



## **Modernisation and Expansion of Rourkela Steel Plant**

There comes a time in the history of any organization when it can be said that the time has come to make history. Rourkela Steel Plant is today on the threshold of such an epoch making era. The Steel Plant is now implementing a massive modernization and expansion programme that is truly historic.

The Steel plant is all set to double its capacity and augment it to the level of 4.5 MTPA of Hot Metal. The Crude Steel making capacity will simultaneously increase from the level of 1.9 MTPA to 4.2 MTPA and production of Saleable Steel will zoom from the level of 1.671MTPA to 3.99 MTPA.

Some key units coming up under the Expansion programme are:

### **Augmentation of Ore Bedding and Blending Facilities:**

The Raw Material circuit of the Ore Bedding and Blending Plant Phase-II commissioned and inaugurated by Chairman, SAIL on 11<sup>th</sup> August. The augmentation facilities include:

- Receiving, unloading, reclaiming and finally transporting of raw materials required for Blast Furnace-5
- Base mix preparation for the New Sintering Complex
- Transportation of Flue dust, Mill scale etc.
- Transportation of crushed fuel and flux for trimming addition to SP-III
- Conveyor line for transportation of Calcining Plant grade limestone and dolomite to consuming units
- Automatic sampling system

The unloading activities will be carried out through a wagon tippler and a track hopper, while the stacking and reclaiming will be carried out in 4 beds. A twin boom stacker, a Stacker-cum-Reclaimer, 2 Barrel Reclaimers and a Bucket Wheel Reclaimer will be engaged to bed, blend and reclaim the raw material from the beds.

### **New Coke Oven Battery # 6:**

The New Coke Oven Battery # 6 was inaugurated on 1<sup>st</sup> June 2013 by the Chairman, SAIL. The battery is top charged having compound twin flue, under jet, regenerative heating with partial recirculation of waste gases. The 7 metre tall battery of 67 ovens has been installed to produce run of oven Coke (Dry) of 0.768 MT/Year. The Computerized Heating Control System (COHC) is being installed for the battery operation for the process management system to improve reduction in environmental emission, improve coke quality and productivity. A coal tower of 4000-ton useful capacity for storing coal, Leak Proof Doors, Water Sealed AP Covers, HPLA (High Pressure Ammonical Liquor Aspiration), Door & Frame cleaner, High Pressure Water Jet door cleaner, Land based Pushing Emission Control (PEC) System and Effluent Disposal and Coke Dry Cooling Plant (CDCP) are being provided for efficient environment management. Some important components of the package are:

#### **New Coke Dry Cooling Plant**

The principle of coke dry quenching is based on cooling of hot coke with inert gas circulating in close loop between the chamber of hot coke and the waste heat Boiler. Apart from ensuring environment friendly operation, the CDCP will also enhance the coke quality.

#### **New Coal Handling Plant**

The new Coal Handling Plant can hold 15 days stock of Coking Coal for COB #6 (@ 3500 T/day) and CDI Coal of 10 days stock @ 1500 T/day). There are 24 Nos. of RCC silos for stocking of Coking Coal and for CDI Coal, 6 Nos of RCC silos, each of capacity 2500 Tons.

#### **New Coal Chemical Department**

The new CCD is being installed to process coke oven gas generated from the new Coke Oven Battery # 6. This will clean the raw coke oven gas by removing Tar, Ammonia, Hydrogen, Sulphur, Sulphide and Naphthalene. The coke oven gas shall also be cooled finally

to 300<sup>0</sup> C at the outlet of final gas cooler. There are Naphthalene Washer and Benzole Scrubber to have clean coke oven gas for use of the Plant.

### **New Sinter Unit # 3**

The New Sinter Unit # 3 has been commissioned and sinter production started from 1st April 2012. The new single strand Sinter Plant having an effective suction area of 360 m<sup>3</sup> has an annual production capacity of 3.70 MT of gross sinter with sinter productivity of 1.3 T/m<sup>2</sup>/hr. The output stack emission is less than 50 mg/Nm<sup>3</sup>, thereby making the unit an environment friendly unit. The sinter plant is being provided with Eirich type mixer and noduliser instead of the conventional mixing & balling drum. A circular cooler is being provided for sinter cooling. Another new feature is pneumatic conveying of ESP dust, as a part of which the ESP dust will be charged to the sinter raw mix bed after passing through an Eirich type Granulator. The Eirich type Mixer, Noduliser & Granulator are being installed for the first time in SAIL Plants.

### **New Blast Furnace # 5**

One of the biggest Blast Furnaces of the country, the new Blast Furnace # 5 with a useful volume of 4060 Cubic metres is designed for a production capacity of 2.8 MTPA with a daily hot metal production of 7924 T (avg.). The Furnace will be operated at high intensification level and for a campaign life of 20 years. Equipped with modern features such as pulverized coal injection system, cast house fume extraction system, cast house slag granulation system, top gas recovery turbines of 14 MW capacities, Twin material bin BLT system, Waste Heat Recovery System, Plate/Stave Coolers and Conveyor Belt Charging System, this Blast Furnace will have Level II Automation.

The furnace has twin flat cast house with four tap holes. Auxiliaries of BF#5:

#### **Turbo Blower Station**

The 3 Turbo Blowers along with its all auxiliaries shall be utilized to provide cold blast to the stoves of new BF # 5.

#### **Boiler, STG, BPTG & Blowing Station**

The unit comprising 3 Boiler arrangements, 2 Steam Turbo Generators and 1 Back Pressure Turbo Generator will generate power as well as cold blast to feed the Blast Furnace and the stoves.

### **Torpedo Ladles & Repair Shop**

The 10 Torpedo Ladles with features like higher capacity and lesser scope of hot metal temperature loss will be used for transferring hot metal from the new Blast Furnace #5 to Steel Melting Shop or Pig Casting Machine. It is noteworthy that, these torpedoes will be used for the first time in SAIL. The Torpedo Ladle Repair Shop will handle jobs like refractory lining, ladle inspection, ladle heating and cooling.

### **Pig Casting Machine**

The twin strand 1500 TPD capacity Pig Casting Machine with average strand speed 9 m/min.

### **Augmentation of Steel Melting Shop-II**

#### **3rd BOF Converter (1 X 150 T)**

The new top blown Basic Oxygen Furnace (3rd converter of SMS-II) of capacity 1.584 MT Liquid steel per year coming up as a part of the augmentation is designed with provision for adoption of combined Oxygen blowing from top and inert gas stirring (with Argon and Nitrogen) from bottom.

#### **Slab Caster # 3 - Conventional (1 x 1 Strand)**

The new slab caster-3 shall be of latest design with state-of-the-art technology and equipped with modern features such as ladle to tundish slag detection system, vertical high speed mould with automatic width adjustment, hydraulic mould oscillator, automatic mould level controller, break-out prediction system, air mist spray cooling system, dynamic spray cooling system, continuous straightening, automatic torch cutting machine, slab pusher cum piler arrangement, transverse torch cutting machines and computerized process control system (Level II) to name a few.

#### **New 4.3 m wide Plate Mill**

The new 4.3 metre wide Plate Mill is being installed having initial capacity of 1.0 MT (0.92 MT saleable), which can be augmented to a capacity of 1.8 MT (1.674 MT saleable). The Plate Mill shall have equipment with state of art technology to produce wide range of plates with close tolerances to meet stringent international standards. The 4-HI reversing mill is designed for roll force up to 90 MN, with hydraulic automatic gauge control, roll bending and shifting facilities and provision of on-line thickness, profile and width measurement.

The Plate Mill shall have advanced computerized control system for Plan View Rolling (PVR) process to maximize yield and an accelerated cooling system to produce high strength TMCP(Thermo Mechanical Controlled Process) rolled plates including for pipe grades up to API 5LX 100 with lower cost. The mill is designed with High capacity levellers with hydraulic control and under load positioning system, high capacity Trimming and Cross-cut-shears up to 50 mm capacity to produce distortion free plates. For operation with a lean manpower and to avoid loss of material identity throughout the production process, the Plate Mill will be equipped with advanced control systems and material tracking facilities.