Secondary Steelmaking Refractories

A Practical Training Seminar

10-13 October 2016 - Birmingham, Ala., USA - The Hilton Birmingham Perimeter Park

About the Course

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; vacuum degassing operations; 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.

Registration Fees

Advance registration by 29 August 2016: Member US$745, Non-member US$960. Registration after 29 August 2016: Member US$845, Non-member US$1,060. Registration includes Tuesday and Wednesday continental breakfast, lunch, and continuous breaks; Tuesday reception; Thursday continental breakfast; plant tour; and a course workbook or flash drive including presentations.

Sponsored By

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

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AIST ASSOCIATION FOR IRON & STEEL TECHNOLOGY

Monday, 10 October 2016

4 p.m.
Registration

Tuesday, 11 October 2016

7 a.m.
Registration and Continental Breakfast

8 a.m.
Welcome Keynote Speaker
Jon Ridgeway, CMC Steel Alabama

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 with a discussion of the raw materials used in the manufacture of refractories, why they are used, availability and characteristics. Using this information, a discussion of the role of the different refractory components, why they are used and their effect on the properties of a brick/shape will follow. This knowledge will be extended to monolithics, mainly castables, where additional parameters like installation and dryout will be covered.

9:45 a.m.
Break

10 a.m.
Brick Manufacturing
Korey Skala, RHI US Ltd.
Overview of refractory brick manufacturing from raw material to finished product.

10:45 a.m.
Break

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

Noon
Lunch

1 p.m.
Stir Plugs, Lances, Slidegates and Tundish Gates
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 controlling steel flow from the ladle. Details include types of mechanisms, ancillary equipment, drive concepts, ladle cycle in shop practice and refractory used.

2 p.m.
Break

2:15 p.m.
Ladle Pre-Heating and Handling
James Barrett, Allied Mineral Products Inc.
Pre-heating 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 p.m.
Break

3:15 p.m.
Tap-to-Cast Operations
Harriet Dutka, Magnesita Refractories
A brief overview that is focused 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: James Barrett, Allied Mineral Products Inc.
Panelists: Albert Dainton, Vesuvius USA; Helmut Oltmann, Nucor Steel–Berkeley

Wednesday, 12 October 2016

7 a.m.
Continental Breakfast

8 a.m.
Safety: Past/Present/Future
John Panconi, BISCO Refractories Inc.
Safety as it was, where we are today and projections on the future of safety.

8:30 a.m.
Refractory Materials Testing
Rakesh Dhaka, U.S. Steel Research and Technology Center

9:30 a.m.
Break

9:45 a.m.
Secondary Steelmaking Process – LMF
Helmut Oltmann, Nucor Steel–Berkeley
The LMF transforms raw steel from the EAF into a castable product and delivers it to the caster at the appropriate time, temperature and chemistry (bulk and inclusion chemistry).
Killing and alloying the steel, making a slag, controlling temperature and non-metallic inclusions, and potential impact on refractory lining performance are also reviewed.

10:45 a.m.
Break

11 a.m.
Ladle Thermal Imaging
Thomas Connors, Connors Industrials Inc.

Noon
Lunch

1 p.m.
Improving the Free Open Rate
Brian Jurczyk, Prince Corp.
A practical and theoretical presentation on how to improve the free open rate of ladles. Key topics include: ladle sand chemistry, amount of sand per heat, delivery systems and ladle cleaning practices.

1:45 p.m.
Break

2 p.m.
Tundish Refractory
Albert Dainton, Vesuvius USA
Tundish refractories and tundish design can have a significant impact on the safe and efficient production of clean steel in the continuous casting process. The session will explore the factors influencing proper selection and installation of refractory materials

and principles used in modeling and designing the best tundish furniture to suit the demands of the casting process.

3:15 p.m.
Break

3:30 p.m.
Principles of Mold Flux Technology
Darrell Sturgill, Imerys Steelcasting USA Inc
A primer on mold flux production, design and selection criteria that will give operators a better understanding of the product.

4:15 p.m.
Flow Control Products
Joshua Kaser, RHI/VRA
A brief explanation of isostatically pressed refractories, including ladle shrouds, stopper rods and submerged-entry nozzles.

Thursday, 13 October 2016

7 a.m.
Continental Breakfast

8 a.m.
Plant Tour of CMC Steel Alabama

Noon
Return From Plant Tour and Adjourn