

RICHARDSON & CRUDDAS

(1972) Ltd.

**(A Government of India Undertaking)
A Subsidiary of Bharat Yantra Nigam Ltd.**



**OVER
135 YEARS OF
ENGINEERING EXPERIENCE**





BYCULLA UNIT

PRODUCTS

- * INDUSTRIAL & TECHNOLOGICAL STRUCTURES
- * OIL, RIG, TUBULAR JACKET PIPES
- * BOILER & PRESSURE VESSELS
- * RUBBER & SUGAR MACHINERIES
- * RAILWAY, SWITCHES & CROSSINGS
- * STEEL SLEEPERS

PROJECT

- * TURNKEY SUGAR PLANTS
- * EFFLUENT TREATMENT PLANT
- * ENVIRONMENT ENGINEERING SYSTEM
- * CIVIL JOBS, SITE FABRICATION & ERECTION
- * EARECTION & COMMISSIONING OF MECHANICAL EQUIPMENT & PLANT MAINTENANCE SERVICES



NAGPUR UNIT

PRODUCTS

- * TRANSMISSION LINE TOWERS
- * MICROWAVE TOWERS
- * GALVANISED SWITCH YARD / SUBSTATION STRUCTURES

PROJECT

- * ERECTION OF TOWERS & STRINGING OF LINES
- * LOAD TESTING OF TOWERS



MULUND UNIT

PRODUCTS

- * PRESSURE VESSELS & HEAT EXCHANGERS COLUMNS
- * HORTON SPHERES & STORAGE VESSELS
- * BOILING HOUSE EQUIPMENTS
- * LPG ROAD / RAIL TANKERS

MADRAS UNIT

PRODUCTS

- * INDIA MARK II DEEPWELL HAND PUMPS
- * RECIPROCATING COMPRESSORS
- * STEEL STRUCTURES

PROJECT

- * CIVIL & STRUCTURAL FABRICATION
- * ERECTION
- * CONSULTANCY & LABORATORY SERVICES
- * MAINTENANCE SERVICES
- * ENVIRONMENT ENGINEERING



The Beginning

Noble Carr Richardson came to Mumbai in 1852, with fiery ambition. In 1858 his ambition found expression in the form of a small foundry. The foundry was set up in the compound of his bungalow in Byculla, then a fashionable locality of Mumbai. Through the years, the foundry flourished, and in 1870, Richardson & Company came into existence. It was a partnership venture - with the two sons Noble and William Richardson joining hands with their father.

A New Partnership

In 1880 Richardson & Company absorbed the business interest of Nicol & Company of Parel Road, Mumbai. With the merger, John Cruddas, the manager of Nicol & Company became a partner and thus began a new thriving partnership—Richardson & Cruddas—later to become the largest structural and mechanical engineering company in Western India.

A New Era Dawns

Richardson & Cruddas as a partnership venture, continued to prosper both in Western and Southern India. However, with India's Independence the British partners sold the company to Haridas Mundhra who became its sole proprietor. In 1949 the firm was turned into a Private Limited Company with 100% Indian Capital. In 1972 the business of the old Company Richardson & Cruddas Ltd. was acquired by the Government under an Act of the Parliament and a new company called Richardson & Cruddas (1972) Ltd., was formed on 15th March, 1973 as a wholly owned, "Government of India Undertaking". The company has become subsidiary of M/s. Bharat Yantra Nigam Ltd., Allahabad from 1.4.1987 a company set up by Govt. of India.

The Present and the Future

At present Richardson & Cruddas has four large workshops with approximately 1800 employees at Byculla-Mumbai, Mulund-Mumbai, Ambattur-Madras and M.I.D.C. Industrial Estate, Nagpur. This includes 300 engineers. All the four units have individual large design and development of equipments & services pertaining to their unit. In the shops, besides skilled operators, R&C has built in all the units, a team of engineers and technicians from Foreman to Fitter level who have familiarised themselves with the drawings/designs of the equipments manufactured in respective units.

BYCULLA UNIT

This Unit has a 12-acre site with a Railway siding. The Unit specialises in design, fabrication and erection of all the types of steel structures, sugar/rubber machinery and other sophisticated engineering equipments. This work shop is completely equipped with latest types of precision machines. In this Unit fabricated structures upto 40 Tons can be handled. The total employee strength of this Unit is about 800, which includes qualified Engineers.

Business Activities & Services

- * **A. PROJECTS DIVISION**
- * **B. PRODUCTS DIVISION**

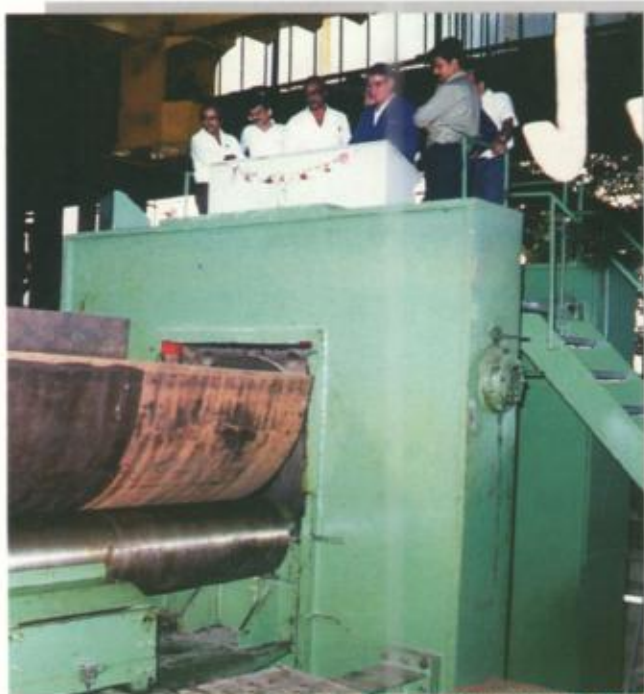
A) PROJECTS DIVISION

* **TURN-KEY SUGAR PLANTS**

Design of Plant lay-out, supply of equipment / machineries, facilities, erection & commissioning trial run, training etc.

* **ENVIRONMENT SERVICE**

Design, supply, erection & commissioning of effluent treatment plants on turn-key basis.



CLIENT : M/s. LARSEN & TOUBRO LTD. HAZIRA.
SHELL SIZE : 35 THK x 4572 DIA x 3900 WIDE, MATERIAL SA 516 Gr. 70.



ROLLING OF SHELL : 1550 X 6000 X 50THK

* **STRUCTURAL**

Site fabrication & erection of technological building structures.

* **PIPELINES**

Supply of pipelines.

B) PRODUCTS DIVISION

* **TUBULAR**

Manufacturing of tubulars Conforming to API-2 B specifications with thickness upto 63 mm x 6 MTS. wide.

* **POINTS & CROSSINGS**

Manufacture of Railway Points & Crossings, Pressed Steel Turnout Sleepers, Switch Expansion Joints & track fittings.

* **MACHINERY**

Various sizes of rubber mixing mills, extruders, calender lines for rubber & PVC Industries.

* **FABRICATION**

Fabrication of medium & heavy steel structures & bridges, equipment structures, pressure vessels, boiler drums etc.

BYCULLA UNIT



Richardson & Cruddas (1972) Ltd. has in house experience and expertise for manufacture, supply, erection & commissioning of complete Sugar Plant, engineering for boiling house. R&C is now in the process of obtaining the latest technology for manufacture of cane crushing mills of 2500 TCD and high speed boilers. R&C has imported plants for manufacture of boilers.

In the past we have successfully, supplied, erected and commissioned plants having capacity of 1250 TCD & 2500 TCD and high speed boilers. The Sugar Plants completed by us on turnkey basis are as follows :

- | | | | |
|----|--|---------------------------------|---|
| 1. | Engineering Projects (India) Ltd., New Delhi | Sonepat Haryana | Design, manufacture and supply of boiling house equipment for Sonepat Co-operative Sugar Factory. |
| 2. | Engineering Projects (I) Ltd. New Delhi | Budaun U.P. | Design, manufacture and supply of boiling house equipment for Kisan Sahakari Chini Mills Ltd. |
| 3. | Engineering Projects (I) Ltd. New Delhi | Talala Gujarat | Design, manufacture and supply of boiling house equipment for Talala Khand Udyog Mandali. |
| 4. | Shri Vithal Sahakari Sakhar Karkhana Ltd. | Gurasle, Pandharpur Maharashtra | Design, manufacture, transportation, supply, handling at site, erection and commissioning of 1250 TCD Sugar Plant on turnkey basis. |
| 5. | National Heavy Engineering Co-op. Ltd. | Tilhar U.P. | Design, manufacture, transportation, supply, handling at site, erection of boiling house equipment except steel staging for one 1250 TCD Sugar Plant. |
| 6. | Navalsingh Sahakari Sakhar Karkhana Maryadit | Ziri, Burhanpur M.P. | Design, manufacture, transportation, supply, handling at site, erection and commissioning of 1250 TCD Sugar Plant on turnkey basis. |
| 7. | Samarth Sahakari Sakhar Karkhana Maryadit. | Ambad Maharashtra | Design, manufacture, transportation, supply, handling at site, erection and commissioning of 1250 TCD Sugar Plant on turnkey basis. |
| 8. | Vighnagar Sahakari Sakhar Karkhana Ltd. | Junnar Maharashtra | Design, manufacture, transportation, supply, handling at site, erection and commissioning of 1250 TCD Sugar Plant on turnkey basis. |



PROJECTS

- | | | | |
|-----|------------------------------------|-----------------------------|---|
| 9. | Kisan Sahakari
Chini Mills | Powayan
Saharanpur, U.P. | Design, manufacture, transportation, supply, handling at site, erection and commissioning of 1250 TCD Sugar Plant on Turnkey basis. |
| 10. | Kaithal Co-op.
Sugar Mills Ltd. | Kaithal
Haryana State | Design, manufacture, transportation, supply, handling at site, erection and commissioning of 2500 TCD Sugar Plant on Turnkey basis. |

The Sugar Plants supplied by R & C are operating at rated capacity.

ENVIRONMENT SERVICE

R&C is playing a major role in environmental protection as per the specifications prescribed by the Ministry of Environment and Forest & State Pollution Control Boards.

R&C has supplied, erected and commissioned many effluent treatment plants for treatment of Industrial effluents. Our clients include steel, gas, petroleum & petro-chemical industries.



STEEL STOCKYARD FOR SAIL, KANPUR

STRUCTURAL

R&C has more than 100 years experience in design, fabrication & erection of structural steel work including Civil work on turn-key basis for various steel yards, sugar plants, factory buildings, power plants, paper, automobiles, tyre & textile industries. **R & C** has constructed many Railway Stations including the famous Mumbai CHATRAPATI SHIVAJI TERMINAL (formerly, Bombay VT), Church Gate, Airport Hangars, Kuwait International Airport, MES at Juhu & Goa, exclusive buildings such as Testing Laboratory for BHEL, the first of its type in Asia.

PIPELINES

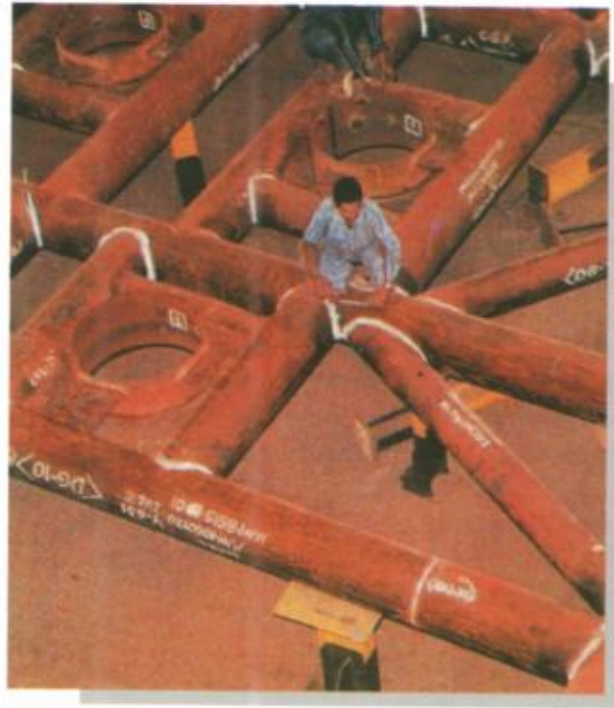
R&C can supply pipes for transportation of crude oil, LPG manufactured from imported bending Machine.

BYCULLA UNIT



TUBULARS

R&C has the necessary experience, skills and infrastructural facilities to undertake the fabrication of specialised tubular structures. Employing the most modern equipment and streamlined production facilities, R & C's production line is designed to produce 30,000 tonnes of the finest quality tubulars annually. Further, R&C has also taken up the manufacture of parts for Offshore Platforms as well as various types of Onshore Drilling Rigs - to meet the country's need for self-sufficiency and sophisticated equipment in its continuing hunt for 'Black Gold', Gas and Hydrocarbon derivatives.



TUBULAR PIPES

Tubulars - a major structural item used in the fabrication of Offshore/On-shore Platforms and Rigs - are special pipes fabricated from Carbon Steel plate and welded by SAW process along the longitudinal seam. Since these sizes cannot be extruded it is necessary to fabricate from plate material.

Technical Specifications

Outside diameter Range	:	406 mm - 1500 mm & above
Thickness Range	:	10 mm - 63 mm
Length	:	12 metres max. with one or more girth seams
Material used	:	Conforms to API - 2H, ASTM-A36, EEMUA - 355
Fabrication Standard	:	API - 2B.
Non-destructive testing	:	By Ultrasonic, Radiography and Magnetic Particle Tests.



BYCULLA UNIT

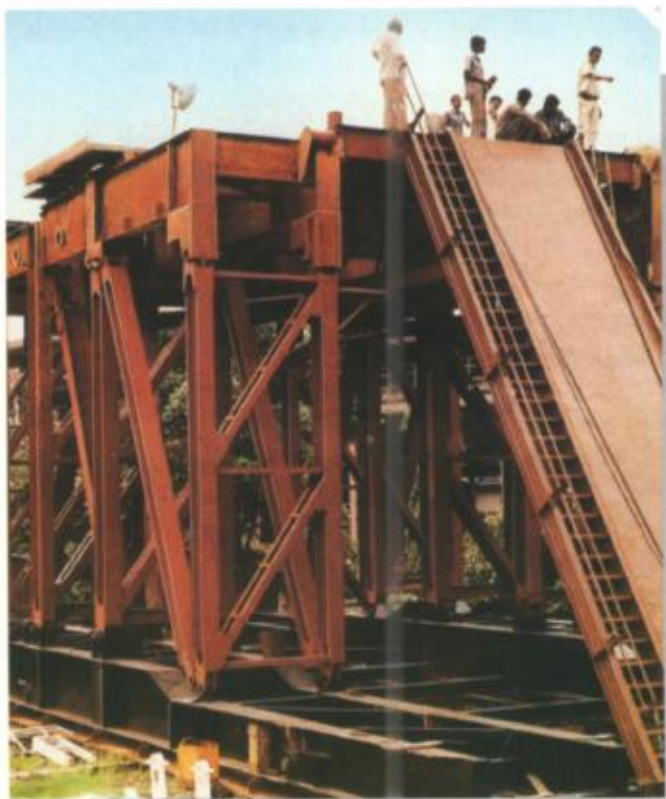
OFFSHORE PLATFORMS

R&C manufactures Conductor Levels, C&D units, Skidding arrangements, etc. for Offshore structures for the Mazagaon Docks Ltd. These tubular structures are fabricated to API specifications. All welded joints of these structures undergo 100% Non-destructive testing.

R&C also has the capability to manufacture Sub-sea Templates, Heli-decks, Test separators, etc. As part of the national endeavour to boost indigenous production, R&C proposes taking up the manufacture of watermakers, produced water conditioners, sewage disposal plants, sump caissons and other equipment.



OFFSHORE PLATFORMS



ON - SHORE RIGS

ON-SHORE RIGS

In 1981, R&C had undertaken the manufacture of E1400 series Drilling Rigs for the Bharat Heavy Electricals Ltd. (BHEL). The 142 feet high 'Skytop' design mast and sub-structure of 1000 KPS capacity is light and easily transportable. The entire superstructure stands on a sub-base designed to uniformly distribute the weight of the structure on to the ground, for exceptional, all-weather stability. The entire fabricated assembly weighs 200 tons - three such masts with sub-structures have already been delivered to BHEL. The draw work housing and mud tanks - also fabricated in R&C's works - are mounted on skids to facilitate transportation and handling.

Facilities for repair of Offshore and On-shore equipment are also being developed.

BYCULLA UNIT





**OBTUSE
CROSSING.**

RAILWAY POINTS & CROSSINGS & STEEL TURNOUT SLEEPERS

R & C is one of the largest manufacturers of Railway Points & Crossings in India with more than 60 years of experience in the line. The workshop is fully equipped to manufacture all types of Points & Crossings including curved switches which are increasingly required by the Railways due to the adoption of higher speeds on their trunk routes. These Points & Crossings are manufactured to Indian as well as Continental standards.

R & C have carried out Exports of High Speed Turn - Outs UIC designs to the Middle East.



BYCULLA UNIT

MACHINE BUILDING DIVISION

PRODUCTS

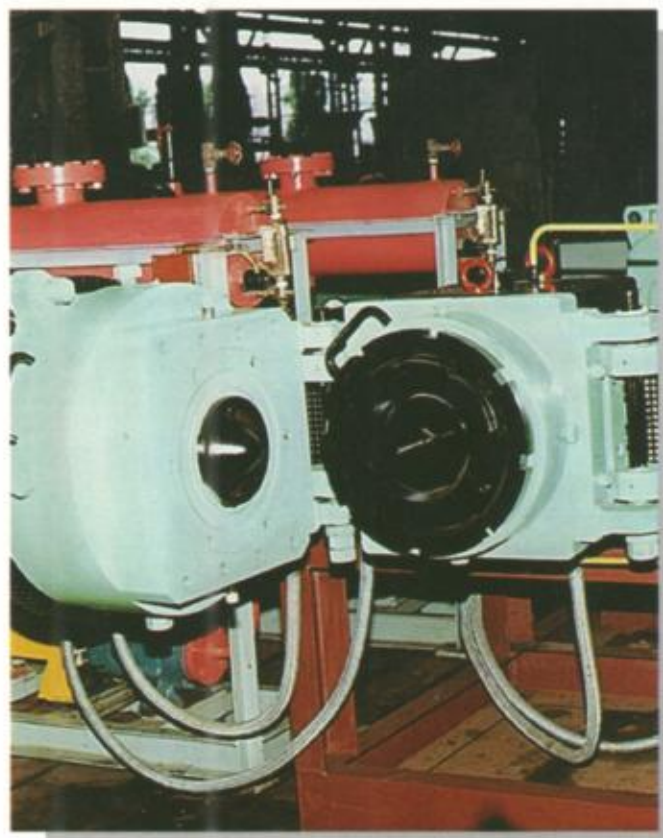
R&C started manufacturing rubber machines about 50 years ago in the true pioneering spirit. Later the growth of rubber industry necessitated the manufacture of 42" & 60" Mills, Calenders, Extruders and Presses as regular products.

To meet the increasing demand for sophisticated rubber machines in the country R&C collaborated with M/s. Comerio Ercole, Italy, one of the leading rubber machinery manufacturers on the Continent, for the manufacture of large 84" rubber mixing Mills. Meanwhile many tyre and tube industries were envisaged to be set up during the 5th Five Year Plan. To cater to the requirement of these tyre and tube industries R&C collaborated with M/s. Hermann Berstorff, West Germany, for the manufacture of large 4-Roll/3-Roll Calenders, 200/250 mm Extruders and their complete lines.

To enable assembly of such heavy sophisticated machines, at our Byculla Unit, the capacity of assembly and testing bay was expanded. At the moment R&C can undertake simultaneously assembly of one 84" mill, three 60" mills, two 42" mills, one large 68" 3-Roll Calender with line, one 200 mm extruder with line. The special feature of the assembly shop is that the machines are assembled on complete levelled bay to ensure accurate alignment and reliability demanded of such machines. The machining of all the major and critical components is being carried out in well equipped medium / heavy machine shop ensuring high quality of the components. .

EXTRUDER

Of sizes 60 mm, 90 mm, 100 mm, 120 mm, 150 mm, 200 mm and 250 mm with complete accessories and line equipments for the manufacture of Tread, Tubing, Hose, Profile Bead etc.



8" DIA. COLD FEED EXTRUDER FOR TYRE INDUSTRY

SOME OF OUR PRESTIGIOUS CLIENTS

- Dunlop India Ltd., Calcutta & Madras.
- J.K. Tyre Industries, Gwalior & Kankrolli.
- Modi Rubber Ltd., Modipuram.
- Nirlon Synthetic Fibres & Chemical Ltd., Mumbai.
- Good Year India Ltd., Faridabad.
- Premier Tyres Ltd., Mumbai.
- Hindustan Organic Chemicals Ltd., Maharashtra.
- Dharmasi Morarji Chemicals Co. Ltd., Ambernath.
- Mukund Iron & Steel Works, Kalwe.
- Crompton Greaves Ltd., Mumbai.
- Cadbury India Ltd., Mumbai.
- Godrej Soaps Pvt. Ltd., Mumbai & Hyderabad.
- Parle Products Pvt. Ltd., Mumbai.
- Bharat Rubber.
- Tyre Corporation of India, Calcutta.
- Andrew Yule, Calcutta.
- Birla Tyres.
- Elgi Tyres

BYCULLA UNIT



RUBBER MIXING MILL

406 mm x 1067 mm (Approx. 16 in. x 42 in.)

SALIENT FEATURES

- Chilled Cast Iron Rolls with mirror finish.
- Heavy duty close grained alloy cast iron side frames.
- Heavy duty cast steel caps.
- Heavy duty close grained alloy cast iron/cast steel bull gear, back gears with moulded / machine-cut teeth and forged alloy steel pinion with machine-cut teeth.
- Specially designed cylindrical type shear plates.
- Split type sealing rings for main bearings.
- Pneumatic with complementary plug braking for instantaneous stoppage.
- Split type base frame as per latest continental practice.



RUBBER MIXING MILL

Mills in our range :

Mixing Mills

- 660 mm x 2130 mm (26 in. x 84 in.)
- 560 mm x 1530 mm (22 in. x 60 in.)
- 350 mm x 800 mm (14 in. x 32 in.)
- 200 mm x 400 mm (8 in. x 16 in.)

Refining Mills

- 535 mm x 610 mm x 865 mm
(21 in. x 24 in. x 36 in.)

Cracker Mills

- 660 mm x 850 mm
(26 in. x 35 in.)
- 560 mm x 630 mm
(22 in. x 25 in.)

HYDRAULIC PRESS

Presses upto 4000 Tonnes in Platen 1400 mm x 6300 mm for Conveyor Belt and general moulding are in our standard range.

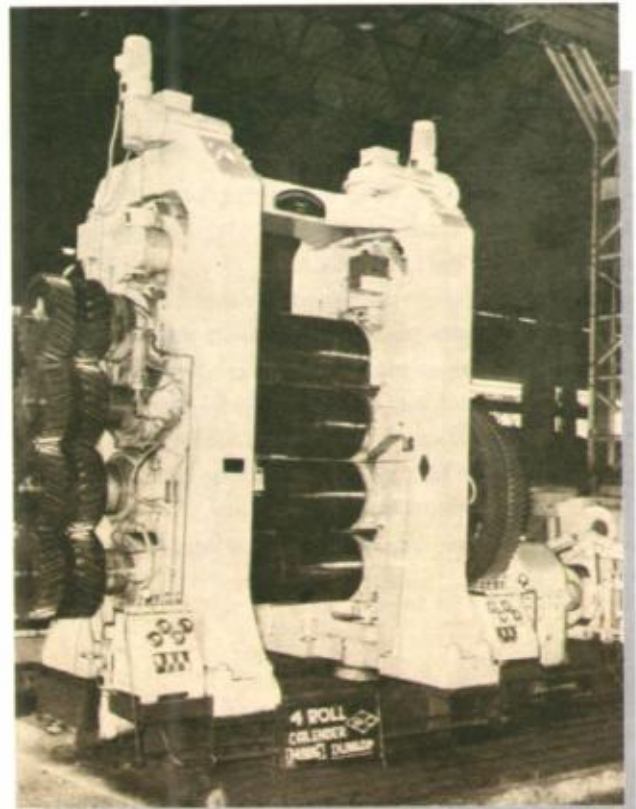


BYCULLA UNIT

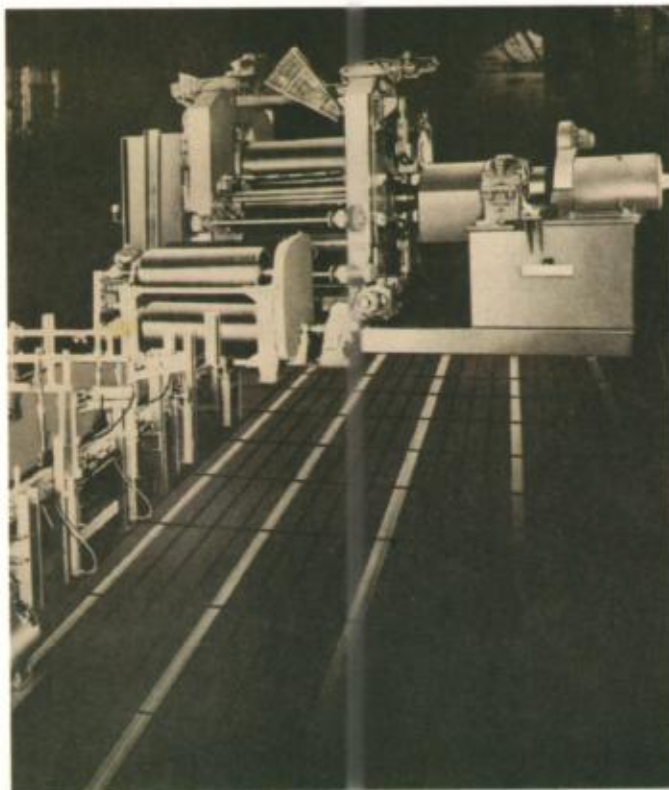
4 - ROLL CALENDER

SALIENT FEATURES

- Imported Chilled Cast Iron Camber Rolls, with bored & mirror finish circumference surface .
- Double poured rolls for special application.
- Central roll fitted with anti friction Timken Roller Bearings.
- Top and Bottom Roll Journals fitted with steel sleeves.
- Hydraulic Roll Bending on top and bottom rolls.
- Heavy duty Cast Iron Side Frames to IS. Grade 30.
- Aluminium Stock Guides with Polyamide Lining.
- Nip Adjustment by our independent motor reducer units, incorporating special globoidal worm and worm wheel.
- Selsyn Receiver Counter System for precise nip gap indication.
- Forced feed oil lubrication for main bearings complete with filtering and cooling units, two high oil delivery pumps, flow controls etc.
- Central grease Lubrication Pump for all Calender points.
- Pneumatic brake for instantaneous stoppage of the Calender.



4 ROLL CALENDER SUPPLIED TO DUNLOP INDIA LTD. CALCUTTA.



Other Sizes in our range

3 / 4 Roll Calenders :

- 400 mm x 1000 mm.
- 457 mm x 1372 mm
- 610 mm x 1730 mm

'Z' & 'L' shape and in many other combination with camber, Cross axis arrangement, Fine roll nip adjustment, bull, gear drive, uni-drive etc. including complete Calender Lines.

3 ROLL CALENDER & COMPLETE LINE SUPPLIED TO M/S. J.K. INDUSTRIES LTD. RAJASTHAN FOR THEIR AUTOMOBILE TYRE & TUBE PLANTS

STEEL STRUCTURES

R&C designs, fabricates and erects various types of medium/heavy steel structures for factory buildings, general engineering workshops, Automobile Industry, Thermal Power Stations, Textile Mills, Ship Building Plants and Railway Work Shops.

SOME OF OUR PRESTIGIOUS CLIENTS

- Deptt. of Atomic Energy.
- Visakhapatnam Steel Plants
- Maharashtra State Electricity Board
- Deptt. of Space, Sriharikota.
- Indian Railways, Govt. of India
- Raman Research Institute, Bangalore
- Gammon India Ltd., Chandigarh
- Larsen & Toubro Ltd., Mumbai.
- Reserve Bank of India, Mumbai
- Hindustan Steel Work Construction Ltd., Bhilai.
- Heavy Electricals India Ltd., Bhopal
- Premier Automobiles Ltd., Mumbai
- Bharat Heavy Electricals Ltd.
- Tata Hydro-Electric Power Supply Co. Ltd., Trombay.
- Neyveli Lignite Corporation, Madras.
- Hindustan Levers Ltd.
- NEPA Mills.



MAINLINE STATION of CENTRAL RAILWAY,
VICTORIA TERMINUS, MUMBAI.
(CHATRAPATI SHIVAJI TERMINUS)

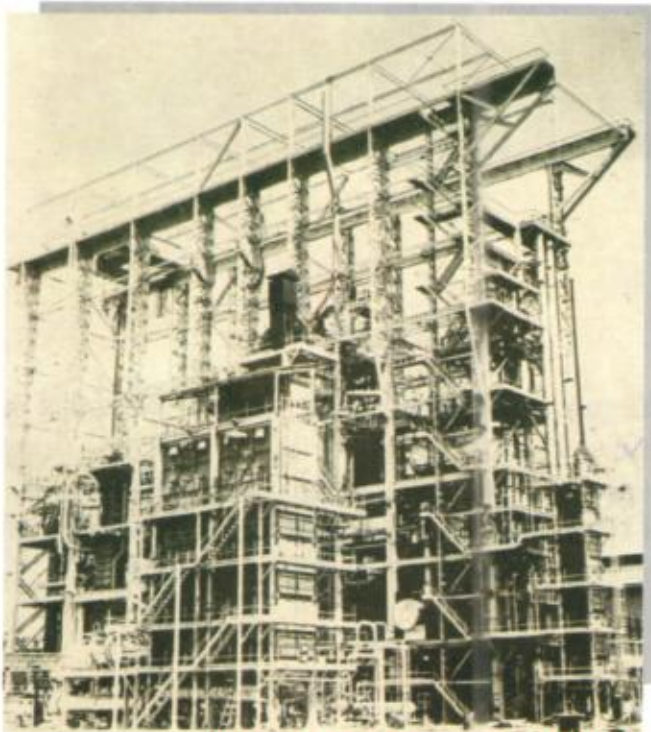
GAS HOLDERS

R&C Specialises in the design, fabrication and erection of complete Gas Holders of various capacities and intricate designs. These jobs include 2 lifts with cup and dip arrangement for Water Connections, Venting Device, Inlet and Outlet Water Connections with Water Seals for isolation of Gas Holders, Platforms, Stairways, Manhole Covers, Cast Iron Ballasts, Manometers etc.

TECHNOLOGICAL STRUCTURES AND EQUIPMENT

R&C is completely equipped to design fabricated and erect Technological Structures for Chemical Petrochemical, Atomic Power Plants, Air Terminal Buildings etc.

R&C's Contribution for SLV-3 Launcher : Support Structures and Arms Complete with Drive Mechanisms to rotate the whole structure around its axis and to lift it from the horizontal position.



HEAVY WATER PROJECT, BARODA.



BYCULLA UNIT

WIND MILLS

R & C was the first Company in 1995 to fabricate 4 Nos. Wind Mill Mast for M/s. ENERCON (I) LTD. M/s ENERCON GmbH/ Germany introduced innovatory wind energy converter without gears in India a new phase in Wind Energy utilization.

The Wind Mill Tower, a 50 meter Conical tower comprising of five despatchable sections, having 2.6 meter diameter at the base with 2° taper. It is fabricated from Mild Steel Plates having thickness of 32mm at the base to 12 mm at the top. The sections were joined by HT bolts through flange holes made up of HT plates. The welds were subjected to spot radiography. The completed sections were shot - blasted to SA 2,1/2 finish and 5 coats of paints were applied by airless spray gun. The sections were fabricated to International Standard requirements and inspected by M/s. Lloyds, Surveyor followed by their German principals.



TOP PORTION OF WIND MILL TOWER



WIND MILL TOWER OF 50 METER
HEIGHT AT LAMBA, GUJARAT
SUPPLIED BY R & C, BYCULLA.

The **present** generating capacity of Wind Mill is 250 KW and can go upto 500 KW. With the experience gained, R&C can undertake fabrication of Wind Mill Tower / Mast having height upto 100 meters meeting International Standards.

BYCULLA UNIT



LIST OF MACHINERY FOR FABRICATION SHOP

Sr. No.	Description	Nos.	Capacity
1.	End Milling Machine	1	Job size 915 ht x 3050 width
2.	Rectifier Welding sets	41	400/600 amps.
3.	Motor Generator sets	2	600 Amps.
4.	Electrode Drying oven	4	250°C
5.	Circular SAW for 1 Beam	2	Max. Beam size 600x320
6.	Rapid SAW cutting for 'L'	1	Max size 150x150x10 thk.
7.	3 Roll plate Bending Machine	1	16 thk x 2500 wide can be rolled UTS-42 kg mm ²
8.	Plate straightening M/cs.	1	Max size 16 thk x 1800 wide
9.	Guillotin shear Machine	2	25 thk x 3150 wide
10.	Radial Drilling Machine	6	Max dia 50 and Radius 1800
11.	Saw Machine (Sub. A/c welding m/c)	2	1000/1200 Amps.
12.	Oxy. Plain cutting machine	1	3000 wide x 12500 long.
13.	Profile cutting machine	1	2400 wide x 1200 long.
14.	Edge planner	1	10.5 mtr long bed for Edge Preparation
15.	Pug cutting machine	6	upto 200 thk plate.
16.	Hydraulic Press (Horizontal)	1	500 MT
17.	Straightening Machine	2	(i) Plate 300 x 25 thk (ii) Angles 200 x 200 x 12 thk. (iii) Beams upto 300
18.	Horizontal Press (Hydraulic Accumulation)	2	200 MT.
19.	Shot blasing plant	1	Chamber size 4.0 x 13.0 mtr.
20.	Hydraulic vertical press	1	400 MT plate size 3.5 mtr x 0.5 mtr Height - 1.0 mtr.
21.	Hydraulic vertical press	1	500 MT.



LIST OF PRIME MACHINERY FOR TUBULAR MFG.

FACILITIES

- Gas Cutting Machine (Bevelmat type 1 imported from M/s SUAG, Germany. Single portal flame cutting machine with two triple cutting torches mounted to cut thickness from 3 mm to 120 mm.
- Bending System (Bending system imported from M/s. Schafer, Germany comprising of three stations : Bending, Post-bending with die & punch and tacking stations. 3 roll bending machine, having 6 meter wide roll, can roll thickness upto 50 mm x 6 meter width. Capacity chart is enclosed. Thicknesses upto 82 mm having width of 2500 mm already rolled. The bending system can be used to barcate steam boiling for Sitson India.
- Welding System (Welding system with pipe handling conveyor system is supplied by M/s. Kirloskar Electric Ltd. comprising of following 9 stations.

Stn. CO₂ Seal bead L.S. Welding Station.

Stn. 2A: Inside/outside L.S. SAW Station.

Stn. 2B : Inside L.S. SAW Station.

Stn. 3A : 3 Wire outside L.S. Saw Station.

Stn. 3B : - do -

Stn. 4 : Gas cutting station for square burning and edge preparation.

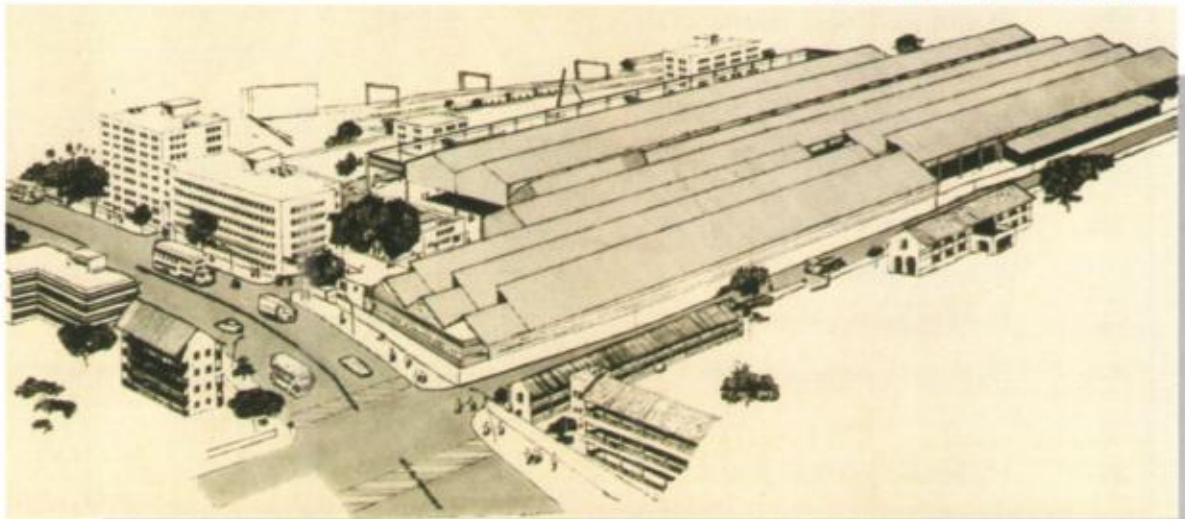
Stn. 5 : Fit up and seal bead CO₂ Welding Station.

Stn. 6 : Inside 'C' seam SAW Station.

Stn. 7 : 2 Wire outside 'C' seam saw Station.

- Hydraulic Press (4 columned 500 MT capacity)
- Shot Blasting (Chamber size : 4.0 x 4.0 x 13 Mtr. long)
- Crane Capacity (40 MT and 15 MT)

BIRD'S VIEW OF BYCULLA



BYCULLA UNIT



LIST OF MACHINERY IN MACHINE SHOP

Sr.No.	Description	Machine Capacity
1.	Horizontal Boring Machines Flow Type	Spindle Dia. = 160 mm Vertical Travel of spindle head = 2500 mm Horizontal Travel of Column = 8150 mm Max. Boring Depth with spindle = 1600 mm Max. Traverse of the Ram = 1250 mm
2.	Hobbing Machine (W&W)	Table Dia. = 1800 mm Min. No. of Teeth = 10 Min. OD of work piece = 200 mm Max. Width of work piece = 710 mm Max. Width of work piece = 2100 mm Max. Module with Hobbing = 22 Max. Module with single indexing method = 30 Hob Cutters Available : Modules : M8, M10, M12, M14, M16, M18, M20.
3.	Vertical Borer	Max. Dia. of the work piece = 3200 mm Max. Height of the work piece = 1600 mm Max. Weight of the work piece = 16000 kgs.
4.	Planning Machine	Planning Width = 2000 mm Planning Length = 8000 mm Planning Height = 2000 mm
5.	Horizontal Boring Machine	Spindle Dia. 100 mm Max. Boring depth with spindle = 900 mm clamping surface area of Table = 1250 mm x 1250 mm. Max. load on table = 3000 kgs. Max. dia. of boring = 560 mm Vertical Travel of spindle head = 1120 mm Longitudinal Travel of Table = 1250 mm Cross Travel of Table = 1250 mm
6.	Horizontal Boring Machine	Spindle Dia. = 100 mm Surface area of table = 1100 mmx1300 mm Max. Load on Table = 5000 kgs. Vertical Travel = 1200 mm Longitudinal Travel = 1250 mm Cross Travel = 1500 mm

LIST OF MACHINERY IN MACHINE SHOP

Sr. No.	Description	Machine Capacity
7.	Boring Machine	Table Dia. = 1200 mm Max. Height of work piece = 1000 mm Max. Weight of the work piece = 2000 kgs. Minimum bore full 1 metre depth = 300 mm Orderwise boring depth = 500 mm
8.	End Milling Machine	3050 MM wide x 2430 mm High x 2590 mm cross
9.	Milling Machine	Spindle Dia. = 95 mm Table size = 355 mm x 2055 mm Table Travel = 1030 mm long x 250 mm wide x 470 mm high Max. load on table = 500 kgs.
10.	Centre Lathe (Heavy Duty)	Max. Swing over Bed = 60" Max. Swing over Saddle = 47" Max. Swing in Gapbed = 87" Max. Distance between centres 7.5 metres
11.	Centre Lathe	Max. Swing over Bed = 1000 mm 40" Max. Swing over Saddle = 710 mm 28" Max. Distance between centres = 6 metres Max. Weight of Job between centres w/o rests = 1000 kgs. Max. Swing over bed = 1000 mm Max. Swing over Saddle = 710 mm Max. Distance between centres = 9 metres Max. Weight of job between centres w/o rests = 1000 kgs.
12.	Centre Lathe (Light and Medium section)	Max. bar diameter = 2.5/8" Max. Swing over Gross Slide = 8" Max. Swing close to cross slide = 13.1/4" Max. Distance from spindle flange to face turret = 44"
13.	Slotting Machine	Table Dia. = 800 mm Max. Ram Stroke = 500 mm Max. Travel Longitudinal = 800 mm Max. Travel Cross = 650 mm Max. Travel Circular = 360

INSPECTION FACILITIES

- Ultrasonic Testing Machines, Magnetic Particle Testing Machine, Prod & Yoke Type, Dye Penetrant, Universal Testing Machine, Hardness Testing Machines, Chemical Analysis by Volumetric method.

MULUND UNIT

In 1975 the company acquired the business interest of Structural Engineering Work at Mulund to cater to the needs of Petrochemicals, Refineries and Fertilizers industries in the Western region for process equipment and fabricated structures. Equipped with full-fledged design and drawing office manned by qualified and experienced engineers and draughtsmen, today Richardson & Cruddas is a name to reckon with in the Indian engineering industry.

Mulund Unit is a premier plant, manufacturing, equipments for Chemical, Petro-chemical complexes, Refineries, Fertilizer, Steel, and Nuclear Power Projects. Mulund Plant layout was set up a quarter century back and is still one of the best in the fabrication industries with special machineries. It has two shops; one heavy and one light having a covered area of 16,000 square meters, and 6,000 square meters respectively. The total employees as on today is 325.

MANUFACTURING ACTIVITIES

Chemical, Petro-chemical, Fertilizer Plants and Refineries.

Pressure Vessels, Storage Tanks, Heat Exchangers, Column Towers, Reaction Vessels, Boilers and Tankers for bulk transport of LPG, Ammonia, Chlorine etc.

Sugar Industries

Complete Projects on turn-key basis.

Dairy & Food Processing Industries

Milk Storage Tanks, Milk Transportation Tanks, Boilers and Stainless Steel Vessels with Agitators.

Steel Industry

Electric Arc Welding Furnaces from 10 MT to 200 MT capacities.

Mineral Industries

Roasters and Calciners

Railways

4 & 8 Wheeler Tankers for Liquified Petroleum Gas, NH_3 and H_3PO_4

Stress Relieving

As per customers requirement within the furnace range.

Dishing

Dished ends upto 210 mm thk and diameter upto 3500 mm in single piece. Construction in Carbon Steel, Clad Steel and Stainless Steel.

Material of Construction

Carbon steel, Boiler quality to specification IS : 2002 Gr 2A, SA : 515 Gr 60/70, SA : 516 Gr 60/70, DIN H-II, H IV, H V, SA : 285 Gr C Chrome-moly steels, BS1501, SA : 240-TP, 304, 304 L, 316, 316 L, 316 Ti, 321, BS : 845 Ti, Monel, Inconel, Incoloy, naval Brass Cupro Nickel etc.

Code of Construction

IS : 2825, ASME Sec. VIII, Div. I, ASME Sec. III, BS : 5500 API : 650, TEMA Class R, C, B Ad Merkblatter etc.



MULUND UNIT

Production Capacity

Process Machinery : 2900 MT Per annum

Manufacturing Capacity

Pressure Vessels, Columns & Horton Spheres Specification

Rolling Capacity (Cold)	- 52 mm
Dia. Range	- 800 to 6500 mm
Max. Dia. for stress relieving	- 4400 mm
Design Pressure	- 500 Kg / Cm ² (g)
Max. Length in Single Piece	- 42000 mm
Max. Weight in Single Piece	- 130 M Tonne

Testing Facility - Radiography, Ultrasonic Testing, Impact testing, helium leak testing and Physical and Chemical testing.

Horton Spheres

Specifications

Diameter	- 17000 mm
Thickness	- 45 mm

Heat Exchangers

Specifications

Max. Tube sheet Thickness	- 250 mm
Max. Outside Dia.	- 2800 mm
Design Pressure	- 345KgCm ² (g)

All types of heat exchangers like floating head, fixed tube Sheet, U-tube bundle, Fin tube, air coolers, double pipe and coil heat exchangers.

Dished Ends

Specifications

Max. Thickness	- 200 mm
Max. dia. in single piece	- 3500 mm
Max. dia. in Crown & Petals	- 9000 mm

DISH ENDS UNDER CLEARANCE LYING IN PRESS SHOP BAY



MULUND UNIT



MAJOR JOBS EXECUTED

Equipment	Details	Client
<u>Rail Tankers</u>		
160 Rail Tankers	4 Wheeler LPG Rail Tankers with RDSO Design.	HPCL, IOCL, BPCL
23 Rail Tankers	8 Wheeler SS 316 L Phosphoric Acid Rail Tankers. First time in India with RDSO Design.	GFCL
30 Rail Tankers	8 Wheeler Ammonia Rail Tankers with RDSO Design	GFCL
40 Nos.	LPG Tankers	Burn Standard.
<u>Horton Spheres</u>		
Horton Sphere	12.7 M LPG Horton Spheres	IOCL, Shakurbasti Bottling Plant
<u>LPG Bullets :</u>		
40 LPG Bullets	100 MT to 150 MT	For various LPG bottling plants of HPCL, BPCL and IOCL throughout India.
Other LPG Bullets	5 MT to 25 MT	To various public and private sectors.
<u>Columns</u>		
Light End Fractionating Column	3.4 M/2M ID x 52/32 THK x 42 M Long. Weighing 130 MT supplied in single piece	ONGC for Urban Project
Atmospheric Distillation column	3.4 M ID x 40 M Long made out of clad materials 410 S and Monel.	HPCL for Vizag Refinery
Extraction Column	305 mm dia. x 50 thk x 22 mm long Weighing - 120t.	HPCL Mumbai Refinery
<u>Coolers</u>		
High Pressure Synthesis Gas Coolers	With integral tube sheets Weighing 5 MT each, thickness of tube sheet. 225 MM with hydro testing pressure 400 Kg/Cm ² (g)	RCF for Thal Project
<u>Fin Tubes Heat Exchangers</u>		
R.C.O. Pre heater	752 Nos 1" O/D C S Fin Tubes	IOCL Guwahati
Stainless Steel	1100 Nos. 3/4" O/D SS Fin tubes for five tube bundles.	IPCI for Acrylic Fibre Project
Condenser Casing	2" OD Fins - 452 Nos. Tubes on each bundle	Gujrat Hydro Cracker,
Air Cooled Exchangers	10 Mtr. Long - 8Sets	IOCL, Baroda
<u>Dished Ends / Pressed Items</u>		
Dished Ends	1250 ID x 100 THK, 1170 ID x 140 THK	Bhopal & Hyderabad
Toricone	4040 OD x 1650 ID x 2250 Long x 86 THK	Larsen & Toubro, Hazira.



MULUND UNIT

Broad Parameters of Jobs Executed

Equipment	Dimensions
Carbon Steel Vessels	4600 mm dia., 52 MM THK Weight 75 MT
Stainless Steel Vessels	400 KG / Cm ² Detector Weight 15 MT
C.S. Column	3400 mm dia., 52 mm THK, 42000 mm long single piece, weight 130 MT
Clad Column	3400 mm dia., 16 mm THK, 40000 mm long, Weight 75 MT
Horton Sphere	12700 mm dia., 32 mm THK
Heat Exchangers	Tube Sheet 2800 mm dia., 140 mm THK, with 3000 Nos. of holes & 1250 mm dia., 225 mm THK, with 860 Nos. of holes.
Dished Ends	1250 ID X 100 THK 1170 ID X 140 THK



HPT PRESSING OF DISHED ENDS IN
PROGRESS ON 1200 MT VERSION DOUBLE
ACTION HYDRAULIC PRESS



Some of our Prestigious Clients

- Hindustan Petroleum Corporation Ltd., Mumbai.
- Bhabha Atomic Research Centre, Mumbai.
- Bharat Petroleum Corporation Ltd.
- Indian Oil Corporation Ltd., Mumbai / Delhi.
- Godrej & Boyce Mfg. Ltd.
- Walchandnagar Industries Ltd.
- Shri Ambuja Petrochemicals Ltd., Baroda.
- Simon Carves India Ltd., Calcutta.
- Oil & Natural Gas Commission, Mumbai.
- Zuari Agro Chemicals Ltd., Goa.

CONDENSATE POLISHING VESSEL FOR
WATER TREATMENT PLANT NTPC TALCHER

MULUND UNIT



Testing Facilities

X-Ray Units upto 300 KV, "Gamma Ray & Cobalt Equipment of 20 Curies "Ultrasonic Flaw Detector "Ultrasonic Thickness gauge "Impact Testing "Helium leak Detector "Universal Testing Equipment / Charpy and Izode impact testing equipment/ Hardness testing machine etc. "Hydraulic testing facility upto 500 Kg / Cm² (g) * Dye penetrant testing "Magnetic particle testing equipment * Spectro Calorimeter * Carbon, Sulphur, Phosphorous analyser "Optical instruments "Metallurgical Microscope.

Inspection Agencies

- * M/s. Lloyds Registered Industrial Services Ltd.
- * M/s. Engineers India Ltd.
- * M/s. Projects & Development India Ltd.
- * Chief Inspector of Boilers
- * M/s. Nuclear Power Corporation Ltd.
- * M/s. Bax Counsel Inspection Bureau Pvt. Ltd.
- * M/s. National Thermal Power Corporation Ltd.
- * Research Design & Standards Organisation
- * M/s. Industrial & General Inspection Services.
- * M/s. Tata Consulting Engineers.
- * M/s. UHDE India Ltd.

EXTRACTION COLUMN FOR HPCL MUMBAI REFINERY LRE - 2 EXPANSION. 3500 MM DIA. X 50 MM THK X 2300 MM LONG, WEIGHT - 110 TONNES.



MULUND UNIT



COLUMN NC - 304 FOR RELIANCE INDUSTRIES LTD. HAZIRA.

Our Clientele

- **Bharat Heavy Electricals Ltd.**
- **Department of Atomic Energy.**
- **Engineers India Ltd.**
- **Godavari Fertilizers & Chemicals Ltd.**
- **Hindustan Petroleum Corporation Ltd.**
- **Hindustan Organic Chemicals Ltd.**
- **Indian Oil Corporation Ltd.**
- **Indian Petrochemicals Corporation Ltd.**
- **Indian Space Research Organisation.**
- **Indian Farmers Fertilizers Co-operative Ltd.**
- **Krishak Bharati Co-operative Ltd.**
- **Larsen & Toubro Ltd.**
- **Mazagaon Dock Ltd.**
- **National Fertilizers Ltd.**
- **Nuclear Power Corporation Ltd.**
- **Oil & Natural Gas Commission.**
- **Projects & Development India Ltd.**
- **Rashtriya Chemicals & Fertilizers Ltd.**

MULUND UNIT



MANUFACTURING FACILITIES

Item	Details
Hydraulic Press	1200 Ton Capacity
For Dished Ends	(1800 x 4399 mm Bolster x 600 mm shut height x 3600 mm daylight)
Pressing	200 mm thick plate
Highpower Bending Roll	For 52 mm thick and 2.5 m wide plate.
Bogie type stress relieving furnace	8.5 x 4.4 x 5.4 m height with precision temperature control and recording instruments
Multi nozzle oxyplaner	4350 x 17300 x 180 mm
Plasma Cutting Machine	With optical attachment for stainless steel cutting upto 100 mm thickness. Also Duplex plate edge planner, profile cutting machine etc.
EOT Cranes, Welding Rotators and Welding Machines	Material Handling facility upto 70 t, Welding rotators 5 MT to 120 MT Capacity, MIG TIG Fuse arc, SAW & other welding machines.
Horizontal Boring Machine	WMW 160 mm Dia. spindle Longitudinal movement 5900 mm x Vertical movement 2900 mm



MULUND UNIT

MADRAS UNIT

The branch office at Madras was set up in 1912. Initially this branch was engaged in selling sanitary fittings, light machinery and engineering sundries. With the growth of business, this branch became one of the leading contractors, undertaking contracts for installation of sanitary equipment with allied drainage and water supply works. During 1926 the first fully equipped work was built in the vicinity of Madras Harbour for the manufacture of fabricated structural steel work.

As years went by, contracts for structural engineering began to flow in. To cope with expanding business, the original works near the harbour was transferred to Cassimode and extensions constructed. From then onwards the works at Cassimode Madras underwent continuous improvements. The total employee strength of the unit is 250 approximately. At present their activity is being done at Ambattur Unit.

The main activities of this plant are :

- Medium and Heavy Structural Fabrication
- Refrigeration Equipments
- Package Water Treatment Plants
- Water, Waste water and Sewage Treatment Plants
- Operation & Maintenance of Treatment Plant, Air Monitoring & Studies.
- Sanitary and Plumbing Installations

STRUCTURAL PRODUCT COMPONENTS

With facilities for manufacturing Heavy Engineering

Components, requiring high quality fabrication and precision machining and assembly, R&C has now begun to undertake manufacture of specialised sub-assembly components for select customers to improve their production levels and deliveries. For Bharat Heavy Electricals Limited, R&C has fabricated connecting plate assemblies and Rotor Housings for their Air Preheater System and Oil Tanks and Bottom Plates for Condensers in the 210 MW Boilers and cable trays for Bharat Heavy Plate & Vessels Ltd. R&C also undertakes, fabrication of atmospheric & pressure vessels for water industry and pollution control projects.

CONSULTANCY SERVICES

R&C renders consultancy services for specialised areas which are in the form of feasibility reports to be submitted to Government Authorities for clearing Industrial licenses, Financial proposals etc., Studies undertaken include Civil and structural - design & detailing including foundations, Environmental Impact Assessment studies, Effluent Treatment, air pollution and gas removal systems, Air-conditioning, Refrigeration and Ventilation. Specialised Training Programmes for installation operation and maintenance of various products and systems, manufactured by R&C are also undertaken exclusively.

The Computer Centre is presently developing software packages for design of treatment plants and related equipments, project appraisal, detailing of drawings etc. This will facilitate improved services to our valuable customers. R&C Structural, Refrigeration and Environmental Engineering departments are manned by a team of highly qualified scientists & engineers having experience in R&D, design and project execution. R&C has working arrangements also with reputed consultants and National Institutions to undertake very specialised jobs.



MADRAS UNIT



PROJECT SERVICES

CIVIL AND STRUCTURAL

With qualified and extensively experienced Project and Design Engineers R&C has been able to execute combined Civil and Structural Turnkey Projects for various Port Trusts and Ship Yards including Outer Harbour Project at Visakhapatnam, Steel Plants, Sugar Factories, Steel Stock Yards, LPG Bottling Plants, Thermal Power Plants, Railways, Paper, Textiles, etc.

For Fertilizer, Petrochemical and Oil industry the detailing of drawings, fabrication and erection of Cone

roof for storage tanks, Underground Tanks, Shock testing tanks, Phosphoric acid storage tanks including sand blasting and painting has been undertaken by R&C.

The quality and scheduling of works have met the approval of all important consultants - EIL, MECON, DCPL, RITES in the Country. Other related works such as the provision of Flood Light Towers and Bunkers at various project sites is also a part of R&C capabilities.

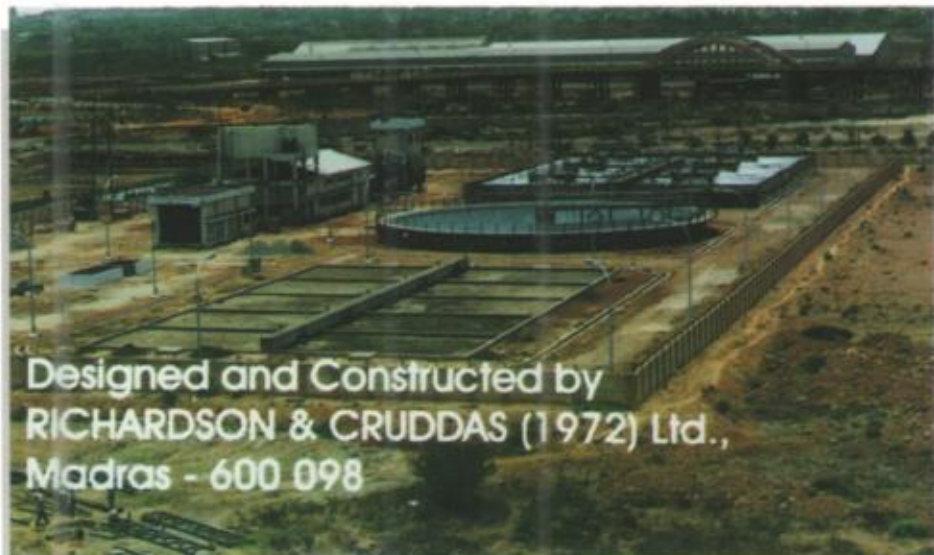


FABRICATION & ERECTION OF MS.FLOATING ROOF & CONE ROOF VERTICAL STORAGE TANKS FOR M / S INDIAN OIL CORPORATION LTD. AT THEIR NEW BANGALORE TERMINAL, DEVAMAGUTTL.

SEWAGE TREATMENT PLANT (10MLD) CAPACITY FOR VISAKHAPATNAM PORT TRUST

ENVIRONMENTAL ENGINEERING

R&C expanded to undertake the Environmental Engineering activities two decades ago. Today the organisation has expanded and diversified to offer total Environmental protection. From concept to commissioning, R&C provides complete Environmental Engineering Services. With a specially trained and skilled task force, R&C offers techniques and equipment for treatment and control of pollution of WATER, AIR and LAND.



Designed and Constructed by RICHARDSON & CRUDDAS (1972) Ltd., Madras - 600 098



MADRAS UNIT

The R&C Package services include process and equipment design, project engineering, execution commissioning, training and comprehensive field service. R&C manufactures and supplies water & waste water treatment systems on turnkey basis for industrial and domestic applications. Having perfected Pollution Control Technology in the Past. R&C have successfully completed several projects all over the country. These are serviced and maintained by our experienced Engineers.

R&C Equipment for Air Pollution Control :

- Centrifugal & Axial Fans, Blowers.

For Water & Waste water treatment :

- Mechanical screens, Grit separation systems, Flash mixers, Clarifiers, Surface Aerators, Agitators/Mixers, Clariflocculators, Sludge mixers, Oil separators, Chemical dosing systems, Pressure filters, Package Iron, Removal plants, Package Defluoridation plants, Package sewage treatment plants.

PUMPING STATIONS / TRANSFORMERS / ELECTRICAL SUB-STATIONS

In line with the commitment to the enhancement of water supply projects / programmes, R&C has designed and executed water and sewage pumping stations with Centrifugal / Turbine / Submersible heavy duty pumpsets,

M.S./ C.I. pipe lines, and overhead cranes with related accessories on Turnkey basis including operation and maintenance of the stations as required by the client.

R&C also does installation works inclusive of supplies of H.T. Sub-stations with Indoor / Outdoor Transformers, generating sets/alternators with switch gears, M.S. Kiosks and 2/4/6 pole structures etc., R&C also provides external/internal electrification including overhead/underground H.T. lines with suitable panel boards. The major customers are the Municipal Corporations and Water supply and Sewerage boards and Public sector undertakings.

SANITATION & PUBLIC HEALTH

Package Water Treatment plant for treatment of Turbidity micro-organism and iron concentration.

Sanitary and plumbing contracts involving supply and fixing of all sanitary wares, supply and installation of internal building water supply and sewage disposal systems for multistoreyed buildings, hotels, hospitals, offices, factory complexes, commercial establishments, etc. Turnkey plants for treatment of water, Sewage, Industrial effluents from consultancy to commissioning. Plants can be provided for any industry manufacturing organic and inorganic chemicals, textiles, dyes or plants engaged in electroplating, food processing, dairies, etc. Fullfledged laboratory for Physico-chemical and biological analysis of Water, Sewage and effluents.

Major Clientele include :

- * Metallurgical & Engineering Consultants (I) Ltd. Ranchi.
- * Central Mine Planning & Design Institute Ltd., Ranchi.
- * Oil & Natural Gas Commission, Madras.
- * Indian Oil Corporation Ltd., Madras.
- * Tamil Nadu Pollution Control Board, Madras.
- * Coal India Ltd.
- * Nagarjuna Fertilizers & Chemicals Ltd. Kakinada
- * Needle Industries Ltd., Ooty

MADRAS UNIT



MECHANICAL ENGINEERING

This department specializes in the manufacture, supply, erection and commissioning on turnkey basis, pumping water sets which include mechanical and electrical equipments i.e. pumps, motors, pipings, transformers, switch gears, sub-stations, overhead cranes, external electrification etc. Besides, this department also manufactures and supplies India Mark-II Deep Well Handpumps to the designs developed by R&C in close co-operation with UNICEF.

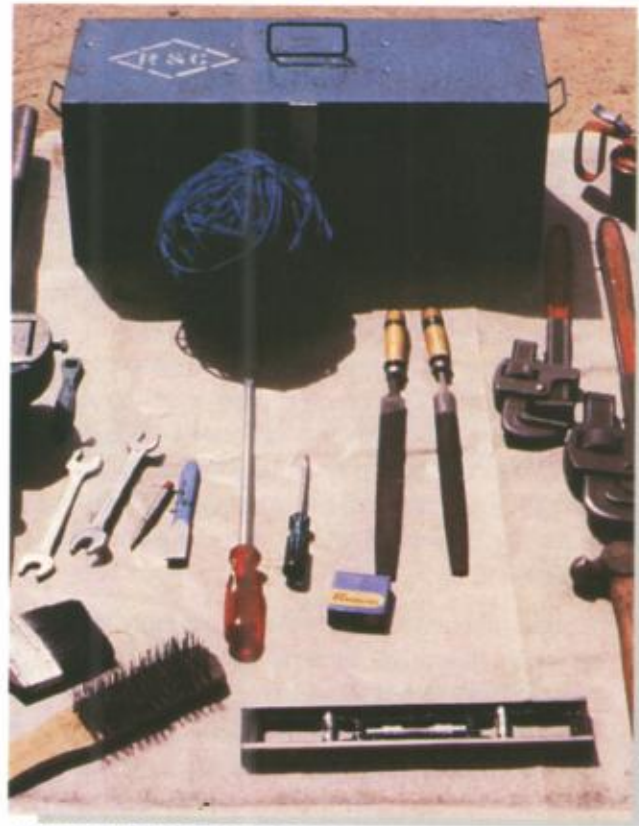
R&C has been playing a vital role in the field of water management in general and in the development of India Mark II Hand Pumps in particular. Over 5,00,000 pumps of R&C make are working satisfactorily in almost thirty seven countries.

India Mark II Deep Well Hand Pumps of R&C make are well known to various national and International agencies. Having mastered the development and manufacture of the world famous India Mark II Deep Well Hand Pump, R&C continues its research and developmental activity and has now brought out the Modified version of the Standard Pumps. The latest ones are the **VLOM India Mark II Deep Well Hand Pump** and



PUMP ASSEMBLY - MARK I, II, III & EXTRA DEEP WELL

PRODUCTS SERVICES



INDIA MARK II STANDARD TOOLS SET

Shallow well Hand Pumps with extractable check valve.

SALIENT FEATURES :

- Pumps are specially designed and constructed to facilitate village level mechanics to attend to the repairs with ease and comfort.
- Trouble free operation.
- Repairing requires only one village level mechanic and a helper.
- Requires few simple tools which can be carried easily for repair work. Time involved to change worn-out washer is only 30 minutes (max.).
- Does not involve removal of riser pipe for change of washers.
- With the modified construction involved in these pumps, handle assembly need not be removed during repairs.



MADRAS UNIT

The VLOM Shallow Well Pump is developed for use upto static water level of 12 metres. These pumps are provided with standard connecting rods with 65 mm N.B.G.I. riser pipe in 3 metre length and 63.5 mm I.D. open top cylinder with extractable check valve. The pump shall have a light handle.

The VLOM Deep Well Hand Pump is recommended for use in wells having static water level (SWL) ranging from 12 metres to 33 metres with standard connecting rods and 65 mm N.B.G.I. riser pipe in 3 metres length, and 63.5 mm I.D. open top cylinder with extractable check valve. The pump shall have a standard handle with or without 'T' bar. The basic design of VLOM pumps is same as Standard India Mark II with following modifications.

1. Shorter and small size handle assembly made from 25 mm square bar for Shallow Well and Standard handle for Deep Well with or without 'T' bar.
2. The head is supplied with a hole of 75 mm at the bottom instead of guide bush. An additional 6 mm plate is supplied with guide bush welded.
3. The water tank assembly is fitted with coupling to suit 65 mm N.B. G.I. riser pipe (medium class).
4. 63.5 mm I.D. cast iron cylinder with brass liner fitted with bottom cap to suit check valve and top cap to facilitate extraction of plunger and check valve assemblies for repairs without lifting the riser main (65 mm G.I.). The rod used is same as in India Mark II Standard Pump.
5. The pump is supplied with synthetic rubber washers having high wear resistance.

Our Clients :

Over 1000 R&C Modified Pumps are in use in India and abroad. Our clients include international aid organisations, various State Governments of India and voluntary organisations in Asia and Africa.

R&C's India Mark II Handpumps are rated as No. 1 in the world, and is the ideal answer to the requirements of thirsty millions. This pump can draw water from 8-90 metres and yields 750 litres per hour, and can be easily operated by women and young children. R&C pumps are manufactured under in-house Quality Assurance



INDIA MARK II HAND PUMP

teams of highly qualified and experienced engineers, as also by reputed external agencies such as SGS, Crown Agents, Export Inspection Agency, Wardrop Consultants (Canada) OMIC, BIS and others. India Mark II Pumps developed in 1976 has become the ultimate answer to tap safe water from deep aquifers all over the world.

R&C's Continuing Research and Development programme successfully yielded further versions of pumps for different duty conditions and for easier maintenance and operation. The pumps identified as Shallow Well, Deep Well, Extra Deepwell and VLOM etc., cater to the conditions and needs of different water levels varying from 8 metres to 90 metres.

In exports, R&C has remained the leader, and is a regular winner of the Certificate of Merit from Engineering Export Promotion Council since 1984-85. With exports to more than 37 countries R&C pumps are in use in Afganisthan, Botswana, Burma, Cotonou, Ethiopia, Guinea-Bissau, Haiti, Kampuchea, Kenya, Madagascar, Nepal, Nigeria, Phillipines, Salisbury, Sierra Leone, Singapore, Sri Lanka, Sudan, Tanzania, Thailand, Uganda, Upper Volta & Zaire, and so far 75,000 pumps to these countries, have been exported.

MADRAS UNIT



LABORATORY SERVICE

THE Environmental Laboratory is recognised as Board Laboratory for Testing Air & Water samples by the Tamilnadu Pollution Control Board.

R&C undertakes Environmental Impact Assessment studies for locating industries under the Environmental regulations. R&C has already carried out studies for Nagarjuna Fertilizers & Chemicals Ltd., and Needle Industries.

R&C equipped with a full-fledged modern laboratory also undertakes analysis of water, sewage and industrial effluents, stack sampling and analysis, air quality monitoring etc. The Environmental Engineering Laboratory is manned by qualified personnel with varied experience in the field of Environmental Engineering. The Laboratory is equipped with the most modern and sophisticated instruments and equipments needed for physico-chemical and bacteriological analysis. R&C undertakes complete analysis of sewage and industrial effluents, to find their suitability for various modes of discharge. The industrial effluent is completely analysed for parameters specified under B.I.S./ State Pollution Control Boards discharge limits. The major areas of activity thus are :

- Analysis of Water & Waste Water.
- Treatability Studies.
- Monitoring of treatment works at regular intervals to evaluate performance of treatment plants.
- Air quality monitoring.
- Stack sampling & Analysis.
- Noise level and monitoring.
- Base line Data generation.
- Environmental Impact Assessment Studies.

For effective treatment of effluents and sewage, this plant has completely equipped laboratory.

Some of the major equipments in the laboratory are :

- 'ADCO-EVAQUIP' Single stage Rotary Vane type vacuum pump 30 Lit./ min.
- 'ELICO' spectro photo meter model CL- 24 for analysis of heavy metals.
- 'BOD' Incubator (10 cubic Feet) with voltage stabilizer
- 'ADCO' Hot Air Drying & Sterilising Oven.
- 'ELICO' Conductivity Bridge with conductivity cell for analysis of dissolved salts.
- Loviband Comparator box with Chlorine Disc.
- Autoclave size 14" x 22" (Gun Metal).
- Bacteriological Incubator.



LABORATORY



MADRAS UNIT

REFRIGERATION ENGINEERING

Custom built combination coolers, bottle coolers, water coolers, milk chilling units, display counters, deep freezers, ice-candy plants, ice-cream freezers, vaccine storage cabinets, hospital and mortuary cold rooms, etc. These are equipped with condensing unit, world famous 'FRIGIDAIRE' compressor to designs of General Motors, U.K.



DEEP FREEZER



1 TON SPLIT A/C
MANUFACTURED BY R&C



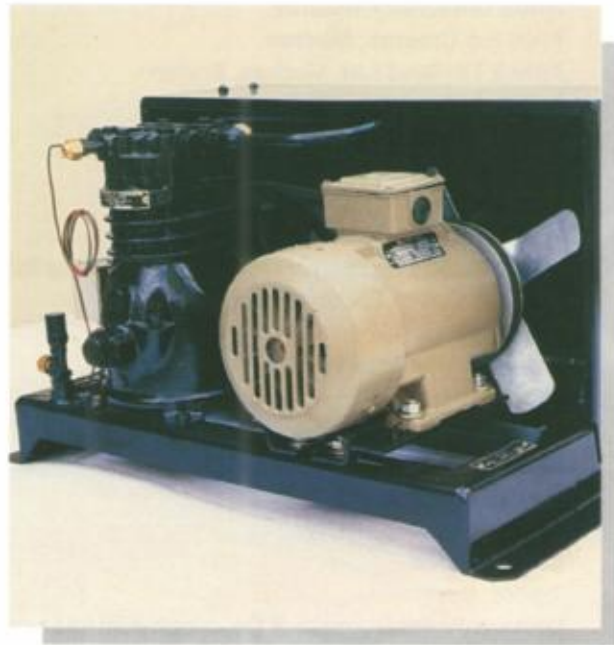
WATER COOLER

MADRAS UNIT



REFRIGERATION COMPRESSORS AND CONDENSING UNITS

The R&C open type reciprocating refrigeration compressors and condensing units have successfully replaced the compressors of the 'Frigidaire' design from General Motors U.K., in India hitherto imported by R&C for its application products and projects. The compressors and condensing units are exclusively manufactured at the newly set-up Ambattur plant with sophisticated machines and testing facility under strict in-house Quality Control. Models are available in 4 sizes : **ADI 50Y (1/2 H.P.)**, **AP3 (1 H.P.)**, **AP6 (3 H.P.)** and **WP8 (7.5 HP)** and these units compare favourably with international makes.



COMPRESSOR



COMPRESSOR

R&C, Madras has also been manufacturing a wide range of application products such as Water Coolers, Ice Cream Freezer, Ice Candy Plants, Ice Makers and Milk Coolers etc. These products are ranked best in performance and durability.

R&C also undertakes projects in areas of Air-Conditioning and Ventilation ; Cold Rooms for poultry, meat, fish, mortuary and industrial applications; chilling plants for Chemical, Pharmaceutical, Tyre, Leather, Automobile and other Industries. R&C also manufactures oil coolers and computer panel coolers for CNC machines.



MADRAS UNIT

SOME OF OUR PRESTIGIOUS CLIENTS

Product Refrigeration Handpumps

- Annapoorna Group of Hotels.
- Anna University, Madras.
- Arun Ice Creams, Madras.
- Ashok Leyland Ltd, Madras, Ennore.
- B.C.C. Laboratory, Madras.
- Chitra Tirunal Institute, Trivandrum.
- Dunlop India.
- English Electric Company, Madras.
- Hindustan Machine Tools, Hyderabad.
- Indian Space Research Organisation, Sriharikota.
- Integral Coach Factory, Madras.
- I.I.T. Madras.
- Lakshmi Machine Works.
- Mico Bangalore.
- Power Products, Hosur.
- Reckitt & Colman of India.
- Savitha Ice Creams, Madras.
- Shriram Fibres Trichy.
- Danida India.
- Eficor, Bangalore.
- Ground Water Surveys & Development Agency, Maharashtra.
- Kerala Water Authority.
- Lutheran World Service, Calcutta.
- Municipal Corporation of Delhi.
- Madras Metropolitan Water Supply & Sewage Board.
- UNICEF, New Delhi.
- Tata Exports Ltd., Mumbai.
- Ashok Layland.
- Bharat Heavy Plate & Vessels Ltd.
- Dunlop (I) Ltd.
- English Electric Ltd.
- Lakshmi Machine Tools Ltd.
- MRF, Ltd.
- PSG College, Coimbatore
- Spic
- Southern Railway
- Thiruvalla Medical Mission
- V.S.S.C. Trivandrum

Hand Pump Exports

1. Ethiopia, 2. Lagos, Nigeria 3. Kano, Nigeria
4. Mali 5. Sokoto, Nigeria 6. Sudan 7. Zaire
- Adventist Development & Relief Agency,
Sudan Finwater, Tanzania
- Nihon Industrial Products Ltd., Singapore
- OXFAM, Thailand
- Swedish International Development Authority,
Sweden
- Tanganyika Christian Refugee Services,
Tanzania
- Thai-pore Enterprise Pte. Ltd., Singapore
- United Nations, New York
- Wenchi Village Water Project, Ghana

MADRAS UNIT



Project Civil & Structural

- Bharat Petroleum Corporation Ltd., Mumbai.
- Bharat Heavy Electricals Ltd., Hyderabad.
- Hyderabad, Haridwar, Ranipet, Trichy.
- Cochin Shipyard Limited.
- Godavari Fertilizers and Chemicals Limited. Kakinada.
- Hindustan Paper Corporation.
- Integral Coach Factory, Madras.
- Raichur Thermal Power Plant.
- Southern & South Eastern Railways.
- Madras Port Trust.
- Nagpal Ambadi Petrochemical & Refineries.
- Naval Science & Technological Laboratory, Vizag.
- Salem Steel Plant.
- Steel Authority of India Limited, Bangalore.
- Vishakapatnam Steel Project.
- Balmer Lawrie & Co. Ltd.
- Hindustan Paper Corporation Ltd., Mevellingore.
- Kerala Minerals & Metals Ltd., Quilon.
- Hindustan Machine Tools Ltd., Bangalore.
- Brooke Bond India Ltd., Secunderabad.
- Thirumalai Tirupathi Devasthanam.
- Hotel Woodlands, Bangalore & Madras.
- Tube Investment Group, Madras.
- Amalgamation Group, Madras.
- Bokaro Steel Plant, Bihar.
- Rourkela Steel Plant, Rourkela.
- Cochin Shipyard Ltd., Cochin.
- Visakhapatnam Port Trust, Vizag.

ENVIRONMENTAL ENGINEERING

- Indian Airlines Corporation.
- Bharat Dynamics Ltd., Hyderabad.
- Central Coal Mines Development Authority, Dhanbad.
- Cuttack Development Authority.
- Hindustan Machine Tools, Bangalore.
- Indian Space Research Organisation, Sriharikota.
- Indian Oil Corporation Ltd.
- Kerala Chemicals and Proteins Ltd.
- Kerala Water Authority.
- Municipal Corporation of Delhi.
- Military Engineering Services.
- Madras Metropolitan Water Supply & Sewage Board.
- Oil & Natural Gas Commission.
- Reckitt & Colman of India.
- Salem Steel Plant.
- Tamilnadu Water Supply and Sewerage Board.
- Vishakapatnam Steel Project.
- New Mangalore Port Trust.
- Municipal Corporation of Visakhapatnam.
- National Dairy Development Board.
- Madras Fertilisers Ltd.



MADRAS UNIT

NAGPUR UNIT

This unit was set up in 1969, is manufacturing Galvanised Transmission Line Towers and doing construction of Transmission Lines for National Thermal Power Corporation Ltd. Powergrid Corporation of India, Damodar Valley Corporation, Neyveli Lignite Corporation and many other State Electricity Boards in India. This unit also specialises in Microwave and Communication Towers and have supplied and erected more than 200 Towers to Posts & Telegraphs Department, "All India Radio" etc. from 20 MTRS. to 150 MTRS. height.

Nagpur Unit is one of the major supplier of Railway Electrification Structures to Indian Railways..



100 MTRS. FM TOWER DESIGNED,
SUPPLIED & ERECTED BY R&C,
NAGPUR FOR ALL INDIA RADIO AT
VISAKHAPATNAM



A VIEW OF STRUNG 200 KV D / C TRANSMISSION
LINE DESIGNED, MANUFACTURED & ERECTED
BY R&C, NAGPUR FOR VISAKHAPATNAM
STEEL PLANT, VISAKHAPATNAM.

NAGPUR UNIT



PRODUCTION

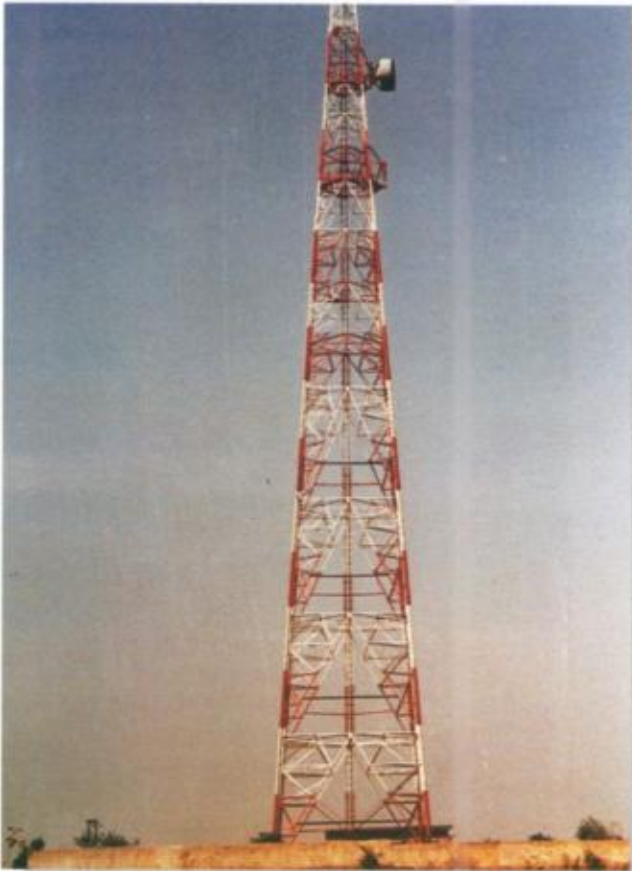
Licenced Capacity	12,000 MT per Annum
Installed Capacity	12,000 MT per Annum
Operating Capacity	11,000 MT per Annum

The unit spread over 25 acres has sophisticated fabrication facilities for manufacture of Transmission lines and other steel structures. Present employee strength is around 360, which consists of trained and specialised design, production and project Engineers.

FACILITIES

Fabrication Section

- * Cropping / Shearing / Sawing machines.
- * Punching and Drilling machines.
- * Section Straightening presses.
- * Hydraulic and mechanical presses for hot and cold bending.
- * Welding, Grinding, Chipping equipments



DESIGN

The design department is manned by qualified, trained and competent engineers having wide experience in computerised designing of Transmission Line / Microwave / Television Towers.

The computerised design facilities available in Nagpur & Mumbai are one of the best in the industry for optimisation, keeping in view structural stability.

QUALITY CONTROL & TESTING

The Unit has well equiped Quality Control Department, where the materials are thoroughly checked / inspected from raw material stage to finished goods as per the requirements of purchaser. Standard Quality is ensured by Quality Control Department right from the receipt of raw material till despatch of finished goods.

A VIEW OF 100 M HIGH MICROWAVE
TOWER SUPPLIED TO
POST & TELEGRAPHS DEPARTMENT
AT WARDHA IN MAHARASHTRA



NAGPUR UNIT

GALVANISING SECTION

Galvanising shop is equipped with modern machines and apparatus to ensure high quality of galvanisation.

FACILITIES

- Pre-treatment plant for pickling.
- Galvanising bath and Furnace
- Post-treatment facilities for dichromating.



A VIEW OF 40 M SHORTWAVE TOWER
DESIGNED, MANUFACTURED &
SUPPLIED BY R&C NAGPUR FOR ALL
INDIA RADIO, JAIPUR



PAYING OUT OF TWIN BUNDLED
CONDUCTOR FOR 400 KV S / C
TRANSMISSION LINE

NAGPUR UNIT



PROJECTS

Nagpur Unit has executed / executing number of Jobs on turnkey / individual job basis for 132 KV / 220 KV / 400 KV Transmission Line and Microwave towers in India and abroad.

Project Department is staffed by well qualified engineers, foreman, supervisors and technicians to undertake construction of Transmission Line, Microwave and Television Towers.

STRINGING

The Unit has its own TESMAC (ITALY) make Tension Stringing equipment for stringing of twin bundled Moose conductors for 400 KV single Circuit Transmission Line Towers.



VIEW OF CONDUCTOR STRINGING
FOR 400 KV SINGLE CIRCUIT
LINE PROGRESS



TENSION STRINGING EQUIP-
MENT USED FOR STRINGING
TWIN BUNDLED CONDUCTOR
(MOOSE) FOR 400 KV SINGLE
CIRCUIT TOWER



NAGPUR UNIT

TOWER TESTING

The Unit has its own full fledged Tower Testing facilities on a land measuring approx. 8 Acres at Wanadongri, proximity to the factory. It enables the company to study the behaviours of individual steel member of a vertically erected superstructure of Proto-type towers upto 400 KV double circuit and 750 KV single circuit when designs loads are applied physically at various loading points.

Salient Features of Tower Test Bed

- | | | | |
|----|------------------------------|---|--------------------|
| 1. | Capacity | : | Upto 750 KV Towers |
| 2. | Base Dimension | : | 18m X 18m |
| 3. | Max. height of Tower | : | 60M |
| 4. | Max. uplift per leg of Tower | : | 350 Tonnes |
| 5. | Max. Cross arm spread | : | 35M |
| 6. | Safe overturning capacity | : | 12,600 t/m |

- * Sophisticated Remote Controlled electronic equipment for application and measurement of loads in three directions.
- * Handling equipments for erection & dismantling of Test Tower.
- * Back up Calibration
- * Workshop Facility

The Test Bed has the credit of testing more than 275 Nos. of Towers so far of its own designed Towers and also of other transmission line tower manufacturers, which including overseas manufacturers from Abu Dhabi, Ethiopia, Malaysia etc.



A view of 220 KV D/C Tower being tested at R&C Test Bed for Damodar Valley Corporation, Calcutta.

A VIEW OF
TOWER TESTING
STATION AT
RICHARDSON & CRUDDAS
(1972) LTD. ,NAGPUR



NAGPUR UNIT



EXPORTS

This unit has bagged against stiff competition the following 2 Transmission Line Export job and Executed in record time much before the stipulated completion period and has won **"EXPORT EXCELLENCE AWARD "**.

- | | | |
|----|---|--|
| 1. | H.M.G. of Nepal,
Electricity Deptt.,
Kathmandu, Nepal | Design, Supply, Erection,
Commissioning of 132 KV D/C
Transmission Line - 3000 MT (208 Kms.) |
| 2. | Second Kulekhani
Hydroelectric Development
Board, Nepal | Design, Fabrication, Supply & Erection and
Commissioning of 132 KV D/C Transmission |

SOME OF OUR PRESTIGIOUS CLIENTS

- Maharashtra State Electricity Board, Mumbai.
- Rajasthan State Electricity Board, Jaipur.
- Goa Electricity Dept., Goa.
- Indian Posts & Telegraphs Dept., New Delhi.
- South Central Railway, Secunderabad.
- Crompton Engineering Co., Madras.
- Hindustan Steel Constructions Ltd., Madras.
- SICOM, Mumbai.
- Southern Railway, Madras.
- Central Railway, Mumbai.
- Firth (India) Steel Co., Mumbai.
- Karnataka Electricity Board.
- Indian Explosives Ltd., Kanpur.
- National Thermal Power Corporation.
- Power Grid Corporation of India.
- All India Radio.
- Doordarshan.
- Tamilnadu State Electrical Board.
- Department of Tele-communication.
- Railway Electrification, Allahabad.
- Damodar Valley Corporation.
- Eastern Railway.
- HMG of Nepal.
- Madhya Pradesh Electricity Board.
- Neyveli Lignite Corporation.
- Bharat Heavy Electricals Ltd. , Bhopal.
- Visakhapatnam Steel Plant.



NAGPUR UNIT

LATEST ACHIEVEMENTS

BYCULLA UNIT SUPPLIES GREASE KETTLE

R&C, Byculla has designed and fabricated a grease kettle for manufacturing lubricants. These grease kettles are associated with Agitator Vessels. Maintaining of internal diameter of the vessel and the gap between jacket shell and main shell, are of very critical importance as slight deviation in limits in inner dia of the shell would result in unequal heat transfer. This would result in agitation of grease and spoiling the entire batch of grease.

Earlier fabrication of such agitator vessel was never tried in India and was the monopoly of PATERSON & CO. of USA. However, R&C took up the challenge and equipment is working satisfactorily at customer's site.

Based on its performance, customer has placed further 2 Nos. of Agitator Vessel on repeat order basis.

MULUND UNIT'S COOLEX COOLER FOR L&T

In an attempt towards diversification, Mulund Unit, Mumbai has taken up fabrication and assembly of coolex cooler for L&T. The cooler, so installed, is an equipment in the Cement Plant in the Kiln section. Clinters in the form of Balls at a temperature of more than 1000 degree centigrade are cooled by this cooler and the excess heat is used in other processes. The machine occupies an area of almost 40 M x 60 M and the weight of set is about 120 tonnes.

TASK COMPLETED ON SCHEDULE BY R&C, MADRAS

Further, R&C has got an order worth Rs. 85 lacs and of a total tonnage of 550 MT from Gammon India Ltd. The order is for fabrication and erection of embedded parts of Almatti Dam.

In executing the contracted orders, R&C has shown commendable efficiency. It completed a shut down job of 180 MT for RCF, Chembur in exactly 4 weeks time as stipulated by the client. The order comprised dismantling, fabrication and erection of conveyer gantries. The order is valued at Rs. 78.3 lacs.

TNEB REPOSES CONFIDENCE IN R&C, NAGPUR

Richardson & Cruddas, (R&C) Nagpur has recently clinched a deal worth Rs. 10.8 crs. This contract is for the supply of 110 KV transmission line towers to Power Finance Corporation Limited. , for TNEB, Madras. Falling under the purview of Power Efficiency Sector, the contract has been given to the company against an amount sanctioned by the World Bank. Total weight of the supply is 2035 MT. In a major breakthrough, R&C, Nagpur has bagged yet another order for supply of 110 KV S/C and D/C transmission line towers from TNEB, Madras at a total value of Rs. 10.2 crs. Total weight of supply is 3721 MT.

RICHARDSON & CRUDDAS

(1972) Ltd.

(A Government of India Undertaking)

A Subsidiary of Bharat Yantra Nigam Ltd.

Byculla Iron Works, Mumbai - 400 008 (India)

Tel: 3766832 - 3766839 Telex : 011-75662 Fax : 022-3731491



ESTD . 1858

BRANCHES & WORKS :

MULUND

MUMBAI :

L.B.Shastri Marg, Mulund, Mumbai - 400 080. Tel : 5680371 Telex : 011-71905

MADRAS :

69 - D, SIDCO Industrial Estate, Ambattur, Madras- 600 098 Tel : 6541111, 6258211 Telex : 041-22132

FAX : 044 - 6258295

NAGPUR :

MIDC Industrial Estate, Nagpur - 440 016

Tel : 07104 - 37326, 37286 Telex : 0715- 7328, Fax : 07104-37693

LIAISON OFFICES :

NEW DELHI :

9th Floor, Kanchenjunga, Barakhamba Road , New Delhi- 110 001

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Fax : 011-3313763

CALCUTTA :

Hindustan Building, 4 Chittarnjan Avenue, Calcutta - 700 072

Tel : 278735

