




HEC

HEC BUILDS MACHINES
THAT BUILD THE NATION



HEAVY ENGINEERING CORPORATION LIMITED
(A Government of India Enterprise)



The journey of Heavy Engineering Corporation Ltd commenced with its inception on 31st December, 1958. The company was one of the ambitious industrial projects of Independent India.

In an endeavor to increase the steel producing capability of the country to support infrastructure development, HEC was set-up to indigenously manufacture and supply steel plant equipment and machineries.

In due course, HEC leveraged its strength and diversified to serve different sectors such as mining, railways, power, defence, nuclear & atomic energy.

HEC is one of the largest integrated engineering complex of India located at Ranchi, in the eastern part of India and has a complete manufacturing set-up starting from castings & forgings, fabrication, machining, assembly and testing, backed by a strong design & engineering team.

50 YEARS *of service*

With over 50 years of experience, HEC has proved its forte in equipment design, engineering & manufacturing and development of unique processes. The organisation has served its clients with utmost commitment and has functioned not only as a supplier, but as a partner to them. HEC is definitely the most preferred supplier of its clients.

Its diverse skill and technical know-how enables HEC to provide comprehensive solutions to its customers. HEC provides complete and cost-effective solutions to the customer's advantage.

HEC with its distinct capabilities, has created a niche for itself. The huge infrastructure, unique manufacturing facilities, advanced technical skills, highly motivated team and valuable support from its suppliers form the basis for HEC's customers' years of trust.



Business Areas

STEEL PLANTS & OTHER
METALLURGICAL SECTORS

MINING & MINERAL
PROCESSING SECTOR

RAILWAYS

POWER

DEFENCE

NUCLEAR & SPACE RESEARCH

DESIGN & SUPPLY OF
MACHINE TOOLS

TURNKEY PROJECT EXECUTION

Operating Units

The company has three manufacturing units and one project execution division.

Foundry Forge Plant (FFP)

FFP feeds castings & forgings to the other two plants, that is, Heavy Machine Building Plant and Heavy Machine Tools Plant. In addition, FFP supplies heavy castings & forgings to other customers. With an annual production capacity of 44,000 tonnes, plant area of 13,16,930 sqm and 76,000 tonnes of installed machinery, it is the largest foundry & forging complex in India and one of its kind in the world.

Heavy Machine Building Plant (HMBP)

The plant has a fenced off area of 5,70,000 sqm and a floor area of nearly 2,00,000 sqm, well-equipped with sophisticated machine tools and handling equipment to undertake the manufacture of heavy machinery and equipment of top quality. The unit is engaged in design and manufacture of equipment and components for steel plants, mining, mineral processing,

material handling, power, cement, space research, nuclear power, etc. It has an annual installed capacity of 40,000 tonnes of equipment and structures.

Heavy Machine Tools Plant (HMTP)

The plant covers an area of over 2,13,500 sqm and is involved in the design and manufacture of medium & heavy duty CNC and conventional machine tools for railways, defence, ordnance factories, HAL, engineering sector, space and other strategic sectors.

Project Division

Backed by a dedicated, committed and experienced team, this division executes turnkey projects from concept to commissioning of bulk material handling, steel plant projects, coal washeries, cement plants and other sectors.



Manufacturing Facilities

Steel melting & refinement facilities

Electric arc furnace	60 T, 30 T (2 nos), 10 T
Induction furnace	2 T and 5 T
Vacuum arc degassing	60 T
Vacuum degassing unit	90 T
Ladle furnace	60 T

Primary and secondary refinement is carried out under close observation of expert metallurgists and is supported by a laboratory set-up to continuously monitor the composition of liquid steel.

Forging facilities

Hydraulic press	- 6000 T
	- 2650 T
	- 1650 T
	- 1000 T

Forging hammers: 3, 1.5 T

Die forgings

Fabrication facilities

- ◆ Two dedicated structural shops of covered area of 52,000 sqm equipped with all necessary facilities
- ◆ CNC flame cutting (upto 500 mm thickness)
- ◆ Hydraulic bending press 800T
- ◆ Plate bending and preparation facility
- ◆ Automatic submerged arc welding
- ◆ CO₂ welding
- ◆ Plasma welding, etc

Special machining facilities

- ◆ Lathe: Swing overbed 4 m, centre to centre 20 m
- ◆ Vertical turning & boring: Job dia 14 m, weight 250 T
- ◆ Horizontal boring: Spindle dia 200 mm, column travel 20 m
- ◆ Gear hobbing: Job dia 5 m, 40 mm module

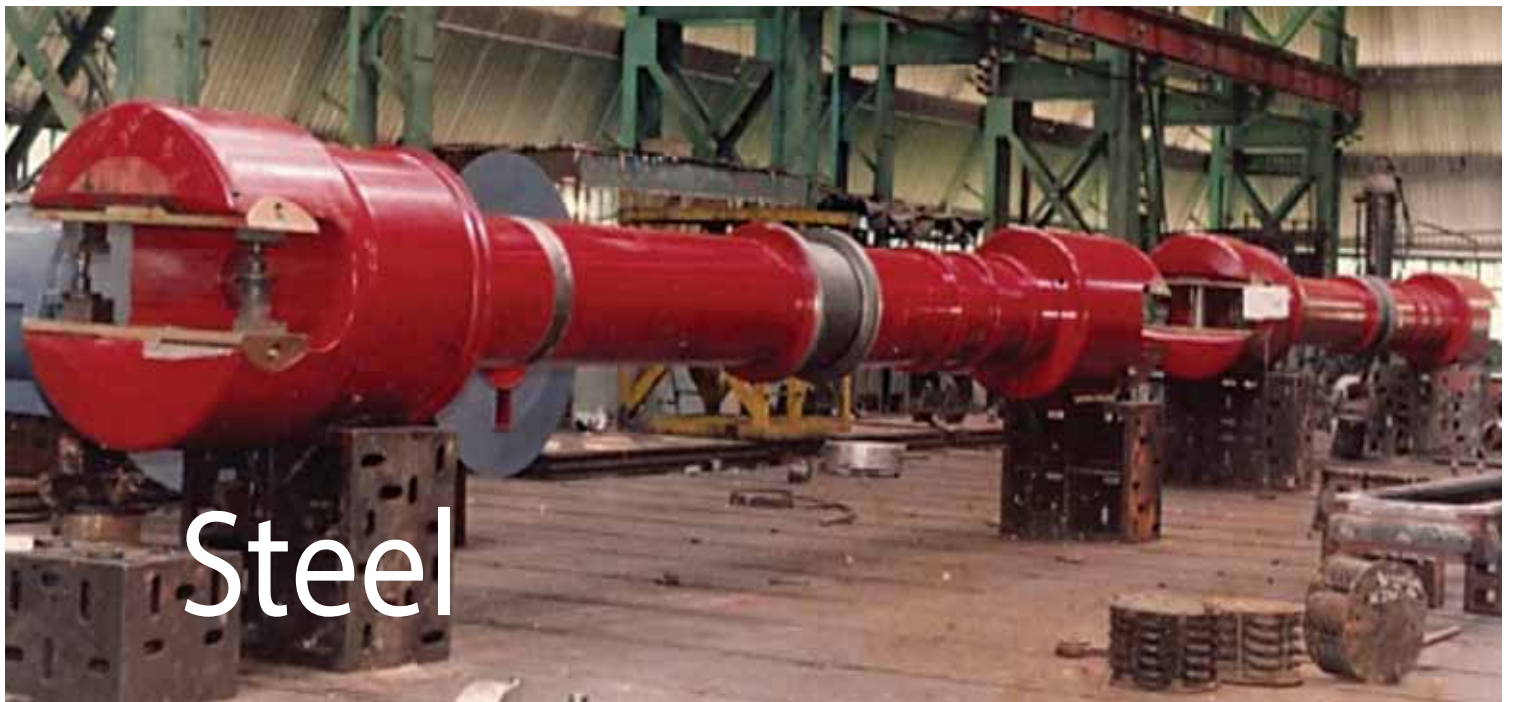




Steel and Metallurgical Sector

HEC is a leading supplier of equipment for steel production facilities. It has assimilated state-of-the-art technology from various leading manufacturers of the world. Clubbed with it, is the years of experience that provides manufacturing excellence for delivery of high quality and highly reliable machines & equipment.

HEC is one of the early establishments to manufacture steel plant equipment in India. It has supplied over 550,000 tonnes of equipment to the steel plants and has played a significant role in setting up the Bokaro Steel Plant and Vishakhapatnam Steel Plant. HEC was also involved in the capacity expansion of Bhilai Steel Plant.



Supplies include

- ◆ Equipment for blast furnace (capacity: 1033 cum to 3200 cum)
- ◆ Coke oven equipment & machines (for 4.3 m to 7 m high battery)
- ◆ Continuous casting machines for blooms/slabs
- ◆ Metallurgical cranes from 25 T to 450 T capacity
- ◆ Steel melting shop equipment including converters
- ◆ Forged rolls
- ◆ Hot metal mixers
- ◆ Sinter plant equipment
- ◆ Slag cups



Forged rolls

HEC is a pioneer in the manufacture of forged rolls in India and is a regular supplier to major steel plants of India.

Dedicated facilities have been created for induction hardened CRM and HRM rolls. Stringent quality control measures ensure high quality rolls.

	Dia (Max) (mm)	Length (Max) (mm)	Weight (T)	Hardness (Shore)
HRM	1350	6000	35	45
CRM	600	6000	15	Upto 100





EOT Cranes

HEC designs and manufactures heavy duty Electric Overhead Travelling (EOT) cranes for application in steel plants, engineering sector, space research applications, etc. The highest capacity crane designed and manufactured so far is the 450 T ladle crane to handle hot liquid metal.

Areas of expertise

- ◆ EOT cranes for workshops and engineering sector up to 400 T capacity
- ◆ Ladle crane to handle hot metal in steel and metallurgical plants up to 450T
- ◆ Rotating trolley crane
- ◆ Tundish handling crane
- ◆ Magnet grab crane

- ◆ Slab handling tong crane for steel plant application
- ◆ Four girder double trolley semi portal scrap charging crane
- ◆ Cantilever roof mounted tower crane

Special features on requirement

- ◆ Fail-safe cranes: Load can be safely brought down from the crane in the event of a power failure, failure of drive motor, failure of brake, snapping of one rope.
- ◆ With flame-proof electrics

More than 350 cranes supplied

- ◆ Clients include Bhilai Steel Plant, Bokaro Steel Plant, Durgapur Steel Plant, Rourkela Steel Plant, Vizag Steel Plant, Tata Steel, NINL, Malvika Steel, ISRO, etc.



Mining Equipment

HEC pioneered the manufacture of heavy duty mining equipment in India and has supplied over 260,000 T of equipment & components. Mining equipment supplied include:

Power shovel	4.6 / 5 CuM – 580 nos
	10 CuM – 30 nos
	12.5 CuM – 2 nos

Dragline	24 CuM / 96 m – 13 nos
	20 CuM / 90 m – 3 nos
Hydraulic shovel	3.5 CuM – 8 nos
	5 CuM – 12 nos
	8.1 CuM – 3 nos
Over burden drill	250 mm dia – 89 nos
Double drum winder	14 nos
Friction winder	5 nos

Power shovel

Simple in design, easy maintenance, longer life, great power

The first heavy duty mining shovel manufactured in India was rolled out from the HEC works in the year 1966. The rugged machine became very popular in the Indian mining industry (coal and iron ore) and can be seen in almost all open cast mines of India. The machine was upgraded from 4.6 CuM to 5 CuM capacity with a centralized lubrication system and other improvised features. Subsequently, power shovel of 10 CuM capacity was also added in the product kit.

Operating parameters

◆ Bucket capacity (CuM)	5	10
◆ Max digging radius (m)	14.4	17.12
◆ Max digging height (m)	10.3	13.03
◆ Max dumping radius (m)	12.65	14.61
◆ Max dumping height (m)	6.7	7.67
◆ Cycle time (sec)	23	28



Walking Dragline

The heaviest walking machine

HEC is the first Indian company to manufacture a walking dragline of 24 CuM bucket capacity with 96 m boom

Operating parameters

- ◆ Bucket capacity: 34 to 24 CuM
- ◆ Boom length: 74.6 to 95.6 m
- ◆ Boom angle: 30° / 38°
- ◆ Operating radius: 64 to 88 m
- ◆ Dump height: 25.5 to 48.1 m
- ◆ Digging depth: 46.2 to 74.5 m
- ◆ Bearing area: 182.65 sqm
- ◆ Average bearing pressure: 0.95 kg per sqcm
- ◆ Walking shoe bearing area (for 2): 95.2 sqm
- ◆ Walking speed (approx): 0.24 kmph
- ◆ Devised with MG set, all motions are powered by adjustable armature DC generators
- ◆ 2 MG sets each driven by 1750 HP synchronous motor





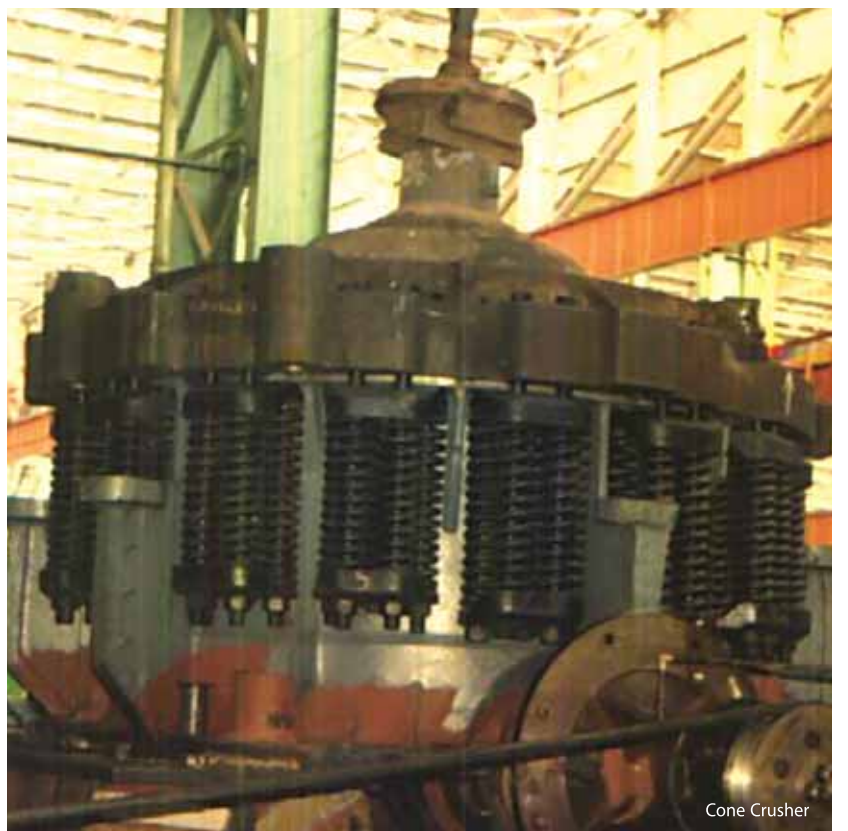
Crushers

A wide variety of crushing & grinding equipment is offered to meet the requirements of ferrous and non-ferrous ore processing plants, cement, fertilizer, chemical and coal industries.

Gyratory Crusher PGC 1500

Types of crushers

- ◆ Gyratory crusher
- ◆ Cone crusher
- ◆ Jaw crusher
- ◆ Reversible hammer mill
- ◆ Two roll crusher
- ◆ Single roll crusher
- ◆ Four roll crusher
- ◆ Rod mill, etc





HEC manufactures machine tools in the heavier range that serve vital industries such as steel, railways, engineering, mining, defence, general workshops, space research & application, etc. With excellent manufacturing infrastructure and a strong design & development wing, supported by prototype assembling and testing facilities, HEC offers high precision machine tools of state-of-the-art design. In addition to manufacturing new machine tools, HEC also provides refurbishment and rebuilding services.

Machine Tools



CNC Deep Hole Boring Machine for Ordnance factory, Kanpur

Both CNC & conventional machine tools

- ◆ Vertical turning & boring machine
- ◆ Heavy duty centre lathe
- ◆ Double column plano milling machine
- ◆ Double column planing machine
- ◆ Radial drilling machine
- ◆ Horizontal boring & milling machine
- ◆ Roll turning lathe
- ◆ Roll grinding machine
- ◆ Railway machine tools



Machining centre



Under floor wheel lathe (CNC) for railway workshop



Assembly activity of a CNC lathe

Turnkey Projects

HEC executes turnkey projects from concept to commissioning that include feasibility studies, site selection, basic engineering, process flow sheets, energy and material balance, detailed specification of plant and process equipment, erection, testing and commissioning of plant & equipment.

design
engineering
execution

Projects under execution

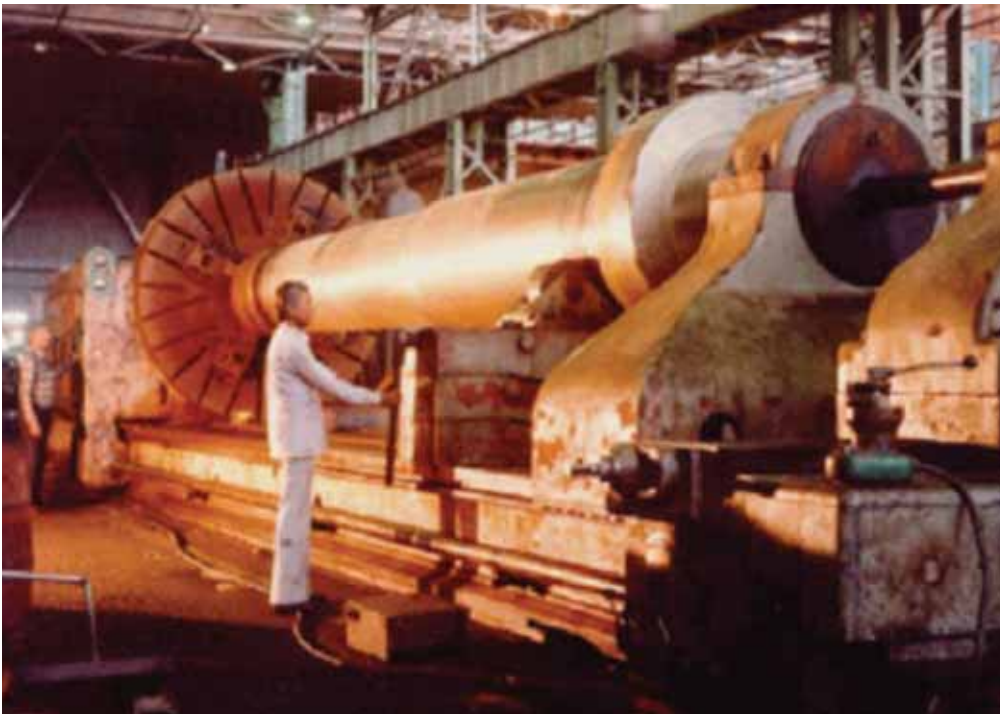
- ◆ Ore handling plant (Pkg-60), BSP, Bhilai
- ◆ Coal handling plant (Pkg-62), BSP, Bhilai
- ◆ Ore bedding & blending plant, RSP, Rourkela
- ◆ Coal handling plant, Krishnashila, NCL
- ◆ Coal washery, Madhuband, BCCL
- ◆ Crushing plant, Raw Material Division, SAIL



Projects commissioned

Coal handling plant	Jayant (NCL), Bina (NCL), Kedla (CCL), Parichha (UPSEB), Bongaigaon (ASEB), Nigahi (NCL)
Raw material handling plant	Rourkela Steel Plant, Neelachal Ispat Nigam Ltd
Low temperature coal carbonization plant	Dankuni Coal Complex, CIL
Coal washery	Kedla (CCL)
Continuous casting plant for slab	Rourkela Steel Plant
Wagon tippler complex	IISCO, Bampur
Pilot sponge iron plant	RDCIS, SAIL
Hammer mill complex	Durgapur Steel Plant
Limestone screening plant	Bokaro Steel Plant
Flux storage, crushing & screening for sinter plant	Bokaro Steel Plant
Modernization of cement plant	Chhatak, Bangladesh
Wheel & axle plant	Durgapur Steel Plant
Space vehicle launch pad	ISRO, Sriharikota

Project & features	Capacity	Year of Completion
Coal handling plant at Parichha Thermal Power Station (UPSEB), UPSEB	675 TPH	1984
Jayant CHP, Northern Coalfields Ltd	1200 TPH	1987
Dankuni Coal Complex, Coal India Ltd	Upto 1000 TPH	1991
Lime storage & screening plant, Bokaro Steel Plant	1500 TPH	1996
Coal preparation plant, Kedla, Central Coalfields Ltd	650 TPH	2001
Raw material handling system (Phase-II), Rourkela Steel Plant	Up to 1200 TPH	1996
Raw material handling system, NINL	Up to 1000 TPH	2001
Second launching pad, ISRO		2006
Coal handling plant (Ph-II), Nigahi, Northern Coalfields Ltd	1600 TPH	2009



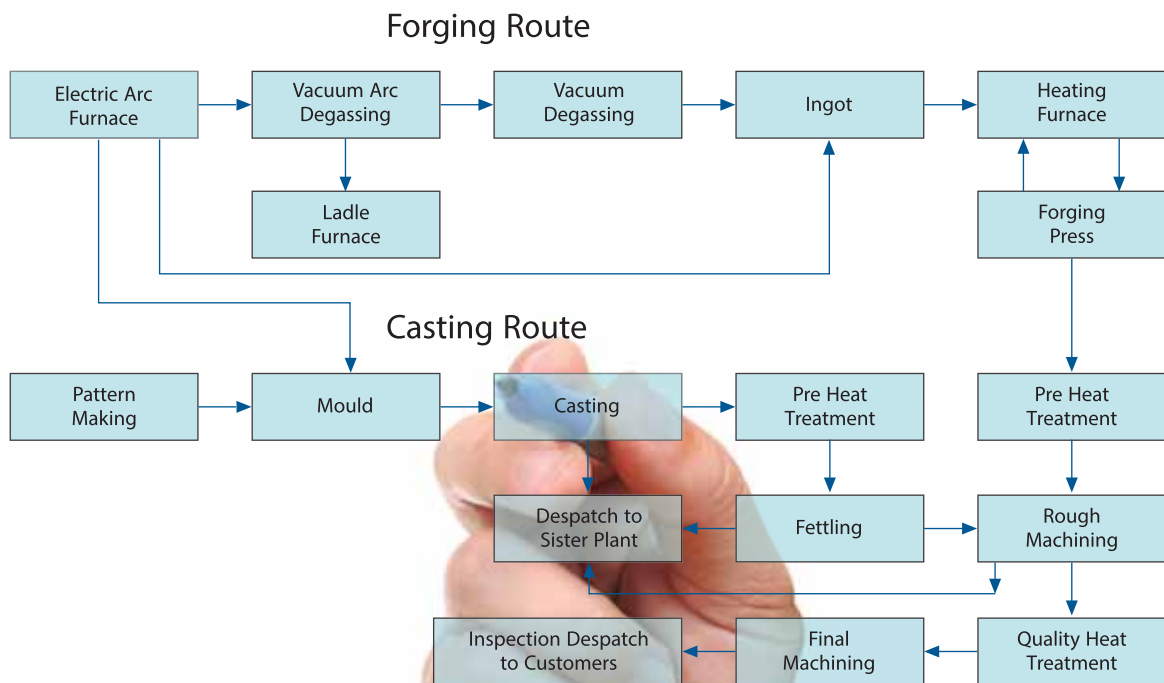
Heavy Castings & Forgings

HEC manufactures heavy castings and forged components for various sectors and different applications. Backed by huge infrastructure and long expertise, it can manufacture all grades of steel in compliance with chemical composition and mechanical properties. Liquid metal of 120 T can be handled at a time for manufacturing castings or ingots

- ◆ Steel casting 70 T piece weight
- ◆ Iron casting 90 T piece weight
- ◆ Non ferrous casting 4 T piece weight
- ◆ Steel forging 65 T piece weight
- ◆ Ring forging upto 4.2 m diameter
- ◆ Centrifugal casting
- ◆ Die forging



Typical process flow chart

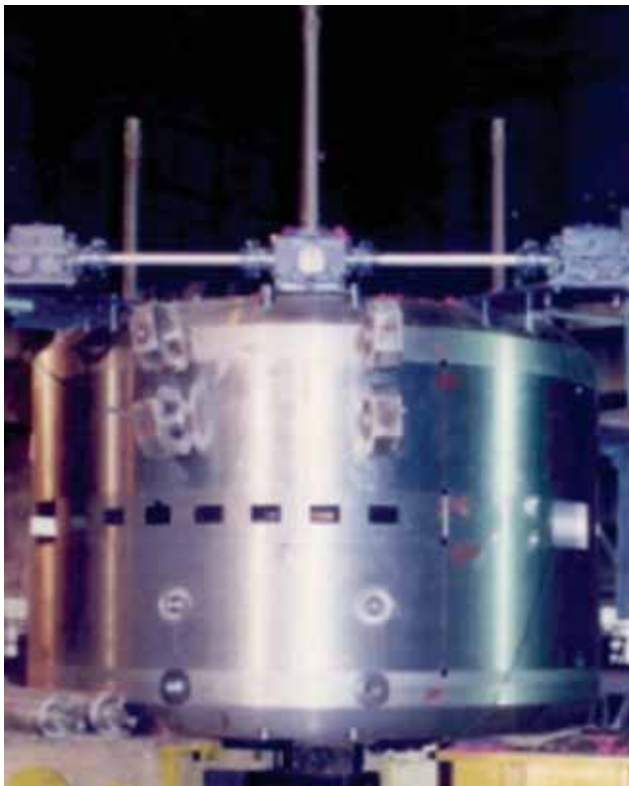


Ultra Clean Steel

HEC has indigenously developed very high quality ultra clean steel for various strategic and defence applications. The steel is characterized by:

- ◆ compositions with minimum harmful elements (like $P < 0.003\%$, $S < 0.002\%$, $Cu < 0.020\%$, $Co < 0.003\%$, $Al < 0.001\%$, $Sn < 0.001\%$, $As < 0.001\%$, $Sb < 0.001\%$, $Ti < 0.001\%$)
- ◆ low gaseous inclusion of Oxygen (< 14 ppm), Hydrogen (< 0.68 ppm) and Nitrogen (< 58 ppm)
- ◆ Poured in ingot at very controlled atmosphere (low pressure < 1 torr)

Ultra clean steel is required for manufacturing various components in the atomic & nuclear sector as well as space research. HEC successfully developed a nuclear grade of steel for which it received the Industrial Excellence Award in 2009, presented by Indian Nuclear Society.



Achievements

- ◆ Special steel developed for magnet pole for super conducting cyclotron k500
- ◆ High impact steel development for DMRL
 - DMR 249A: used for making hull & body of warships capable of withstanding ballistic impact. Steel is both hard and tough and tested at -60°C temperature
 - DMR 249B: more resilient steel to withstand impact of 20-30 T with repeated landings of fighter aircraft
- ◆ Nuclear grade steel for product SK-1 and others
- ◆ Nuclear grade plate ($t=100$) for pressure vessel, P and S limited to 30 ppm
- ◆ Tube sheet for NPCIL – 117 T ingot, oxygen < 20 ppm
- ◆ Special soft steel grade for ISRO to improve performance of magnetic circuit in large accelerators
- ◆ Special steel for Vikram Sarabhai Space Centre

Defence & Strategic Sector

Supplies to defence sector

- ◆ Indian mountain gun (MK-II)
- ◆ Gun barrel
- ◆ Forged armour plates
- ◆ Turret casting for T72 tank
- ◆ Fabricated hull & turret for MBT Arjun
- ◆ Marine diesel engine block
- ◆ Stern gear systems for INS RANA
- ◆ Rudder stock assembly
- ◆ Propeller shaft assembly
- ◆ Various machine tools



Horizontal Sliding Doors

Folding cum Vertically
Repositionable Platform
(FCVRP)

Mobile Launch Pedestal

Contribution to space research

- ◆ EOT crane 400/60T fail-safe type to operate at a height of 46 m
- ◆ EOT crane 200T with flame-proof electrics controllable from 6 different levels
- ◆ Folding cum vertically repositionable platform (FCVRP) to facilitate integration of space vehicle
- ◆ Mobile launch pad
- ◆ Horizontal sliding doors for vehicle assembly station to cover a height of 47 m against cyclone, rain and adverse weather conditions
- ◆ Tower crane at the top of umbilical tower (height 80 m)
- ◆ Ring forging for VSSC
- ◆ 6 and 3 axis CNC machine tools, etc



Folding cum Vertically Repositionable Platform (FCVRP)

Some of our valued customers



Vikram Sarabhai Space Centre, Bhabha Atomic Research Centre,
Mishra Dhatu Nigam Ltd, DLW, Siemens, BALCO, Hero Cycles, Steel Co,
UP State Electricity Board, Bihar / Jharkhand State Electricity Board,
VECC, TCIL, Mint, Ordnance Factories, NMDC, Hindustan Paper Ltd,
Monnet, Bangladesh Railways, etc



Corporate Social Responsibility

HEC was set-up in the backward area of Chhotanagpur in the eastern part of India. The company feels that it has the responsibility of developing the adjoining area and for the welfare of the people inhabiting the area.

Doctors and medical staff of HEC regularly visit the neighbouring villages to provide free medical treatment & vaccination and to create health awareness. Providing roads and facilities for drinking water are some of the other activities undertaken by HEC.

HEC runs a number of schools for the wards of its employees and others living in the vicinity of the

township. A Technical Training Institute is also run by HEC to impart technical skill and knowledge to the local youth to equip them to live a better life and to facilitate the availability of qualified technical persons for industries set-up in the area.

A large industrial area near HEC has been set-up for small fabrications, castings, forgings, machining, electrical repair shops, etc as ancillary support. HEC facilitates the entrepreneurs by placing orders on them, and helps them undertake assignments by imparting training, technical know-how as well as management skills. This encourages entrepreneurship in the area.

Awards

SCOPE Award 2007-08

Indian Nuclear Society Award 2009

BRPSE Turnaround Award 2010

Performance Excellence Award 2011

BT Star PSU Excellence Turnaround Award 2012



Heavy Engineering Corporation Limited

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Machine Tools Tel: 0651 2401191/2400359, Fax: 0651 2401124

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