Cold Rolling Fundamentals

A Practical Training Seminar

in conjunction with System Automation Fundamentals

5–9 March 2017
Indianapolis, Ind., USA
Hyatt Regency Indianapolis

AIST
ASSOCIATION FOR IRON & STEEL TECHNOLOGY

About the Program

This seminar provides a comprehensive overview of cold rolling. The course covers fundamentals, equipment, rolling theory, control, threading, rolls, lubrication, measurement, safety and new technology. Attendees will leave this course with a better understanding of the basic metallurgy involved, the different types of products and product attributes, the types of mills used and equipment involved with the mills, the theory of rolling, latest technologies involved in cold rolling, safety aspects, rolling solutions, production measures, and much more. Panel discussions will provide an opportunity to discuss issues and engage in problem-solving.

Who Should Attend

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

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Visit AIST.org/byoyp for more information

Organized By

AIST's Cold Sheet Rolling Technology Committee.

Schedule of Events

Sunday, 5 March 2017

4–6 p.m.
Registration

6 p.m.
Welcome Reception

Monday, 6 March 2017

7 a.m.
Registration and Continental Breakfast

8 a.m.
Introductions and Opening Remarks
Mark Blankenau, HyCAL Corp.

8:10 a.m.
Overview
John Speer, Colorado School of Mines
General overview of products, metallurgy, and processing from steelmaking to finishing, including product properties, end users and applications.

9 a.m.
Break

9:10 a.m.
Cold Rolling Fundamentals
John Speer, Colorado School of Mines
Deformation and metallurgical properties, iron-carbon phase diagram, grain size, stress-strain relationship, work hardening, effects of annealing, effect of percent reduction on R and N values, and effect of composition on properties.

10 a.m.
Break

10:10 a.m.
Rolling Mill Designs
Michael Peretic, SMS USA LLC
This presentation will open with a brief history of rolling technology, and will include a discussion of how material and process needs drove the development of roll stack designs and gap shape actuators. Examples of 2-high, 4-high, 6-high, MKW and cluster mill stack designs will be discussed with regard to their product applications. Finally, various line configurations — including reversing mills, batch tandem mills and continuous tandem mills — will be presented, showing the relative impact on production.

11 a.m.
Break

11:10 a.m.
Line Arrangements
Michael Peretic, SMS USA LLC

Noon
Lunch

1 p.m.
Entry Mill Equipment
Frank Beddings, Primetals Technologies USA LLC

2 p.m.
Break

2:10 p.m.
Mill Exit Equipment
Eric Thokar, Primetals Technologies USA LLC

3 p.m.
Break

3:10 p.m.
Hot Band Requirements for Cold Rolling

4 p.m.
Break

4:10 p.m.
Roundtable Discussion

Tuesday, 7 March 2017

7 a.m.
Continental Breakfast

8 a.m.
Roll Specifications and the Influence on Roll Performance
Ronald Perhosky, Union Electric Åkers

9 a.m.
Break

9:10 a.m.
Roll Shop Practices
William Jennings, Rockport Roll Shop

Basic understanding of the management of a critical tool for all steel processing units. Mill rolls are costly and can determine the quality of the product.

10 a.m.
Break

10:10 a.m.
Cold Rolling Lubricant Fundamentals
Matthew Knapik and William Hartley, Quaker Chemical Corp.

Basic training in rolling oil chemistry used in the steel cold rolling process. Process control of coolants to optimize mill performance and strip surface quality.

11 a.m.
Break

11:10 a.m.
Rolling Solution Systems

Noon
Lunch

1 p.m.
Depart for Plant Tour of Nucor Steel–Indiana

5 p.m.
Return From Plant Tour

5:30 p.m.
Reception

Wednesday, 8 March 2017

7 a.m.
Continental Breakfast

8 a.m.
Hydraulic Systems
Corey Sutherlin, Andritz Metals Inc.

9 a.m.
Break

9:10 a.m.
Inspection for Cold Rolling
Mark Blankenau, HyCAL Corp.

The specific inspection techniques for cold rolling mills will be discussed. Defect types, root causes and corrective actions will be the focus.

10 a.m.
Break

10:10 a.m.
Cold Rolling Theory
Mark Zipf, Cold Rolling Technologies Inc.

Examination of what's going on in the roll bite and how the cold reduction/rolling process works. Analytic details of the force-loaded interaction and deformation behavior of the work rolls and material along the longitudinal plane, including methods of modeling and characterizing the rolling process conditions and dynamics.

11 a.m.
Break

11:10 a.m.
Cold Rolling Theory (cont'd)
Mark Zipf, Cold Rolling Technologies Inc.

Discussion will focus on the practical use of and how to apply this theoretical understanding, including: process design and off-line simulation, what-if scenarios, performance and production prediction, multi-stage reduction/annealing planning, pass scheduling and setup modeling, mill/equipment sizing and selection, operational assistance, and guidance in problem resolution.

Noon
Lunch

1 p.m.

Automatic Gauge Control

Mark Zipf, Cold Rolling Technologies Inc.

Investigation of the thickness control problem, including available sensors, actuators, control dynamics, perturbation sensitivities and algorithms. Details of the basic automatic gauge control (AGC) modes (in an ideal, fully instrumented, single-stand configuration), their performance characteristics and when/where to use them, including their adaptations for variations in the rolling conditions. Study of critical couplings/interactions between AGC activities, strip tensions, roll bite friction/rolling speed and shape control activities, followed by an expansion to tandem mill configurations and constrained actuation/sensing arrangements. A closing examination of AGC performance characterization and specification.

2 p.m.

Break

2:10 p.m.

Shape/Flatness Measurement and Control

Mark Zipf, Cold Rolling Technologies Inc.

Introduction into the overall shape/flatness control problem, including specific definitions of profile, shape and flatness. Overview of the distortion phenomena and its sources/formation, including an analysis of the force-loaded transverse roll stack deflection characteristics, thermal reactions and available corrective shape actuators. Examination of how to measure shape/flatness and the strategies used in contemporary systems. Discussion of the primary components, architecture, and theory of operation of automatic shape/flatness measurement and control systems. A closing examination of shape/flatness control performance characterization and specification.

3 p.m.

Break

3:10 p.m.

Intermediate Concepts and Special Topics

Mark Zipf, Cold Rolling Technologies Inc.

Exposure to the next level of concepts and approaches, including non-circular arc rolling theories, advanced controls and multi-variable concepts/methods, a closer look at the subtle details of the overall shape/flatness control problem, envelope and control range depictions of mill capabilities, a study of 20-high cluster/Sendzimir mills (AGC and shape), strategies for different materials and thickness ranges, multi-stage and multi-pass rolling operations, coordination of mill setup/roll crowns, pass scheduling, and shape target progression.

4 p.m.

Break

4:10 p.m.

Roundtable Discussion

Thursday, 9 March 2017

7 a.m.

Continental Breakfast

8 a.m.

Cold Mill Safety

Phil Littell and Chris Hudson, Nucor Steel–Indiana

9 a.m.

Break

9:10 a.m.

Cold Rolling Operation Bottlenecks — Pickling Line Minus Tandem Mills

Harald Van Bracht, AM/NS Calvert LLC

10 a.m.

Break

10:10 a.m.

Rolling AHSS

Leland Robinson, Primetals Technologies USA LLC, and Matt Baur, AK Steel Research

11 a.m.

Break

11:10 a.m.

Surface Texture Design

Mark Blankenau, HyCAL Corp.

Noon

Lunch

1 p.m.

Motors and Drives

Ronald Tessendorf, TMEIC Corp.; Curtis Parrott and Barra O'Fathaigh, Nucor Steel–Arkansas

Topics covered include motor types in use, various drive topologies and a review of a cold mill that has experienced many of these configurations since coming on-line in 1998.

2 p.m.

Break

2:10 p.m.

Chatter

Stuart Critchley

3 p.m.

Break

3:10 p.m.

Chatter (cont'd)

Stuart Critchley

4 p.m.

Break

4:10 p.m.

Roundtable Discussion

5 p.m.

Conference Adjourn

Registration

AIST Members

US$995	US$1,095
by 23 January 2017	after 23 January 2017

Non-Members

US$1,210	US$1,310
by 23 January 2017	after 23 January 2017

Registration Includes

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

Hotel Accomodations

A block of rooms has been reserved at the Hyatt Regency Indianapolis, Indianapolis, Ind., USA. Please call the hotel at +1.402.592.6439 by 13 February 2017 to secure the AIST discount rate of US$149 per night for single/double occupancy.

Featured Plant Tour

Nucor Steel–Indiana

Upcoming Events

> Scrap Supplements and Alternative Ironmaking 7

19–21 February 2017

Wyndham Lake Buena Vista > Orlando, Fla., USA

> Rod and Bar Rolling

20–23 February 2017

The Atlanta Marriott Marquis > Atlanta, Ga., USA

> System Automation Fundamentals in conjunction with Cold Rolling Fundamentals — A Practical Training Seminar

6–9 March 2017

Hyatt Regency Indianapolis > Indianapolis, Ind., USA

> International Symposium on New Developments in Advanced High-Strength Sheet Steels

30 May–2 June 2017

Keystone Resort and Conference Center > Keystone, Colo., USA

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