RCC Institute of Information Technology
Canal South Road, Beliaghata, Kolkata - 700015

A **Report** on **Industry Visit at Vizag Steel Plant**, Visakhapatnam, Sponsored by **TEQIP II** on 13th and 14th September 2013

Motivation:

Industrial visits represent important activities in any engineering undergraduate programme that contribute to the achievement of various essential learning outcomes and programme objectives. The purpose of the Industry Visit to **Vizag Steel Plant** was to give exposure to the students on the following:

1. Applications of Industrial Drives
2. Process Control
3. Industry inclination/ industry-preparedness of the students
4. Familiarization with the working environment of core industry.

Another important but indirect purpose of the visit was to enhance relationship with the core industry, so that the chances of placement of the students with the particular industry could be increased.

Details of the Visit:

The visit to VSP, Visakhapatnam was conducted on 13th and 14th September 2013. A batch of 45 students of B.Tech. (EE), 4th year were visited the plant. The students were guided by 3 faculty members of the EE Department, RCCIIT. A travel agency was conducted the visit to the industry. The students along with the faculty members left for Visakhapatnam on 11th September, 2013 from Shalimar (SHM) station by SHALIMAR-SECUNDERABAD Experss. Accommodation was booked at Hotel Simhagiri before the visit. The visitor reached Visakhapatnam in the night at about 2.30 AM. They came to the hotel by Bus. A room allocation list was prepared to avoid any delay. The industry visit was conducted on 13th September and 14th September. The scheduling time for the visit was 10 am to 1 pm. The visitors started back for Kolkata on 14th September and reached at around 4.30 PM on the next day.

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Interaction at Vizag Steel Plant:

On the morning of 12th September, 2013 the students led by the faculty members reached the Kasipatnam 33/11 kV transmission substation by bus from the hotel at about 9.30AM. After necessary permission at the gate and identification of the students, the participants were led to the substation area. In this substation the students are got familiarized with different relays, circuit breaker and transformer. In the control room of the substation they understand the operation of the digital control panel furnished with different meter and displays. They have also seen how a supervisor continuously monitoring the total scenario. After the visit last for 2 hours all the students returned hotel by pre booked bus.

On the next day i.e. 13th September 2013 the students with their teacher reached the Vizag Steel Plant (VSP) Training and Development Department sharp at 9:30am. After the necessary permission from the Head of the TDD, Mr. E. Srinivas Rao they again reached the main entrance of the VSP guided by Mr. Amitava Halder, AGM (P & O). At the main entrance the CISF guards issued the entry pass for all the visitors. At first they visit the **Coke Ovens & Coal Chemical Plant** and got familiarized with the process of converting coke from coal. Mr. Halder nicely explained the overall process for this conversion. Coal is converted into coke by heating the prepared coal blend charge in the coke ovens in the absence of air at a temperature of 1000^{o}C-1050^{o}C for a period of 16/19 hours. The volatile matter of coal liberated during carbonization is collected in gas collecting mains in the form of raw coke oven gas passing through stand pipes and direct contact cooling with ammonia liquor spray. The gas cooled from 800^{o}C to 80^{o}C is drawn to Coal Chemical Plant by Exhauster. The residual coke is pushed out of the oven by pusher car through a guide into coke bucket. The red-hot coke is taken to coke dry cooling plant for cooling. After spending half an hour in this part of the plant they now visited the **Blast Furnace**. Three coke ovens are there. The students are permitted to visit the third oven which was in operation at that time. Iron is made in the Blast Furnaces by smelting iron bearing materials with the help of coke and air. The solid charge materials like sinter, sized iron ore, coke etc. are charged in the vertical shaft of the Blast Furnace at top and hot air blast is blown through the tuyeres located at the bottom. The oxygen from the hot air combines with the carbon of the coke and generates heat and carbon monoxide. The gases, while ascending upwards react with the descending charge materials. Eventually the charge melts and hot metal and slag are produced and tapped out. The cooled gas is also used as fuel in the plant. The Paul-Wurth, bell less top system is installed for furnace charging.

Last day of the visit i.e. 14th September 2013, all the visitor visit the LMMM (**Light & Medium Merchant Mill**), WRM (**Wire Rod Mill**) and MMSM (**Medium Merchant & Structural Mill**).

The Wire Rod Mill of VSP is high speed 4 strand No-Twist continuous mill designed to produce 8,50,000 T of wire rod coils. The mill is designed to produce plain wire rods from 5.5 mm to 12.7mm diameter and Rebar in 8mm, 10mm and 12mm diameter in coil form.

However sizes up to 14mm are being rolled presently. The mill is constructed at an elevated level of +5350 mm. Rolled billets of 125 mm x 125 mm square cross section, length ranging from 9.8 m to 10.4 m and weighing approx 1250 kgs are used as input material. The mill is designed to roll steel stock of 0.9% max. carbon content.

The cast blooms from continuous casting department are heated and rolled in the two high speed and fully automated rolling mills namely Light & Medium Merchant Mill (LMMM) and Medium Merchant & Structural Mill (MMSM). The billets produced in LMMM are further rolled in Bar Mill / Wire Rod Mill (WRM). The finished products include wire rods & long products like Reinforcement bars, rounds, squares, flats, angles, channels, billets etc.
Blooms from Continuous Casting Division are rolled into billets, some of which are sold and rest are sent to Bar Mill/WRM. The continuous two-line Bar Mill comprises of 8 Stand Double Strand roughing train, 2 nos. of 4 Stand Single Strand intermediate train & 2 nos. of 4 Stand Single Strand finishing train. Loopers are provided in between the finishing stands for tension free rolling in order to obtain good surface quality and tolerances. Housings are of closed top type. Roll necks are mounted in anti friction bearings.

The Medium Merchant and Structural Mill (MMSM) is one of the modern rolling mills of Visakhapatnam Steel Plant. This is a single strand continuous mill having production capacity of 8,50,000 T/year. The important feature of this mill is that Universal beams (both parallel and wide flange) have been rolled first time in India using Universal stands. Parallel flange beams have advantage over conventional beams as, for the same weight; the section is stronger and stiffer due to greater moment of inertia and higher radius of gyration.

Kasipatnam Substation Visit in 12th September 2013

A group photo session in front of main entrance of VSP on 13th September 2013