

INDUSTRIAL VISIT TO DURGAPUR STEEL PLANT

Abhishek Srivastav, Arnab Mandal & Chiranjib Ghosh
2nd Year, B.Tech., Mechanical Engineering

Durgapur - the Ruhr of India is situated at a distance of 158 km from Calcutta. Its geographical location is defined as 23° 27' North and 88° 29' East. It is situated on the banks of the Damodar river. The Grand Trunk Road and the main Calcutta-Delhi railway line are passing through the heart of Durgapur.

It was 20th day of March when we got together for our 1st industrial visit to Durgapur Steel Plant, a renowned Eastern Indian steel company under Steel Authority of India Ltd. (SAIL), a Government of India Enterprise. Set up in the late 50's with an initial annual capacity of one million tonnes of crude steel per year, the capacity of Durgapur Steel Plant (DSP) was later expanded to 1.6 million tonnes in the 70's. A massive modernization programme was undertaken in the plant in early 90's, which, while bringing numerous technological developments in the plant, enhanced the capacity of the plant to 2.088 million tonnes of hot metal, 1.8 million tonnes crude steel and 1.586 million tonnes saleable steel. The entire plant is covered under ISO 9001: 2000 quality management system.



The modernized DSP now has state-of -the-art

technology for quality steel making. The modernized units have brought about improved productivity, substantial improvement in energy conservation and better quality products. DSP's Steel Making complex and the entire mills zone, comprising its Blooming & Billet Mill, Merchant Mill, Skelp Mill, Section Mill and Wheel & Axle Plant, are covered under ISO: 9002 quality assurance certification. With the successful commissioning of the modernized units, DSP is all set to produce 2.088 million tonnes of hot metal, 1.8 million tonnes of crude steel and 1.586 million tonnes of saleable steel annually.

PRODUCT-MIX	TONNES/ANNUM
Merchant Products	2,80,000
Structural	2,07,000
Skelp	1,80,000
Wheels & Axles	58,000
Semis	8,61,000
Total Saleable steel	15,86,000

The time was 4:35 pm when we all were at Kalyani Ghoshpara station to catch the local train to reach Naihati. At 5:35 pm we caught Intercity express and finally arrived at Durgapur station at 8:30. Two buses of NPTI (National Power Training Institute) brought us to the college hostel. They provided us shared accommodation at a very nominal cost.

On the next day first session we kept ourselves busy in the conference room of the institute and one professor gave a brief speech about the boilers used in different power plant industries. But we were eagerly waiting for our industrial visit.

After lunch we prepared ourselves for DSP. Teachers as well as students were provided helmets. It was already instructed to us that we must strictly maintain all the safety rules. Two buses carrying all the students when stopped in front of main gate of DSP, about 3 km away from NPTI Guest House, it is time for security check-up. We were surprised to see such a giant industry set up; two of DSP employees from training department were with us for our assistance.

We first went to the Coke Oven Battery. The battery was rectangular box shaped with the approx volume of around $6m \times 40m \times 7m$ in which there were almost 78 cells of rectangular cross sections. This battery is used to convert coal into coke at the temp of $1250^{\circ}C$, which was ignited by the coke oven gas. It will take about 19 hours for completing conversion. The produced red coke was pushed to the quenching car, which was then taken to a terminated position, where a stream of water was passed through to make it cool. It is then transferred to hammering shop by an automatic carriage. Then it was taken to blast furnace, where it was used as energy source to melt the raw material in the furnace.

Molten metal was coming out from the furnace on a red hot condition and was then poured to ladle at $1750^{\circ}C$.

The molten metal was transferred to the storage, where it was continuously heated. It was now converted to steel inside the ladle, which was then taken to different shops.

This melted steel was taken to the continuous casting section; where automatic casting of billet bars of $8m \sim 10m$ length and $100mm \times 100mm$ cross-section

was produced. Five minutes were taken to produce 15 such types of bars. These bars after cooling were transferred to Merchant Mill, where these bars were converted to $14 \sim 36$ mm (diameter) Thermo Mechanically Treated (TMT) bars by different machining process. These bars have a very large importance in the constructional fields.

Our next step was to cover the wheel and axle shop (one of two wheel and axle making shops of India), where wheels and axles of trains are produced. It was 12 footed spigots, which was segregated into 3 equal parts by serial Band Saw machines. Each piece was then taken to heat furnace to increase the plasticity of the spigot. It was placed in the base plate of Hydraulic Press to press to certain thickness and circular cross section. It was then reheated in the furnace and transferred to quenching machine, where it was quenched by cool water circulation. Finally it was machined and finished at CNC section. Its defect was identified by several techniques.

We were also introduced to cooling tower design.

It was around 2:00 pm when we left the company with a lot of visual experience and with one determination to come back again to the industry as an engineer.

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**PROCESS FLOW CHART :
DURGAPUR STEEL PLANT**

