

## **Condition monitoring of tuyere based on life cycle study to avoid tuyere failure in BF**

### **About Blast Furnace Department:**

The Department is engaged in production of hot metal from its three Blast Furnaces having useful volume of 3800 m<sup>3</sup>, each capable of producing 2.5 MT of hot metal per year. Most of the Hot metal is sent to SMS, remaining is sent to PCM/hot metal dump yard. Pig iron from PCM, processed iron from metal dump yard and granulated slag generated during production is sold by Marketing Dept. All furnaces are equipped with state of the art technology like Level-2 Automation, PaulWurth Top Charging system, slag granulation system; flat bed cast house, hydraulic Cast House equipment etc. Department produces most of the tap hole mass required to run furnaces.

Inside Blast Furnace, the iron ore is reduced to form hot metal and slag, which collects in the hearth. From there, Hot metal and slag is periodically tapped through tap holes. Hot metal is channeled via tilting runners into torpedo ladle cars, which carries it away. Slag is granulated in the slag granulation plant, dewatered and subsequently carried away by a conveyor to slag storage yard. The Blast Furnace top gases enter into the dust catcher for primary cleaning and then to annular scrubber for final cleaning. Cleaned BF gas is then passed through Turbine Stations (GETS/TRT) to convert the pressure energy into electrical energy. After this BF gas is diverted to mix gas lines for use as fuel throughout the plant.

### **Problem Description and Solution Desired:**

Blast furnaces tuyere are critical components in the iron-making process and are subjected to intense thermal conditions. Their failure can result in production disruption, costly downtime & repairs and potential safety hazards. Condition monitoring of blast furnace tuyeres based on life cycle study can help avoid their failure by detecting problem and addressing the issues before they become critical. The startups are required to implement maintenance approach that predicts tuyere's health and safety through the combination of technological deployments with state-of-the-art machine monitoring software.