

9941 New Process for Hot Metal Production at Low Fuel Rates - Phase 1

Benefits

- ❖ Eliminate cokemaking and high temperature iron ore agglomeration from the ironmaking process.
- ❖ Reduction of carbon equivalent consumption and CO₂ emissions.
- ❖ Reduce cost of hot metal production.
- ❖ Increase operational efficiency.
- ❖ Replace aging blast furnaces.

Applications

Integrated and Electric Arc Furnace based steel production facilities.

The trend of decreasing energy intensity (the average energy consumed per shipped ton) continues in the U.S steel industry, but it has been forecasted for a slower rate in the next decade unless there is major structure change or a new “disruptive” technology emerges.

This application proposes the building and operating of a demonstration plant for the commercialization of a new coal-based, coke-free process to produce hot metal at much lower fuel rate and higher yield. This process has the potential to replace the blast furnace to gain economic and environmental advantages and to provide hot metal on-site resulting in more operational efficiency in EAF shops.

Phase I is an engineering design study for a demonstration scale plant for the Paired Straight Hearth Furnace developed by the Technology Roadmap Program project TRP-9810. It was successfully completed in 2002.

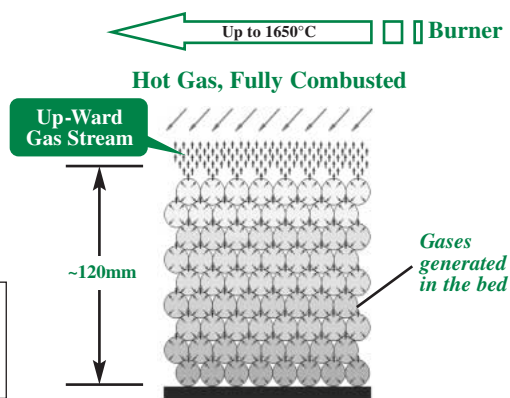
New Hearth Furnace Process - Breaking All the Rules Simultaneously

Flame: $\text{CO/CO}_2=0.0$
1600~1650 °C

Bed Height: 120mm, to generate the protective gas flow

Coal: Higher Volatile Mater

A This is the BASIS for the Development of the New and Better Coal-based ironmaking Process



Project Goal:

To develop a coal-based and coke-free ironmaking process based on the Paired Straight Hearth (PSH) furnace concept developed and laboratory demonstrated under TRP 9810 in 2002.

This technology has the potential to change the current ironmaking process into a simpler, more energy efficient, environmentally-friendly, coal-based (as opposed to coke-based) process. Phase 1 is the preliminary engineering phase. Pilot plant scale designs will be developed including process and mechanical designs, plant arrangement designs, and computer models of the furnace and reduction processes. An economic evaluation will also be performed estimating the final design, construction and operation costs for pilot plant.

Progress and Milestones Phase 1:

- ❖ Project start date: November 2004
- ❖ Delivery of Engineering Study: June 2005
- ❖ Project completion date: May 2006

Total Project Cost: \$83,600

Duration: 18 months

Research Organization

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Industry Participants

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