



Secondary Steelmaking Refractories

A Practical Training Seminar

22–25 October 2018

Hyatt Place Charleston – Historic District
Charleston, S.C., USA

Featured Plant Tour: Nucor Steel–Berkeley



Registration Includes

Registration fees include breakfast and lunch Tuesday and Wednesday, reception, breakfast Thursday, plant tour with bus transportation, and a course workbook or flash drive including presentations.

Hotel Accommodations

A block of rooms has been reserved at Hyatt Place Charleston – Historic District. Please call the hotel at +1.800.993.4751 by 1 October 2018 to secure the AIST discount rate of US\$169 per night for single/double occupancy.

AIST Members	
US\$845	US\$945
by 10 September 2018	after 10 September 2018

Non-Members	
US\$1,060	US\$1,160
by 10 September	after 10 September 2018



Featured Plant Tour

Nucor Steel–Berkeley

About the Program

Secondary steelmaking refractory maintenance is vital to both productivity and safety in a meltshop and caster. It is important for those involved to have a thorough understanding of the basic concepts of refractory system design. Consultants, suppliers and recognized industry experts have developed a curriculum to educate attendees on the following topics: refractory raw material selection; properties of refractories, application and limitations of refractories; theory and application of insulation; design and application of stir plugs, lances and slidegates; free opens, refractory handling, installation and pre-heating; ladle secondary steelmaking – LMF; and casting requirements and wear mechanisms.

Presentations will provide data from steelmaking operations, and attendees will benefit from the practical experience of the presenters, including the application of the latest tools and techniques being used. Open discussions will allow participants to gather additional information and network with attendees and instructors.

Who Should Attend

This conference is intended for steelmaking operations personnel, maintenance and supervisory employees. Refractory suppliers and service suppliers should also attend. The AIST Ladle & Secondary Refining and Refractory Systems Technology Committees strongly believe that this course provides the basic knowledge for a better understanding of secondary steelmaking, refractory and insulating systems.

Professional Development Hours

This course may qualify for up to 14 Professional Development Hour (PDH) credits. Each attendee will receive a certificate listing the quantity of PDH credits earned for the course. This course is not approved for PDH credits in New York, Florida, North Carolina and Oklahoma.

Organized By

AIST's Ladle & Secondary Refining and Refractory Systems Technology Committees



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Schedule of Events

Monday, 22 October 2018

4 p.m.
Registration

Tuesday, 23 October 2018

7 a.m.
Registration and Breakfast

8 a.m.
Welcome and Keynote Speaker

8:30 a.m.
Introductions

8:45 a.m.
Raw Materials, Bricks and Shapes and Monolithics
Ruth Engel, Refractory Consulting Services
The seminar will begin by presenting the raw materials used in the manufacture of refractories, why they are used, their availability and characteristics. Using this knowledge, the role the different refractory components play and their effect on the properties of a brick/shape will be discussed. This knowledge will be extended to monolithics, where additional parameters like installation and dry-out, if applicable, will be covered.

9:45 a.m.
Break

10 a.m.
Brick Manufacturing
Korey Skala, RHI Magnesita
Refractory brick production from raw materials to finished product.

10:45 a.m.
Break

11 a.m.
Ladle Construction Design and Insulation
Rob Doty, IMACRO Inc.
A wide-ranging discussion about the many options in ladle refractory design. Then the basics of heat transfer will be covered, from molten steel through refractories to ladle shells, followed by insulation choices, how they affect ladle shell temperatures, and refractory expansion dynamics.

Noon
Lunch

1 p.m.
Slidegates, Tundish Gates and Ladle Stirring
Carl Corbin, Vesuvius USA
This overview includes reasons for stirring, gas delivery, systems, basic plug design, achieving results and troubleshooting. The slidegate discussion will include general refractory selection, mechanism types and troubleshooting.

2 p.m.
Break

2:15 p.m.
Ladle Pre-Heating and Handling
Jimmy Barrett, Allied Mineral Products Inc.
Steel ladles: pre-heating, refractory wear mechanisms and measuring options.

3 p.m.
Break

3:15 p.m.
Tap-to-Cast Operations
Harriet Dutka
This presentation is a brief overview that focuses on answering the "why's" of certain practices and procedures in steelmaking. If you are a new to steelmaking or are in a non-technical role, this presentation will answer many of the questions you would like to ask.

4 p.m.
Panel Discussion and Reception
Moderator: Jimmy Barrett, Allied Mineral Products Inc.
Panelists: Harriet Dutka; Helmut Oltmann, Nucor Steel-Berkeley; Carl Corbin, Vesuvius USA

Wednesday, 24 October 2018

7 a.m.
Breakfast

8 a.m.
Safety: Past/Present/Future
John Panconi, BISCO Refractories Inc.
This discussion focuses on where we were with safety, where we are now and a look into the future.

Schedule of Events (cont'd)

8:30 a.m.

Refractory Materials Testing and Product Selection

Rakesh Dhaka, United States Steel Corporation
Discusses commonly used test methods and their use in selection of refractories.

9:30 a.m.

Break

9:45 a.m.

Secondary Steelmaking Process — LMF

Helmut Oltmann, Nucor Steel–Berkeley
This presentation provides a review of the LMF processes to modify chemistry and temperature of the steel in the ladle and the impact on refractories.

10:45 a.m.

Break

11 a.m.

Infrared for Steel Processes Affecting Refractories

Tom Connors, Connors Industrials Inc.
The non-visible spectrum of infrared wavelengths provides the primary steelmaker with: 1. Safety 2. Ability to measure furnace, ladle and tundish shell temperatures with accuracies of $\pm 2\%$ to evaluate heat transfer characteristics of various refractories substrates. 3. Ability to "see" ladle meniscus during tapping. 4. Ability to measure ladle refractory temperatures just prior to tap. 5. Ability to "see" factors that create ladle arc flare. 6. Ability to "see" ladle meniscus variations in vacuum tank degassers with data of torr levels. Using the data above supports the refractory manager in making an informed decision. Scheduled maintenance is inherently less expensive than reactionary maintenance.

11:30 a.m.

Ladle Laser Program

Michel Bonin, Vesuvius USA

Noon

Lunch

1 p.m.

Ladle Free Opens: Theory and Application

James Conrad, Fedmet
Ladle free-opening theory will be discussed. Methodology for tracking, identifying and correcting process variables will also be examined.

1:45 p.m.

Break

2 p.m.

Total Tundish Technology

Daniel Schaner, Vesuvius USA

3:15 p.m.

Break

3:30 p.m.

Principles of Mold Flux Technology

Darrell Sturgill, Imergys Steelcasting USA Inc.
Participants will receive an overview of continuous casting fluxes from production through their end use. Included in the discussion are continuous casting flux selection criteria.

4:15 p.m.

Flow Control Products

Josh Kaser, RHI/VRA

Ladle shrouds, stopper rods and tundish shrouds will be discussed.

Thursday, 25 October 2018

7 a.m.

Breakfast

8 a.m.

Plant Tour of Nucor Steel–Berkeley

Noon

Return From Plant Tour and Adjourn

