Improving Hot Rolling Quality and Maximizing Mill Throughput

Level 2 Automation for Mill Reheating Furnaces

Optimised reheating of semis through high performance automation solutions and precise process controls in reheating furnaces is a key enabler to meet the demands for high quality and low cost hot rolled products. Tata Steel Automation Division offers you a Level 2 automation system for delivering optimally soaked flat or long semis through furnace temperature control which has a significant impact on the product quality. The system has been developed using in-depth understanding of hot rolling technology and years of experience in developing automation solutions.

A Product of Automation Division
Tata Steel Limited
The Need:

In hot rolling of steel, the uniform heating of flat or long semis at exactly the right temperature and their timely delivery to the rolling mill is extremely critical to the quality of the rolled products, mill performance and cost of manufacturing. The semis need to be delivered to the mill at the required temperature with minimum fuel consumption and uniform temperature all across.

The zonal temperatures inside the reheating furnace are controlled through set points which need to be determined dynamically to achieve quality heating in various production scenarios. Manually controlling these set points compromises the quality of heating of the semis and therefore the quality of the end product.

Level 2 automation for reheating furnaces is an online furnace temperature control system whose main task is to provide optimally heated steel semis to the rolling mill for various production requirements. It controls the furnace temperature to achieve the required discharge temperature of semis, low oxidation losses, less energy consumption while ensuring the heating quality. The system also provides furnace visualization, furnace health check and web reporting system.
The Working:

The major system components are:

I. **Online semis temperature control system (OLSTC)** - Aspects like unknown retention time, influence of adjacent semis etc., that cannot be estimated in advance make the attainment of the required temperature at the different zones in the furnace difficult. With OLSTC, the required drop out temperature will be achieved by continuously comparing the calculated semis temperature with the target temperature at each position in the furnace resulting in a new zone temperature set point which is recalculated and downloaded to the level1 system every 5 seconds.

II. **Pacing** – The target dropout temperature and optimum furnace throughput is achieved by a combination of temperature control and transportation speed of the semis inside the furnace. Furnace pacing controls the discharge of semis to deliver properly soaked semis at regular intervals to the mill, and optimizes mill productivity.

III. **Material tracking** – The tracking function gives information regarding the exact location of the semis inside the furnace and the progress of the charging schedule to the operator.

IV. **Data archive, reports & HMI** – The system provides online reports, which can be accessed from any computer having web browsers. Robust security has been provided for access only to authorized persons. The main reports provided are production & delay reports, slab archive reports and the trends of furnace process parameters and model adaptation parameters.
Benefits:

- Portable, scalable and easy to maintain solution
- Seamless integration with business planning systems and mill automation
- Provides material tracking in the furnace area
- Online temperature calculation and zonal temperature control
- Models for hot and cold semis mixed charging
- Thermal history of slabs as they are heated through the furnace
- User friendly HMIs and web based reports
- Tools for in-depth analysis of the reheating process

Contact Us!

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