

ROURKELA STEEL PLANT, SAIL

Rourkela (Odisha)

Unit Profile

Rourkela Steel Plant (RSP), the First Temple of Modern India is the pride of Odisha. The state's glorious heritage of initiative, enterprise and entrepreneurial brilliance finds its modern expression in the Steel Plant. Rourkela Steel Plant is located in the north-western tip of Odisha and at the heart of a rich mineral belt.

A major producer of diversified range of sophisticated steel products, RSP is an integral part of the Steel Authority of India Limited (SAIL) - a Navratna Company. Built in the late 50's with West German collaboration, RSP was the first integrated steel plant to be set up in the public sector. RSP also pioneered the adoption of the sophisticated LD process of steel making in Asia.



The Plant, initially designed to produce half a million ton (MT) of crude steel per annum, was upgraded to produce 1 million ton of crude steel. The production of hot metal commenced at RSP with the lighting up of its first Blast Furnace 'Parvati' by the then President of India, His Excellency Dr. Rajendra Prasad on 3rd February, 1959. The other units at the 1 MT stage were commissioned by the early part of 1962.

In order to meet the additional demand for flat products in the country, the capacity of the steel plant was further expanded to 1.8 MT. Commissioning of the expansion units commenced in 1965 and was completed by 1969. In order to overcome technological obsolescence and to continue to remain competitive in the market place, RSP went for further modernization in 1988. **The modernisation of the Plant was completed in two phases from 1994 to 1999. With this the production capacity of the Steel Plant was augmented to 2 million tons of Hot Metal and 1.8 Million tons of Crude Steel.** Rourkela Steel Plant has carved a name for itself as a unique producer of special purpose steels in the flat steel segment. Plates, Hot Rolled Coils, Cold Rolled Sheets and Coils, ERW Pipes, Spiral Weld Pipes and Silicon Steel Sheets and Coils are the products in RSP's repertoire.

RSP has many firsts to its credit. It was the first plant in India to incorporate LD technology of steel making. It is also the first steel plant in SAIL and the only one presently, where 100% of the slabs rolled are produced through the cost effective and quality centered continuous casting route. RSP is the only plant in SAIL to produce silicon steels for the power sector, high quality pipes for the oil and gas sector and tin plates for the packaging industry. Another uniqueness of RSP is that it does not produce semis.

The use of its Plates in ship building & high pressure vessels, Silicon Steel in the electrical machine manufacturing industries, corrugated galvanized sheets for roofing including industrial roofing, pipes in the oil & gas sectors, tinplates in packaging industry and Special Plates in the defence of the nation is well known.

RSP is further undergoing massive expansion to augment Hot Metal Production from 2.0 to 4.5 MT and Crude Steel Production from 1.9 to 4.2 MT with introduction of state of art technology and energy efficient processes.

Specific Energy Consumption

Rourkela Steel Plant 2009-10

SL No.	SHOP/UNIT	Production ratio			GCal/TCS	
		GCal/TP	Actual	Balanced	Actual	Balanced
1	Coke Ovens	1.6075	0.6900	0.7174	1.1092	1.1533
2	Sinter Plant - I	0.5566	0.6702	0.5378	0.3730	0.2993
3	Sinter Plant - II	0.5305	0.9234	0.7410	0.4899	0.3931
4	Blast furnace	2.8663	1.0658	1.0573	3.0549	3.0306
5	SMS - I	0.9264	0.1936	0.1936	0.1794	0.1794
6	SMS - II	0.1526	0.8064	0.8064	0.1231	0.1231
7	Plate Mill	0.7213	0.2159	0.2146	0.1557	0.1548
8	Hot Strip Mill	0.5892	0.7354	0.7299	0.4333	0.4300
9	Pipe Plant	0.2574	0.0279	0.0353	0.0072	0.0091
10	Cold Rolling Mill	1.2801	0.1413	0.1790	0.1808	0.2292
11	Silicon Steel Mill	2.0210	0.0371	0.0468	0.0751	0.0945
12	CPP - I (Boiler)	0.0944	1.5181	1.5181	0.1432	0.1432
13	CPP - I (Power)	1.1207	0.1876	0.1876	0.2103	0.2103
14	MP Boiler	0.1265	0.3693	0.3693	0.0467	0.0467
15	Oxygen Plant	0.9415	0.0931	0.0931	0.0877	0.0877
16	RMP	0.9318	0.1197	0.1197	0.1115	0.1115
17	Auxiliary	0.1561	1.0000	1.0000	0.1561	0.1561
18	Losses	0.1221	1.0000	1.0000	0.1221	0.1221
19	Total				7.0591	6.9740

Rourkela Steel Plant 2010-11

SL No.	SHOP/UNIT	Production ratio			GCal/TCS	
		GCal/TP	Actual	Balanced	Actual	Balanced
1	Coke Ovens & CCD	1.5858	0.6986	0.7044	1.1079	1.1170
2	Sinter Plant - I	0.5615	0.6466	0.5201	0.3631	0.2920
3	Sinter Plant - II	0.5369	0.9091	0.7312	0.4881	0.3926
4	Blast furnace	2.8663	1.0661	1.0532	3.0558	3.0190
5	SMS - I	0.9656	0.1855	0.1855	0.1791	0.1791
6	SMS - II	0.1877	0.8145	0.8145	0.1528	0.1528
7	Plate Mill	0.7230	0.2135	0.2120	0.1543	0.1533
8	Hot Strip Mill	0.5805	0.7283	0.7309	0.4228	0.4243
9	Pipe Plant	0.2022	0.0392	0.0505	0.0079	0.0102
10	Cold Rolling Mill	1.2515	0.1334	0.1701	0.1670	0.2129
11	Silicon Steel Mill	2.0068	0.0358	0.0457	0.0719	0.0917
12	CPP - I (Boiler)	0.0484	1.4788	1.4788	0.0715	0.0715

Sl. No.	SHOP/UNIT	Production ratio			GCal/TCS	
		GCal/TP	Actual	Balanced	Actual	Balanced
13	CPP - I (Power)	1.2162	0.1836	0.1836	0.2233	0.2233
14	MP Boiler	0.1673	0.3936	0.3936	0.0659	0.0659
15	Oxygen Plant	0.6274	0.0950	0.0950	0.0596	0.0596
16	RMP	0.9559	0.1146	0.1146	0.1095	0.1095
17	Auxiliary	0.1346	1.0000	1.0000	0.1346	0.1346
18	Losses	0.1608	1.0000	1.0000	0.1608	0.1608
19	Total				6.9960	6.8702

Energy Conservation Measures Taken In RSP, Rourkela During 2010-11

- 1. Installation Of VVVF Drives In Hot Air Dryer Of Tandem Annealing Line of Silicon Steel Mill:** Hot air dryer motor is used for delivering hot air which is subsequently used to dry the sheet treated in TA Line. VVVF drive has been installed in the above mentioned motor of capacity 30 KW by M/S Danfoss Industries Pvt. Ltd. resulting in benefit of about 9 KW. Current drawn by the motor has been considerably reduced from a level of 45 to 30 Ampere. Besides this it has also resulted in ease of maintenance and reduction in down time.

Total Investment: Rs. 1,50,000

- 2. Oxygen enrichment in Blast furnace 2 & 3:** Hard coke is the main energy input to Blast Furnaces. It acts as reducing agent; acts as fuel for maintaining temperature to keep the iron in molten condition and it also take the burden load of the furnaces. Oxygen enrichment in B.F. – 2 & 3 of RSP has been done by utilizing the in-house facilities by 1 – 1.5 % to increase the coke burning rate and productivity. Productivity of the furnace has improved by about 2 – 2.5 %. Subsequent reduction in energy consumption by way of reduction in coke rate shall be quantified after stabilization of the process.

Total Investment: Rs. 4.53 Crores

- 3. Automatic operation of Electrical fields of ESP in Sinter Plant-II on Energy Saving mode/Charge ratio mode:** Automatic operation of the electrical fields of ESP of waste gas, SP-II in energy saving mode. Electronic controller unit for ESP with firing card & other accessories were procured from M/S Ador Powertron Pvt. Ltd., Pune and commissioned with in-house resources resulting in a saving of about 30 kWh.

Total Investment: Rs. 3.5 Lacs

- 4. Installation of VVVF drives in all the running equipments of Batt-IV of Coke Oven:** Analog drives of all the running equipments (20 nos. of motors) Battery-IV of Coke Oven have been replaced with VVF drives during re-building of battery-IV. This has resulted in substantial reduction of power consumption besides other benefits like ease of maintenance and reduction in incidents of break-downs.

Total Investment: Rs. 100 Lacs

- 5. Introduction of mixed gas firing in MP Boiler as a retrofitting project:** Mixed gas firing was introduced in MP Boiler-2 after suitable modification to enable utilization of by-product fuel gas & substitute the boiler coal. This has resulted in a saving of about 1.5T coal per hour, besides other benefits like ease of maintenance reduction of carbon in bottom ash and prevention of fire slippage during monsoon.

Total Investment: Rs. 10 Lacs

- 6. Commissioning of energy efficient new 700 TPD ASU-III of TOP-II:** Obsolete and highly energy intensive TOP-I of RSP has been stopped and substituted by one of the most energy efficient and state-of-the-art 700 TPD ASU-III of TOP-II. This has resulted in substantial saving of power consumption.

Total Investment: Rs. 340 Crores

- 7. Conversion of traditional tube-lights to CFL:** About 1000 nos. of 40 Watt tube-light in Offices and corridors have been converted to CFL of 18 watts, resulting in substantial saving in power consumption. This scheme will be extended in subsequent years to all the office buildings of RSP as a part of energy conservation measures.

Total Investment: Rs. 2.0 Lacs

- 8. Conversion of HPSV to LED in Street lights of RSP:** 50 nos. of 250 watt HPSV lamps in street lights of RSP were replaced by 90 watt LED, resulting in substantial saving in power consumption. This scheme will be extended in subsequent years as a part of energy conservation measure

Total Investment: Rs. 6.0 Lacs

- 9. Conversion of Aluminum to FRP blade in five nos. of cooling tower of TOP-II:** There are numbers of Cooling Towers in the plant for recycling the water in cooled condition. The temperature of water controls the efficiency of the process where cooled water is used. In plant most of the Towers were having Aluminum blades which are highly energy intensive. By using FRP blade electricity consumption can be brought down by 25 %. Now we are replacing Aluminum blades with FRP blades in a phased manner. In 2010 we have replaced 5 such blades

Total Investment: Rs. 5.0 Lacs

- 10. Thyresterization of mill run out table and approach table, entry and exit manipulator of Plate Mill:** Thyresterization has been introduced in mill run out table and approach table entry and exit manipulator, wherein the Analog drives and have been converted to digital drives. This has helped in reducing power consumption as well as other benefits like ease of maintenance and reduction in incidences of break downs.

Total Investment: Rs. 80.0 Lacs

11. Introduction of coal tar fuel injection in Blast furnace – I: Coal tar injection through tuyers has been commissioned in Blast furnace-I of RSP with a capacity of 100 kg Tar/THM, as a partial replacement of coke. This project is under stabilization. It is expected to replace coke at 1:1 ratio after stabilization. Exact amount of saving will be quantified after stabilization of the system.

Total Investment: Rs. 6.6 Crores

12. Thermal insulation of steam pipe lines: About 2000 m² of damaged thermal insulation on steam lines have been replaced, which has increased steam temperature at consuming end and reduced condensate formation down the stream. This has resulted in availability of steam required by plant unit. Steam saved has consequently resulted in saving of boiler coal.

Total Investment: Rs. 16.0 Lacs

Energy & Environmental Policy

