



# Hot Sheet and Plate Rolling Fundamentals

Practical Training Seminars

25 February–1 March 2018

The Renaissance Mobile Riverview Plaza Hotel  
Mobile, Ala., USA

*Featured Plant Tours: SSAB Americas or  
AM/NS Calvert LLC*



## About the Program

This seminar provides a comprehensive overview of hot rolling steel strip and plate rolling. The course covers fundamentals, metallurgical and quality requirements, equipment, rolling theory, control, rolls, temperature control, measurement, safety, and new technology. A new module on maintenance and reliability has been included by popular demand. Attendees will leave this course with a better understanding of the basic metallurgy involved; the different types of products and their attributes; the types of rolling mills and equipment; rolling theory; the latest technologies involved in hot rolling; safety aspects; production measures; maintenance practices and much more. There will be opportunities to discuss issues and solve problems during this interactive course. A full-day parallel session will be devoted to discrete plate and Steckel rolling, and tours will be offered of sheet and plate rolling operations.

## Who Should Attend

Anyone who would like to expand his or her knowledge and understanding of hot strip mills, Steckel mills, plate mills and hot rolling. This includes electrical, mechanical, lubrication and metallurgical engineers; maintenance personnel; operators; and those responsible for quality assurance. Equipment manufacturers and service suppliers would also benefit from this course.

## Professional Development Hours

This course may qualify for up to 27.25 Professional Development Hour (PDH) credits. Each attendee will receive a certificate listing the quantity of PDH credits earned for this course. This course is not approved for PDH credit in New York, Florida, North Carolina and Oklahoma.

## Organized By

AIST's Hot Sheet Rolling and Plate Rolling Technology Committees.



## Featured Plant Tours

SSAB Americas or AM/NS Calvert LLC

## Registration Includes

Registration includes welcome reception Sunday, breakfasts and lunches Monday through Thursday, continuous breaks, reception Monday, plant tour with bus transportation, and a course workbook or flash drive including presentations.

## Hotel Accommodations

A block of rooms has been reserved at the Renaissance Mobile Riverview Plaza Hotel. Please call the hotel at +1.800.922.3298 by 4 February 2018 to secure the AIST discount rate of US\$139 per night for single/double occupancy.

### AIST Members

US\$1,095

by 15 January 2018

US\$1,195

after 15 January 2018

### Non-Members

US\$1,310

by 15 January 2018

US\$1,410

after 15 January 2018



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# Schedule of Events

## Sunday, 25 February 2018

4–6 p.m.  
Registration

5–6 p.m.  
Welcome Reception

## Monday, 26 February 2018

7 a.m.  
Registration and Breakfast

8 a.m.  
Introductions and Opening Remarks

8:30 a.m.  
**Safety — It's a Conversation**  
Robert Brock, Steel Dynamics Inc. – Flat Roll Group Columbus Division  
A review of how the Steel Dynamics Inc.'s facility in Columbus, Miss., USA, uses communication with employees to shape its safety programs' path to reduce injuries and identify at-risk work conditions.

9:45 a.m.  
Break

10 a.m.  
**Overview/History of Hot Rolling**  
Ian Ward, Primetals Technologies USA LLC

11 a.m.  
**Review of Metallurgical Basics**  
John Speer, Colorado School of Mines

Noon  
Lunch

1 p.m.  
**Application of Fundamentals to Hot-Rolled Processing/Products**  
John Speer, Colorado School of Mines

2:15 p.m.  
Break

2:30 p.m.  
**The Reheat Furnace**  
Jared Kaufman, Tenova Inc.  
An introduction to the purpose, basic design and operating characteristics of a reheat furnace as used in a plate rolling mill. The presentation will highlight the typical furnace structure and lining, material handling, process combustion and exhaust systems, safety systems, and automation.

3:30 p.m.  
**Rough Mill Area Equipment**  
Eric Thokar, Primetals Technologies USA LLC  
Topics will include: roughing mill area layout, primary descaling, edgers, slab sizing presses, coilboxes, table covers, edge heaters and drum shears.

4:30 p.m.  
Question and Answer Discussion

5 p.m.  
Reception

## Tuesday, 27 February 2018

7 a.m.  
Breakfast

8 a.m.  
Introductions and Opening Remarks

9:15 a.m.  
**Finishing Mill Equipment**  
Frank Beddings, Primetals Technologies USA LLC  
An overview of finishing mill equipment from the entry of the finishing stands through the downcoiler.

9:45 a.m.  
Break

10 a.m.  
**Finishing Mill Equipment (cont'd)**  
Frank Beddings, Primetals Technologies USA LLC

11 a.m.  
**Flatness With Profile Control**  
Eugene Nikitenko, U. S. Steel Research and Technology  
Presentation will cover flatness, including definitions, measurements and ASTM standards; fundamentals of strip buckling under applied compressive stress, buckling conditions for center buckles and buckling conditions for wavy edges; the relationship between flatness and strip profile, plain strain hypothesis and flatness as a function of strip unit crown change; and profile and flatness control, roll stack deformations, mill actuators, and flatness sensors.

Noon  
Lunch

1 p.m.  
**Maintenance and Reliability**  
Randy Heisler, Life Cycle Engineering

2 p.m.  
**Plant Tour of SSAB Americas or AM/NS Calvert LLC** 

6 p.m.  
Return From Plant Tour and Adjourn

## Wednesday, 28 February 2018

7 a.m.  
Breakfast

### >> Hot Sheet Rolling Track

8 a.m.  
Introductions

8:15 a.m.  
**Rolling Theory**  
Yuli Liu, Quad Engineering Inc.  
The presentation will focus on basic rolling theory for hot flat rolling. Discussion will include flow stress of metals and its influence factors, roll bite friction and its influence factors, roll bite geometry and roll deformation, basic portion of roll pressure, tension effects, friction hill, roll flattening effect, rolling force torque, and power calculations. A simulation program to demonstrate the effects of different rolling process parameters is also included in the presentation. Examples of applying basic rolling theory in hot strip mill rolling schedule design are presented together with a hot strip mill rolling schedule design program.

9:45 a.m.  
Break

10 a.m.  
**Mini-Mills**  
Ian Ward, Primetals Technologies USA LLC  
The characteristics of mini-mills are discussed in terms of many aspects, including quality and throughput.

11 a.m.  
**Finishing Mill Operations and Temperature Control**  
Ian Ward, Primetals Technologies USA LLC  
Several fundamental requirements for stable mill operations will be covered.

Noon  
Lunch

# Schedule of Events (cont'd)



1 p.m.

## Hot Rolling Defects

Larry Gansho, ArcelorMittal

This presentation will discuss defects commonly associated with hot rolling mills, source causes, methods for detection and countermeasures to prevent reoccurrence.

2 p.m.

Break

2:15 p.m.

## Hot Rolling Defects (cont'd)

Larry Gansho, ArcelorMittal

3:15 p.m.

## Continued Developments in Hot Rolling Mills

Michael Peretic, SMS USA LLC

This presentation will provide an overview of continued developments in hot rolling technologies. Specific topics will include roll gap lubrication concepts, anti-peeling concepts and enhanced runout table cooling technologies to produce multi-phase steels. The Castrip production process will also be discussed, along with concepts for endless strip production.

4:30 p.m.

Question and Answer Session

## >> Plate Rolling Track

8 a.m.

Plate Rolling Introduction

8:15 a.m.

## Steckel Rolling — Process

Emin Erman, ArcelorMittal Conshohocken

This session will provide a comprehensive overview of Steckel rolling. The history, purpose and concept, advantages, typical layouts, operational differences, and product mix will be discussed. The session will cover all the processing aspects of a slab starting from the slab yard all the way to the finished plate product.

9 a.m.

## Steckel Rolling — Equipment

Blane Vines, Nucor Steel Tuscaloosa Inc.

This presentation will address the unique pieces of equipment used in the Steckel rolling process. Some equipment is used for Steckel rolling exclusively, while others are used in other flat rolling processes.

9:45 a.m.

Break

10 a.m.

## Discrete Plate Rolling — Process

Charlie Romberger, ArcelorMittal Global R&D – East Chicago

11 a.m.

## Discrete Plate Rolling — Equipment

Eric Thokar, Primetals Technologies USA LLC

Topics will include: housing and spindle requirements, slab broadsiding, and ingot rolling.

Noon

Lunch

1 p.m.

## Plate Finishing Equipment

Eric Thokar, Primetals Technologies USA LLC

Topics will include: cooling beds, plate transfers, sidetrimmers and shears, dividing and flying shears, ultrasonic testing, inspection, marking, and piling.

2 p.m.

Break

2:15 p.m.

## Practical Aspects of Plate Leveling

Rich Smith, ArcelorMittal Coatesville

3:30 p.m.

## Plate Heat Treating

Joe Stubenbort, Tenova Core

4:30 p.m.

Question and Answer Session

## Thursday, 1 March 2018

7 a.m.

Breakfast

8 a.m.

Introductions

8:15 a.m.

## Gauge and Width Control

Reginald Snyder, TMEIC

A study of the process control strategies and regulating systems involved in hot band gauge and width.

9:15 a.m.

## Descaling, Roll Cooling and Spray Issues in Hot Rolling

Lesli Peterson, Spraying Systems Co.

This session details the descaling and roll cooling processes. Discussed are spray nozzles and their use in the descaling and roll cooling processes.

10:15 a.m.

Break

10:30 a.m.

## Runout Table Cooling Technology

Michael Peretic, SMS USA LLC

This presentation will discuss objectives for runout table cooling technology and will also give some background on how today's laminar

flow cooling systems were developed. Relevant cooling concepts, table configurations and zone designs will also be presented, along with recent developments in cooling strategies and edge masking technology. Finally, a discussion of expected future developments will be provided.

11:30 a.m.

Lunch

12:30 p.m.

## Hot Strip Mill Downcoilers — Practical Considerations for Operation and Maintenance

Jose de Jesus, Xtek Inc.

This session will discuss the practices and parameters for attaining successful and reliable coiling operations, along with important maintenance criteria for achieving coiling consistency. The presentation will focus on the coiling sequence of operation and the role of each coiler component in achieving successful coiling.

1:30 p.m.

## Roll Design Concepts

Kevin Marsden, WHEMCO

Roll performance is critical for production of high-quality hot band and plate. Evolving mechanical design features of modern rolling mills that address processing requirements of advanced flat roll products also govern innovation in roll technology. Roll metallurgy for hot rolling applications optimizes important performance characteristics such as wear resistance, thermal response and damage tolerance.

2:30 p.m.

Break

2:45 p.m.

## Roll Shop Practices and Equipment

Ron Webber, Union Electric Åkers

Rolls are an integral part of the operation of a hot strip mill. The practices and equipment required to provide the mill with proper rolls will be discussed.

3:30 p.m.

## Managing Roll Surface Quality

Ron Webber, Union Electric Åkers

Roll surface is a critical parameter in producing high-quality product. This session will discuss the variables that affect the roll surface quality and methods to ensure the quality is maintained.

4:30 p.m.

Question and Answer Session

5 p.m.

Conference Adjourn

