



MODERN ELECTRIC FURNACE STEELMAKING

A PRACTICAL TRAINING SEMINAR
IN CONJUNCTION WITH SPECIALTY STEELMAKING TRAINING

03-07 FEBRUARY 2014

HILTON BIRMINGHAM PERIMETER PARK

BIRMINGHAM, ALA., USA

ABOUT THE COURSE

This course covers safety, the basics of electrical and mechanical features of electric arc furnaces, refractories, and the role of raw materials. The program will explore the fundamentals of electric furnace steelmaking technology, the use of energy inputs, the steelmaking process, electrodes and environmental concerns for electric steelmaking. Attendees will also have the opportunity to learn how their operation compares to industry benchmarks and hear about the latest developing technologies. The midpoint of the conference includes a plant tour followed by an experts roundtable and reception with an open forum to discuss questions and challenges. Attendees with a focus in specialty steelmaking will have the opportunity to attend a special breakout session to discuss decarburization, degassing and desulfurization, various refining processes, equipment and operations, an overview of ingot casting and practical aspects of bottom pouring.

SCHEDULE OF EVENTS

MONDAY, 3 FEBRUARY 2014

4 p.m.

Registration

5:30 p.m.

Welcome Reception

TUESDAY, 4 FEBRUARY 2014

7 a.m.

Registration and Continental Breakfast

8 a.m.

CMC Steel Alabama Preview

Jonathan Ridgeway, CMC Steel Alabama

8:30 a.m.

Safety as a Culture Change

Fred Rine, FDRsafety

9:30 a.m.

Break

9:45 a.m.

Chemistry of EAF Steelmaking

Larry Heaslip, Interflow TechServ Inc.

The chemistry of steelmaking with particular reference to the electric arc furnace (EAF) is presented in a manner that is designed to interest, involve and inform both those persons having little or no background or previous training in the chemical metallurgy of steel production, as well as those persons who do have such background. The topics covered will relate to the interactions between the thermal behavior, physical behavior, and chemical behavior of liquid steel and slag during the melting, alloying, and removal of undesirable elements from steel, with the goal of improved understanding of the practices and procedures that are undertaken in an EAF shop to produce heats of quality liquid steel ready for casting.

Noon

Lunch

1 p.m.

Chemistry of EAF Steelmaking, cont'd

Larry Heaslip, Interflow TechServ Inc.

2:15 p.m.

Break

2:30 p.m.

Chemistry of EAF Steelmaking, cont'd

Larry Heaslip, Interflow TechServ Inc.

3:45 p.m.

Chemical and Electrical Energy Inputs and EAF Performance

Sam Matson, CMC Americas

WEDNESDAY, 5 FEBRUARY 2014

7 a.m.

Continental Breakfast

8 a.m.

Part I: EAF Designs and Operations

Jeremy Jones, Tenova Core

Over the period from 1980 to 2005, EAF operations went through a rapid evolution as facilities pushed to increase productivity and improve product quality. Chemical energy use in the EAF tripled in magnitude, and many new technologies were introduced. In addition, many different EAF designs were introduced, aimed at heat recovery from the offgas, reducing electrode consumption, increasing productivity and providing greater flexibility in the choice of raw materials. This section of the seminar focuses on EAF technologies and designs implemented over the past 25 years.

9 a.m.

Break

9:10 a.m.

Part II: EAF Technologies — The Path to EAF Optimization

Jeremy Jones, Tenova Core

The focus of EAF technology for the past 20 years has been on the increased use of chemical energy, reduced energy losses from the EAF, flexibility in choice of energy inputs to the EAF and higher productivity (more energy, faster tap-to-tap), with a minor focus on raw materials and environmental issues. There were many different EAF designs focused on leveraging specific local conditions to reduce steelmaking costs. The steel industry has consolidated over the last few years. Due to economic considerations, facilities have focused less on the design of the EAF and more on the process itself. The importance of auxiliary equipment has grown, and steelmakers are now demanding better tools to help the operator make better decisions. There is greater emphasis on understanding energy utilization in the EAF because, as the use of chemical energy has grown, energy efficiency has suffered. This section of the seminar focuses on development of a proven approach to EAF optimization. It draws on the experience gained at several North American EAF facilities.





4:30 p.m.

Roundtable Discussion

Harriet Dutka, Magnesita Refractories; Eugene Pretorius, Nucor Steel–Berkeley; Jeremy Jones, Tenova Core; and Dennis Rodal, ELG Haniel Metals

THURSDAY, 6 FEBRUARY 2014

7 a.m.

Continental Breakfast

8 a.m.

Electrical Engineering 101

9:15 a.m.

Break

9:30 a.m.

Scrap Selection for Quality Specialty Steel

Dennis Rodal, ELG Haniel Metals

What makes scrap blending so difficult is tramp residual element control. An in-depth explanation is provided of the sources of tramp residual elements and the effects on both the specialty steelmaker and scrap supplier.

10:30 a.m.

Break

10:45 a.m.

Gas/Carbon Injection Systems

Mike Grant, Air Liquide S.A.

This lecture will describe the use of oxygen and gaseous fuels in the electric arc furnace. The importance and use of carbon injection will also be presented. The presentation will include the latest technologies of EAF burner, oxygen and carbon injection systems, as well as the general theory and strategy of their use. A strong emphasis on the safe use of oxygen will be made.

Noon

Lunch

1 p.m.

EAF Industry Perspective: Past, Present and Future

Raymond Monroe, Steel Founders' Society of America
Economic conditions have a major impact on the capital investment requirements and demand for steel products. Understanding the impact of macro-economic policies and their legacy effects on the steel industry allows us to know how we got here and where we might be going in market demand for steel products and in the development of EAF operations.

2 p.m.

Break

10:20 a.m.

Break

10:30 a.m.

Ladle Metallurgy Furnace Processing of Steel From the EAF

Helmut Oltmann, Nucor Steel–Berkeley

The ladle metallurgy furnace (LMF) transforms raw steel from the EAF into a castable product and delivers it to the caster at the right time, temperature and chemistry (bulk and inclusion chemistry). The ability to do so is determined by equipment and processing approach, as well as the quality from the EAF. A review of killing and alloying the steel, making a slag, controlling temperature and non-metallic inclusions is also given.

11:30 a.m.

Lunch

12:15 p.m.

Plant Tour of CMC Steel Alabama



2:15 p.m.

Arc Furnace Regulation System

Reinzi Santiago, Tenova Core

This discussion focuses on the arc furnace regulation system, a technology that greatly reduces harmonics, flicker and energy consumption.

3:15 p.m.

Break

3:30 p.m.

EAF Energy Efficiency and Associated Environmental Considerations

Doug Zuliani, Goodfellow

This paper will focus on improving EAF energy use and recovery as a means to simultaneously reduce operating costs, improve yield and minimize emissions. Major energy losses and sources of offgas emissions will be identified for a typical scrap melting practice. The focus will be on first optimizing "in-EAF" energy inputs as efficiently as possible for the production of steel. Various technologies designed to improve in-EAF process energy efficiency and the resulting impact on gaseous emissions will be explored. Once in-EAF energy efficiency has been optimized, the discussion will focus on the efficient recovery of remaining energy leaving the EAF in the offgas. Heat recovery technology and possible uses for the recovered energy will be explored. The net impact of these technological improvements on energy use and related emissions will be summarized.

4:15 p.m.

Refractories and Slags for Quality Specialty Steel Production

Jim Conrad, Fedmet Refractories

FRIDAY, 7 FEBRUARY 2014

7 a.m.

Continental Breakfast

EAF TRACK

8 a.m.

Graphite Electrode Manufacture and Use

Jerry Castleman, Showa Denko Carbon Inc.

The equipment and raw materials used in the manufacture of graphite electrodes and their use will be discussed.

9 a.m.

Break

9:15 a.m.

The Selection and the Use of Refractories in Electric Arc Furnaces

Tomas Richter, North American Refractories Co.

The chemical, physical and application attributes will be presented for the refractories which are used during the electric arc furnace steelmaking process. The proper refractory selection will be summarized in the relationship with the operational and metallurgical parameters of the EAF steelmaking process.





SPECIALTY STEEL TRACK

8 a.m.

Refining of Specialty Steels

Ian Masterson, Praxair Inc.

This presentation covers decarburization, degassing and desulfurization of specialty steels, along with a brief overview of the various refining processes, equipment and operations.

9 a.m.

Break

9:15 a.m.

Introduction to Casting of Specialty Steels and Alloys

Mark Rodney, Latrobe Specialty Metals Inc.

10:15 a.m.

Break

10:30 a.m.

Introduction to Casting of Specialty Steels and Alloys, cont'd.

Mark Rodney, Latrobe Specialty Metals Inc.

10:15 a.m.

Break

10:30 a.m.

Benchmarking the Modern Meltshop

Wayne Adams, GrafTech International Holdings Inc.

This presentation will focus on providing insight into achieving maximum efficiency in an EAF. Industry statistics showing productivity and power inputs will be presented, as well as time utilization, heats per day, tons per hour, and electrode and energy consumption. Comparisons will be made between worldwide geographic regions and various types of furnace. The presentation will finish with some key steps for continuous improvement.

REGISTRATION FEES

Advance registration by 20 December 2013: Member US\$1,095, Non-member US\$1,310. Registration fees after 20 December 2013: Member US\$1,195, Non-member US\$1,410. Registration fees include Monday welcome reception, Tuesday through Friday continental breakfast, Tuesday through Thursday lunch, continuous breaks, Wednesday reception, plant tour and a course workbook.

>> REGISTER NOW

COMPANY DISCOUNT

Three or more individuals from the same facility attending any one seminar can receive a 10% discount per person. All registrations must be received together along with payment to qualify for the discount. Not applicable with any other discount.