathy of labour not until the content of welfare work had become integrated into the management structure and the disagreeable connotations attached to the term were discarded.
2.2 Classification of Welfare Work:

Welfare work may be classified in various ways. Firstly, it may be classified into the following three categories: (1) Statutory Welfare Work. Some welfare work may be distinguished from other categories in that it comprises those provisions of welfare work whose observance is binding on the employers under law. With a view to maintain a minimum standard of health and safety, etc., of the workers, the Government of a country enacts certain rules under various Acts or Ordinances which have to be added by the employers in respect of their workers. Such rules may relate to certain essential working conditions, e.g., hours of work, sanitation, etc. (2) Voluntary Welfare Work. This category includes all those activities conducive to the welfare of the workers, which are undertaken by the employers themselves of their own free will. Some social organizations also undertake this type of work. (3) Mutual Welfare Work. It signifies a corporate enterprise of the workers with a view to improve their lot. Activities of the trade union, which are conducive to the welfare of their members, are included under this category.

Welfare work may be classified into two other categories: (1) welfare work inside the factory, and (2) welfare work outside the factory* or in the words *The Committee of Experts on Welfare Facilities for Industrial Workers convened by I.L.O in 1963 divided Welfare services in two groups that within the precincts of the establishment and that outside it.

Of Dr. G.M. Broughton into (1) Intra-mural welfare work including various facilities and amenities provided to the workers inside the factory, e.g., provision of drinking water, cleanliness and sanitation, canteens, crèches, medical facilities, first aid appliances, etc. and (2) Extra-mural welfare work including the provision of facilities and various amenities, outside the factory, e.g. provision of educational and recreational facilities, amusements, games and sports, housing and medical facilities, etc.

Further, a distinction may be made between welfare work relating to conditions of employment and that confined to living conditions of the workers. Work relating to hours of work, rest-pauses, wages, holidays with pay, etc., constitute the first category and the latter comprises various schemes of benefits of the workers, housing, co-operative societies, medical facilities, etc.

2.3 Some Special Aspects of Labour Welfare

Certain important aspects of labour welfare deserve mention in a more specific manner. These may be considered under the heads: canteens, crèches, entertainments and other facilities. The canteen is being increasingly recognized all over the world as an essential part of an industrial establishment, providing undeniable benefits from the point of view of health, efficiency and well-being. Some of the objects of an industrial canteen are "to introduce an element of nutritional balance into the otherwise deficient and unbalanced dietary of the workers, to provide cheap and clean food and an opportunity to relax in comfort near the place of work, to save time and trouble to workers on account of exhausting journeys to and from work after long hours in the factory and to enable them to surmount the difficulties experienced in obtaining meals or foodstuffs. In European and American countries canteens are becoming immensely popular and are looked upon as laboratories carrying on experiments in nutrition and diets, and are making rapid progress as instruments of industrial welfare. In U.K., the Factories Act 1973 requires the employers to provide mess-room accommodation while under recent orders efficient and suitable canteens where hot meals can be purchased may be ordered by the Factories Inspector to be provided in specified
factories. In India, canteens, tea stalls, refreshment rooms, etc, have been an ex-gratia affair and they hardly conform to any standards or principles. In most places where they exist, they are little more than private contractor's tea stalls supplying tea and sweets. Where foodstuffs are supplied, they are neither cheap nor good in quality while maximum of profit is the only principle of the contractor who is there by virtue of being the highest bidder for the contract. As a result either high prices are charged from the workers for the articles supplied or bad stuff is provided to them at low prices. It is, therefore, no surprise that the workers prefer to bring their own snacks with them for mid-day consumption and the canteens are not popular amongst them. That the workers are not at all averse to making use of good canteens is proved by the experience of certain employers who run them not for profit making prices. Thus the progress in respect of the canteens in industrial concerns in India has been slow. However, the Factories Act of 1948 empowers State Governments to issue rules for the provision of canteens in factories employing 250 or more workers.

The Government of India under the Factories Act has empowered the State Governments "to make rules requiring the reservation of a suitable room for the use of children under the age of six years belonging to women workers in factories employing fifty or more such workers and describing the standard of such rules and the nature of supervision to be exercised for the children. The States have availed themselves of this rule making power but the employers had been rather slow in observing the requirements in regard to the provision of crèches even in States where the law had required it. The tendency has been to conform only to the letter of the law and to break the spirit of it. Some enlightened employers have, no doubt, crèches that are well-equipped and adequately staffed. The importance of crèches is very great and the position can be improved if the law regarding crèches is made universal and is rigorously enforced.

2.4 Aims and Objective of Welfare Work

The aim of welfare work is three-fold. It is partly humanistic since it enables the workers to enjoy a richer and fuller life by providing them those amenities and conveniences of life which they themselves cannot provide. Then it is partly economic, since it improves the efficiency of labour, increases its availability where it is scarce or helps to secure better class of workers if it is not scarce and by keeping the workers contented, it minimizes the chances of any industrial strife. Lastly, the aim is partly civic, since it develops a sense of responsibility and dignity among the workers and thus makes them worthy citizens.

Although provisions of welfare work should be the prime responsibility of employers, the State which is the representative of the entire community also owes a duty to do things beneficial for the community as a whole. In a country like India where the working class forms a weaker section of the community, the State should have a special obligation towards this class and should make efforts to raise it from the level of moral, intellectual, social and economic degradation. The workers organizations or the trade union also have a duty towards, therefore welfare schemes according to their financial capacity should occupy priority in their programmes. Any other social agency, however may also come forward to make the lot of the unhappy happy. Thus the employers, the state, trade unions and other social organizations all combined must make efforts thorough the provision of welfare schemes to make the life of industrial workers in the country comfortable and happy.