



LADLE REFRACTORY AND SECONDARY STEELMAKING

— A PRACTICAL TRAINING SEMINAR

30 SEPTEMBER—2 OCTOBER 2013 | THE FRANCIS MARION HOTEL, CHARLESTON, S.C., USA

MONDAY 30 SEPTEMBER 2013

4 p.m.
Registration

5 p.m.
Welcome Reception

TUESDAY 1 OCTOBER 2013

7 a.m.
Registration and Continental Breakfast

8 a.m.
NUCOR STEEL—BERKELEY PREVIEW
Jeff Powers, Nucor Steel—Berkeley

8:15 a.m.
INTRODUCTIONS
James Barrett, Allied Mineral Products Inc.

8:30 a.m.
RAW MATERIALS, BRICK/SHAPED REFRACTORIES, MONOLITHICS
Ruth Engel, Refractory Consulting Services
Refractory linings are an integral part of the smooth operation of the meltshop. This seminar covers the raw materials commonly used to manufacture refractories, their characteristics, the reasons for their selection and how they can be combined. This knowledge will be then be expanded to explore how they affect brick properties. Monolithics used in meltshops will also be covered, from raw materials and types available to critical installation considerations.

9:30 a.m.
Break

9:45 a.m.
INSULATION AND LADLE CONSTRUCTION AND DESIGN
Roby Doty, IMACRO Inc.

The first part of this presentation, focusing on insulation, will cover the basics of heat transfer from molten steel, through refractories and out of ladles. Discussion will also cover the effects of ladle insulation on heat transfer and ladle refractories. The ladle construction and design portion of the course will cover the many choices of refractory materials, qualities, and shapes used in ladle refractory design. It will also cover all aspects of ladle refractory construction from the sub-bottom to the lip ring.

11 a.m.
SAFETY

Noon
Lunch

1 p.m.
STIR PLUGS, LANCES AND SLIDEGATES
Carl Corbin, Vesuvius USA

Basic concepts of ladle gas stirring will cover reasons for purging in ladles, overview of gas delivery equipment, types of systems used, purge plug design basics, achieving desired results and troubleshooting. The slidegate discussion will include reasons and concepts for controlling steel flow from ladle. Details include types of mechanisms, ancillary equipment, drive concepts, ladle cycle in shop practice and refractory used.

2:15 p.m.
Break

2:30 p.m.

LADLE PREHEATING AND LADLE REFRACTORY WEAR MECHANISMS

James Barrett, Allied Mineral Productions Inc.

Preheating of ladles for optimum refractory performance and minimizing problems of putting ladles into service. Recommended pre-heat schedules are discussed for particular lining configurations. Ladle lining wear mechanisms are discussed, along with examples of lining configurations to help combat various operating conditions.

3:30 p.m.

Break

3:45 p.m.

PROCESS MODELING FOR SECONDARY STEELMAKING

Kamalesh Mandal, Severstal Columbus

WEDNESDAY
2 OCTOBER 2013

7 a.m.

Continental Breakfast

8 a.m.

SECONDARY STEELMAKING PROCESS

Helmut Oltmann, Nucor Steel-Berkeley

The ladle metallurgy furnace transforms raw steel from the electric arc furnace into a castable product and delivers it to the caster at the right time, temperature and chemistry (bulk and inclusion chemistry). This presentation will provide a review of killing and alloying the steel, making a slag, controlling temperature and non-metallic inclusions, and potential impact on refractory lining performance.

9:15 a.m.

Break

9:30 a.m.

LADLE TREATMENT PROCESSES

Kevin Cotchen, SMS Siemag LLC

Vacuum equipment operation and treatment procedures will be discussed, particularly as they affect the refractory materials used in the ladle and refining vessel.

10:30 p.m.

Break

10:45 a.m.

LADLE REFRACTORY & SECONDARY STEELMAKING ROUNDTABLE

James Barrett, Allied Mineral Productions Inc.; Kevin Cotchen, SMS Siemag LLC; Kamalesh Mandal, Severstal Columbus; and Helmut Oltmann, Nucor Steel-Berkeley

Noon

Lunch

1 p.m.

PLANT TOUR OF NUCOR STEEL-BERKELEY

5 p.m.

Return From Tour and Adjourn

