



# Continuous Casting

## A Practical Training Seminar

16–19 October 2017  
Fort Wayne, Ind., USA  
Courtyard by Marriott Fort Wayne Downtown





## About the Program

Developed and presented with the talented resources of the Continuous Casting Technology Committee, this informative program targets the heart of steelmaking: the frontline operator. The key focus of the program is to discuss the practical aspects of casting slabs, billets and blooms, while introducing the theoretical concepts. By achieving the proper teaching balance, attendee understanding of the process is ensured without the need for a technical background. This course is a must for the progressive, informed and educated steelmaker of the future!

## Who Should Attend

This training seminar has been designed for the frontline casting employee. It would also be beneficial to individuals newly assigned to work in the casting area, suppliers of casting consumables and services, as well as others wishing to review major variables that impact the quality of as-cast products. The presentations will be geared toward general casting principles, with all machine types represented.



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## Organized By

AIST's Continuous Casting Technology Committee.

# Schedule of Events

## Monday, 16 October 2017

4–6 p.m.  
Registration

## Tuesday, 17 October 2017

7 a.m.  
Registration and Continental Breakfast

8 a.m.  
**Historical Perspective of Continuous Casting**

Jack Young, Hatch Ltd.  
A review of the historical development of continuous casting and the solidification process.

8:45 a.m.  
Break

9 a.m.  
**Continuous Casting Design and Technology (Slab and Long Products)**

Dewey Humes, Primetals Technologies USA LLC  
The presentation will cover the basics of machine and equipment design for continuous casting technology. Both flat and long product technologies, equipment, and machines will be explained. A brief introduction to process models affecting quality will also be provided.

10 a.m.  
Break

10:15 a.m.  
**Principles of Mold Flux Technology — An Operators Guide to Continuous Casting Flux**

Marc McClymonds, Imerys Metalcasting Solutions

11 a.m.  
**Initial Solidification and Oscillation Mark Formation**

Brian Thomas, Colorado School of Mines

Noon  
Lunch

1 p.m.

**Sources of Reoxidation and Why to Avoid**  
Ron O'Malley, Missouri University of Science and Technology

To produce high-quality cast products, steel must be protected from reoxidation. Reoxidation can occur in the ladle, at secondary ladle metallurgy operation, and also in the transfer operations from ladle to tundish and tundish to the mold. Various techniques are described that can be used to minimize reoxidation.

2 p.m.  
Break

2:15 p.m.  
**Caster Breakouts**

Bill Emling, SMS USA LLC  
Review of various causes for breakouts and discussion of systems and solutions designed to prevent them. This talk will closely follow the chapter in *The Making, Shaping and Treating of Steel, 11th Edition, Casting Volume*.

3:15 p.m.  
Break

3:30 p.m.  
**Caster Quality Defects and Their Potential Causes — Slab and Billet Quality**

Ron O'Malley, Missouri University of Science and Technology  
The surface and internal quality of continuously cast slabs and billets is intimately linked to the caster design and to the operating and maintenance practices employed in the continuous casting process. Common causes for five classes of continuous casting defects (longitudinal cracking, transverse cracking, slivers and lamination defects, internal cracking, and segregation defects) will be reviewed and linked to these design and practice influences.

5 p.m.  
Adjourn

## Wednesday, 18 October 2017

7 a.m.

Continental Breakfast

8 a.m.

### Mold Copper Alloys, Design and Influence of Operating Factors on Performance

Ian Bakshi, KME America Inc.

The requirements that molds must fulfill on a steel continuous casting machine, the copper alloys used, details of their design, various operating factors that affect mold life and typical mold problems will be presented.

9 a.m.

Break

9:15 a.m.

### Mold and Copper Maintenance, Mold Coatings

Chad Donovan, SMS Technical Services LLC

Basics of continuous caster mold maintenance and specifics related to mold copper repairs. Historical and current overview of mold copper coating options available in North America.

10:15 a.m.

Break

10:30 a.m.

### Caster Roll Maintenance and Overlay Technologies

Jeff Brower, Primetals Technologies USA LLC

Caster roll and segment life can be significantly increased through the use of customized weld overlays and base materials. This session details the operational impact on caster rolls and technologies developed to improve roll performance.

11:30 a.m.

Lunch

12:30 p.m.

### Plant Tour of Steel Dynamics Inc. – Structural and Rail Division

4 p.m.

### Panel Discussion

Panelists: Yury Krotov, Steel Dynamics Inc. – Flat Roll Group Butler; Ron O'Malley, Missouri University of Science and Technology; Bill Schlichting, SKW North America; Rick Besich, ArcelorMittal Indiana Harbor; and Ian Deeks, Nucor Steel–South Carolina

5 p.m.

Reception

## Thursday, 19 October 2017

7 a.m.

Continental Breakfast

8 a.m.

### Billet and Bloom Caster Operations and Maintenance

Ian Deeks, Nucor Steel–South Carolina, and Bill Schlichting, SKW North America

Detailed review of casting billets and blooms from an operational and metallurgical perspective.

9 a.m.

Break

9:15 a.m.

### Caster Hydraulics — Failure Modes and Preventive Maintenance

Mark Cook, Yates Industries Inc.

Cylinders used in casters, failure modes, preventive maintenance, effective cylinder reconditioning program.

10 a.m.

Break

10:15 a.m.

### Caster Secondary Cooling and Water Treatment and Spray Nozzles for the Steel Industry

Eric Rosenow, NALCO Water, An Ecolab Company, and Steven Swoope, Delevan

The water treatment challenges and needs of a continuous caster secondary cooling system will be reviewed, along with the potential impacts that secondary water quality can have on the operational and maintenance key performance indicators of a caster. The presentation will also be a review of the hydraulic and two-fluid nozzles used in steel production, highlighting the basic use of atomizers focusing on the various technologies, operations and maintenance uses.

11:15 a.m.

### Caster Bearings — Types of Bearings, Failure Modes and Preventive Maintenance

Paul Brda and Bimal Nathwani, NSK Corp.

Types of bearings, failure modes and preventive maintenance.

Noon

Conference Adjourn

## Registration

### AIST Members

US\$845

by 4 September 2017

US\$945

after 4 September 2017

### Non-Members

US\$1,060

by 4 September 2017

US\$1,160

after 4 September 2017

## Registration Includes

Continental breakfasts and lunches Tuesday and Wednesday, reception Wednesday, continental breakfast Thursday, plant tour, and a course workbook or flash drive including presentations.

## Hotel Accommodations

A block of rooms has been reserved at Courtyard by Marriott Fort Wayne Downtown. Please call the hotel at +1.866.704.6163 by 25 September 2017 to secure the AIST discount rate of US\$129 per night for single/double occupancy.



## Featured Plant Tour

Plant Tour of Steel Dynamics Inc.  
– Structural and Rail Division



## Upcoming Events

- > **Managing Technology — Big River Steel**  
12–14 September 2017  
Sheraton Memphis Downtown Hotel > Memphis, Tenn., USA
- > **Sheet Processing and Finishing Lines — A Practical Training Seminar**  
17–21 September 2017  
Ann Arbor Marriott Ypsilanti at Eagle Crest > Ypsilanti, Mich., USA
- > **Material Handling and Transportation Logistics**  
10–12 October 2017  
The Seelbach Hilton Louisville > Louisville, Ky., USA
- > **Environmental Solutions: Meeting EPA Air Emission Requirements**  
16–18 October 2017  
Sheraton Indianapolis City Centre > Indianapolis, Ind., USA
- > **Secondary Steelmaking Refractories — A Practical Training Seminar**  
23–26 October 2017  
The Westin Milwaukee > Milwaukee, Wis., USA



### Association for Iron & Steel Technology

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