

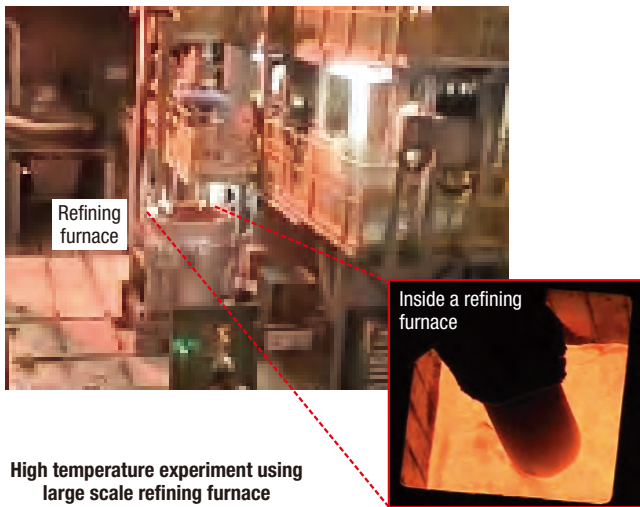


Steelmaking

Steelmaking Research Department is developing steelmaking processes for cast steels and final steel products with high quality and excellent properties. Experimental simulators and numerical simulations are fully utilized in the steelmaking research.

Refining Process Control

Using a refining furnace simulator, we perform large scale experiments with hot metal (molten pig iron) and molten steel to investigate high temperature reaction under actual operation. Innovative refining processes are also studied.



High temperature experiment using large scale refining furnace

Solidification Control

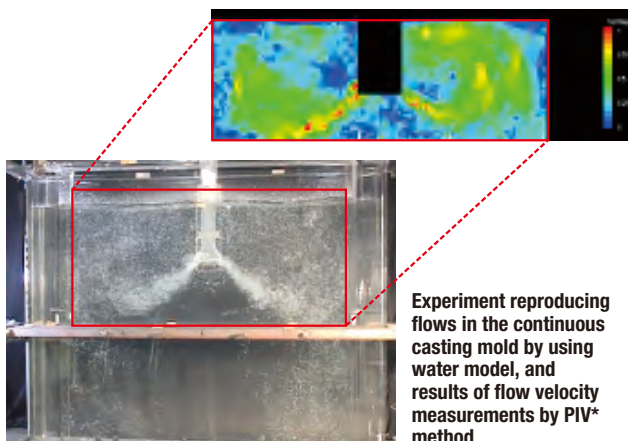
Solidification phenomena of steels has been investigated by using a continuous casting simulator. Research on casting processes for improving quality and productivity is also significant.



Molten steel casting experiment using small scale continuous casting simulator

Visualization of Molten Steel Flow

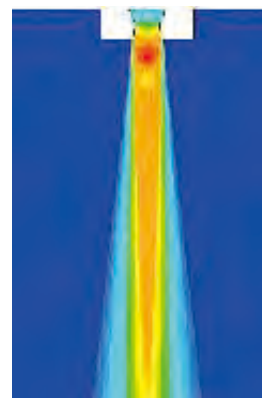
Flows in refining furnaces and continuous casting molds are investigated by experimental approaches at ambient temperature based on the Law of Similarity. Those dynamic analyses contribute to process developments.



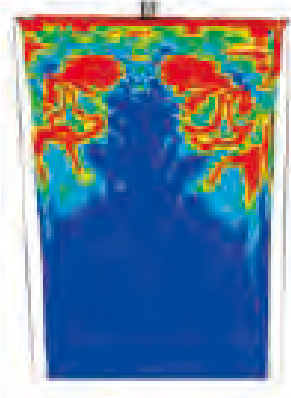
* Particle Image Velocimetry

Numerical Simulation Analysis for Fluids

Numerical simulations are also strong tool to optimize operating conditions and introduce new processes. Oxygen jet stream in a converter and flow of molten steel in continuous casting mold are simulated.



Example of analysis of flow velocity of supersonic oxygen jet stream from converter lance nozzle



Example of computation of argon bubble distribution in continuous casting mold