



# SHEET PROCESSING AND FINISHING LINES

## A PRACTICAL TRAINING SEMINAR

20-23 MARCH 2022

Sheraton Indianapolis City Centre Hotel • Indianapolis, Ind., USA  
Plant Tour: Steel Dynamics Inc. Flat Roll Group - Heartland Division

### ABOUT THE PROGRAM

This seminar will provide a comprehensive overview of process lines, including pickling, annealing, galvanizing, cleaning, plating, painting, skinpass rolling, leveling, slitting and special processes. This seminar will also focus on terminal equipment for the entry and exit sections, strip quality assessment, industrial hygiene, safety, environmental concerns, overview of modeling for design and line control, operations, maintenance, and factors to consider in configuring a new process line. There will be many opportunities to discuss issues and solve problems during the question-and-answer periods.

### WHO SHOULD ATTEND

Those who would like to expand their knowledge and understanding of process lines: new and transferred employees of steel producers; mechanical, electrical, process and metallurgical engineers; software and process control personnel; maintenance personnel; operators; and quality assurance specialists. Equipment manufacturers, employees from steel processors and steel service centers, suppliers, and customers of steel producers will also benefit from this seminar.

### ORGANIZED BY

AIST's Rolling and Processing Technology Division.

### PROFESSIONAL DEVELOPMENT HOURS

This course may qualify for up to 20 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 credits in New York, Florida, North Carolina and Oklahoma.



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### FEATURED PLANT TOUR

Steel Dynamics Inc. Flat Roll Group – Heartland Div.

### UPCOMING EVENTS

The Making, Shaping and Treating of Steel: 101

5-6 March 2022  
Sheraton Birmingham Hotel  
Birmingham, Ala. USA

Digital Transformation Forum for the Steel Industry

14-16 March 2022  
The Westin Indianapolis  
Indianapolis, Ind., USA

Energy and Utilities Workshop – Roadmap to the Energy Efficient, Sustainable and Decarbonized Steel Industry

14-17 March 2022  
Oak Ridge National Laboratory and Embassy Suites by Hilton Knoxville West  
Oak Ridge, Tenn., USA



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### REGISTRATION INCLUDES

Welcome reception Sunday, breakfast Monday–Wednesday, lunch Monday through Wednesday, reception Tuesday, 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 Sheraton Indianapolis City Centre Hotel. Please call the hotel at +1.888.236.2427 by 4 February 2022 to secure the AIST discount rate of US\$134 per night for single/double occupancy.

### ATTENTION NON-MEMBERS

Non-member registration fees include membership in AIST through 31 December 2023. Membership is not automatic. A completed membership application must be returned to AIST.

#### AIST MEMBERS

US\$1,195

Before 7 February 2022

US\$1,295

After 7 February 2022

#### NON-MEMBERS

US\$1,410

Before 7 February 2022

US\$1,510

After 7 February 2022

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# SCHEDULE OF EVENTS



## Sunday, 20 March 2022

4 p.m.  
**Registration**

5 p.m.  
**Reception**

## Monday, 21 March 2022

7 a.m.  
**Breakfast**

8 a.m.  
**Introductions, Overview, Definition of General Terms**  
Chad Donovan, SMS group Inc.

8:40 a.m.  
**New Lines Installation at Heartland and Sinton and the Pairing Process**  
TBD, Steel Dynamics Inc.

9 a.m.  
**Process Line Design Fundamentals**  
Dave Withrow, Withrow Industries Inc.  
To ensure the success of a process line, its performance requirements must be integrated fully with its setting, and the strip driving power must be ample.

10 a.m.  
**Break**

10:15 a.m.  
**Incoming Material**  
Mark Zipf, SMS group Inc.  
This presentation examines the characteristics of the material that arrives at the entry end of process lines and finishing equipment. The first point of discussion involves gaining an understanding of the material's typical dimensional geometry, metallurgical characteristics, mechanical properties, surface conditions and flatness. This leads to a review of methods specifying and standardizing the incoming material, such that it falls within the capabilities envelopes of the process and finishing equipment. Next is a quick look at where the material comes from, and the upstream, multi-stage processes involved in its formation, providing some key insight into what to expect and what can go wrong. The discussion then takes a tour of the many defects and unsettling conditions that the process and finishing end should anticipate and must be prepared to contend with.

Noon  
**Lunch**

1 p.m.  
**Control Basics**  
John Ingram, Primetals Technologies  
This presentation is an introduction to control concepts used on process lines, with practical examples to illustrate control design.

1:45 p.m.  
**Coil Joining Using Resistance Welding**  
Matt Keller, Taylor Winfield Technologies Inc.  
An overview of coil joining using resistance seam, spot and flash butt welding in continuous processing lines.

2:05 p.m.  
**Laser Welding for Coil Joining**  
Deni Bellai, Hugo Miebach GmbH

2:25 p.m.  
**Laser UT In-Line Diagnostic of Weld Quality for Coil Joining**  
Marc Choquet, Tecnar Automation Ltée  
A new technology has been patented and will soon be available to perform a live diagnostic of the quality of weld found in coil-joining activities. The new tool is mounted right on the welding station and provides in a matter of seconds both the level of fusion of the coils and the level of crystallization, in other words the heat input, that was transferred to the weld joint.

2:45 p.m.  
**Break**

3 p.m.  
**Pickling: Carbon and Stainless Steel**  
Jay Kremm, Danieli Corp.  
This goal of this presentation is to provide a general overview of both the pickling process and the equipment that makes up a modern strip pickling line. Several main line configurations will be reviewed, along with a discussion on the benefits of each regarding productivity, flexibility and quality.

3:45 p.m.  
**Advancements and Opportunities in Strip Cleaning Section Optimization,**  
David Thiemann, Atlantic Process Technology Inc.

4:30 p.m.  
**Leveling Lines**  
John Wallace, SES LLC

## Tuesday, 22 March 2022

7 a.m.  
**Breakfast**

8 a.m.  
**The Chemical Process of Steel Strip Cleaning and How to Enhance Performance**  
Stephanie Williamson, Quaker Houghton  
Steel strip undergoes cleaning for the removal of process fluids, metal fines, and surface residue prior to various downstream processing and finishing applications. A clean metal surface is necessary for these applications including annealing, metallic coating and painting. Before enhancing cleaning performance, it's important for operating personnel to understand the general framework for chemical and mechanical strip cleaning. There are three basic mechanisms of cleaning: physical interaction, chemical reaction and physical energy. Physical interaction and chemical reaction are related to the functionality of the individual components in the cleaner formulation. Conversely, physical energy is imparted by the mechanical equipment of the cleaner line. Once this general framework is learned, ways to optimize cleaner performance through solution chemistry control and equipment design will be discussed.

9 a.m.  
**Annealing**  
Bill Lucas, Fives  
This session will consider various aspects of steel annealing as it pertains to strip. The reasons for annealing, along with the physical results possible with different thermal cycles, will be covered. Equipment employed along with methods of heating, cooling and strip conditioning will be reviewed in greater detail. A brief discussion of materials used and how they influence equipment lifetime and maintenance is included. Processing atmospheres, equipment control methods and safety considerations are also discussed.

10 a.m.  
**Break**

10:15 a.m.  
**Skinpass/Temper Rolling**  
Mark Zipf, SMS group Inc.  
This presentation provides an overview of skinpass and temper rolling, with an emphasis on "why we are doing this" and "how all this works." Starting with a study of the material's yielding and deformation behavior, the strip's surface structure, and the concepts of profile, shape and flatness, an understanding of the key factors is established, warranting the rolling deformation process and governing its objectives. Next, classical rolling mill arrangements are reviewed, and the discussion examines the force-loaded conditions/reactions occurring within the roll bite (in both the longitudinal and transverse directions), leading to how these actions impart certain transformations of the material's geometry, surface condition and mechanical properties. The mill's equipment is then dissected with a focus on the general arrangement and roll gap/shape actuators, combined with the mill's control strategies and systems. Methods of performance measurement/quality evaluation are introduced, along with an examination of problems and shortcomings that are often experienced. The presentation closes with a comparison of differing mill formats and a review of recent developments in enhanced quality and productivity.

Noon  
**Lunch**

12:30 p.m.  
**Plant Tour of Steel Dynamics Inc. - Flat Roll Group Heartland Division**

5 p.m.  
**Reception**

## Wednesday, 23 March 2022

7 a.m.  
**Breakfast**

8 a.m.  
**Automated Surface Inspection of Sheet and Finished Product**  
Greg Gutmann, ISRA Vision Parsytec  
This presentation covers basic automated surface inspection system technology and how it can be applied. Attendees will learn to use inspection data to assess product quality and assist in decision-making, and will understand the available return on investment.

8:45 a.m.  
**Flatness Measurement and Control**  
Brian Smith, ANDRITZ Metals USA Inc.

9:30 a.m.  
**Break**

9:45 a.m.  
**Continuous Hot-Dip Galvanizing**  
Gary Dallin, International Zinc Association  
The presentation will describe the metallurgy of the zinc-iron reaction in the bath and how it is controlled. Also covered is the wiping process to remove excess liquid zinc from the strip achieve the specified coating weight.

10:45 a.m.  
**Tinplating – As Relevant Now as Ever**  
Vikram Trehan, Tata Steel  
The strong demand for tinplate cans during and after the COVID pandemic, along with the need for sustainable packaging options, has made tinplate more relevant now than ever before.

11:30 a.m.  
**Paint Lines**  
Nikhil Kulkarni, Steel Dynamics Inc. – Flat Roll Group Jeffersonville Plant

Noon  
**Lunch**

1 p.m.  
**Corrosion Preventives and Surface Treatments**  
Stephanie Williamson, Quaker Houghton  
During storage and transit, it is critical to protect steel and zinc-coated coils against corrosion and prepare the surface appropriately for downstream processing. This presentation will review the chemistry, types, applications and troubleshooting of two different product categories that are used for this purpose: corrosion preventives and surface treatments. These products are applied to meet the unique needs of several market segments including automotive, appliance, heavy industrial, construction and consumer-related equipment. The primary purpose of oil and solvent-based corrosion preventives is to protect against corrosion and staining on ferrous and non-ferrous surfaces. Other important attributes may include lubrication, ease of cleaning, and compatibility with welding, phosphating, adhesives and sealants. Surface treatments, such as passivates and thin organic coatings, are applied post-metallic coating to impart a number of properties such as corrosion protection, lubrication, paint adhesion, water repellence and anti-fingerprint.

2 p.m.  
**Slitting Line Technology for Efficiency**  
Jochen Muenker, GEORG North America  
This presentation will discuss state of the art slitting Lines with high automation level for efficiency in output, set up flexibility and reduced man power.

3 p.m.  
**Break**

3:15 p.m.  
**Slitting Mechanics and Slitter Tooling for Modern Metal Processing,**  
Brian Shaw and Jim Robbins, ANDRITZ Metals USA Inc.  
This presentation will equip attendees with the knowledge to be able to evaluate a cut metal edge with respect to a customer's quality requirements and understand what knife adjustments are needed to meet those requirements. The information given will be a practical application of basic engineering principles to sidetrimming and slitting all gauges and grades of steel ranging from low-carbon interstitial-free steel to advanced high-strength steel.

4 p.m.  
**Metals Packaging-Coils and Sheets**  
Steve Hart, DuBose Strapping  
A brief discussion of automated and manual packaging across the metals industry.

4:30 p.m.  
**Conference Adjourns**