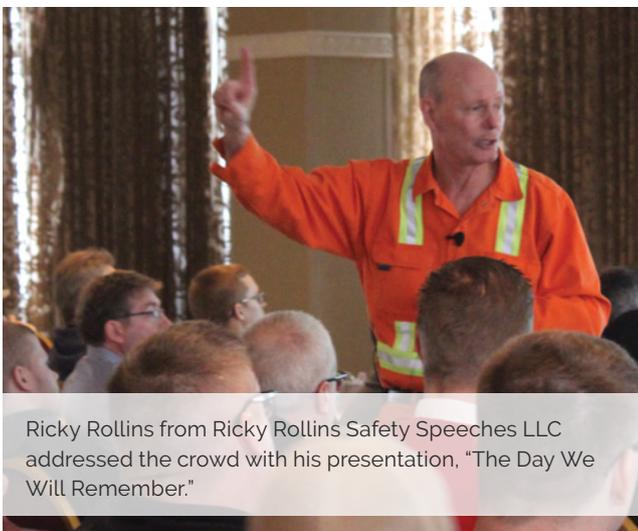




# Recap: Modern Electric Furnace Steelmaking – A Practical Training Seminar

By Sam Kusic



Ricky Rollins from Ricky Rollins Safety Speeches LLC addressed the crowd with his presentation, "The Day We Will Remember."



A roundtable discussion was held during a reception on Wednesday evening (left to right): Stephan Ferenczy, Sam Matson, Harriet Dutka, Jeremy Jones, Brett McGee and Eugene Pretorius.

Talk about preaching to the choir.

Before a standing-room-only conference of 150 or so steel industry professionals, longtime AIST member and accomplished metallurgist Larry Heaslip declared, "Steel is a truly remarkable material. It is steel's versatility that is its greatest asset, and it is this versatility that accounts for the fact that worldwide steel production exceeds 1 billion tons each year, and for the fact that hundreds of millions of tons of steel are recovered and recycled each year. Your average person doesn't understand that."

Had this been said in a church, you might have expected to hear an "Amen!" But this having been said in a hotel banquet room full of faithful steelmakers, it instead elicited a "Hell, yeah!" from someone in the audience.

Indeed, some things are just worth repeating, even if already well understood. But, Heaslip wasn't intending to preach so much as to teach. And he had a lot of ground to cover during AIST's Modern Electric Furnace Steelmaking seminar, held 5–9 February in Memphis, Tenn., USA. This was the 24th edition of the annual practical training seminar, which is geared toward those who work in and supply to mini-mill and foundry meltshops.

The seminar provides an in-depth review of EAF steelmaking and looks closely at its operational aspects, including basic

metallurgy, refining, scrap selection, injectables, maintenance and furnace regulation.

One of the conference organizers, Jeremy Jones, and other organizers said that although the seminar has evolved concurrently with EAF steelmaking, its primary goal remains unchanged — to provide those who attend with a thorough grounding in EAF steelmaking.

To that end, Heaslip walked attendees through the basic chemistry of EAF steelmaking and the processes in play during the melting and ladle metallurgy stages. Heaslip, in fact, delved deeply into refining, focusing heavily on the importance of a proper slag practice.

"Ladle slags should have a balanced fluidity," he said, "not crusty and not watery. Crusty slags will not absorb inclusions, and watery slags attack refractory and can become emulsified in the liquid steel."

Also during the seminar, Jones, an EAF expert and managing partner of the Continuous Improvement Experts LLC consultancy, reviewed EAF designs with attendees.

Jones said that the industry over the last two decades has collectively been focused on furnace design as mills sought improvements in energy recovery and looked to meet the unique requirements of individual operations. But Jones said he sees that focus shifting to process optimization as operators



The sold-out Modern Electric Furnace Steelmaking seminar was held 5–9 February 2018.



Larry Heaslip walked attendees through the basic chemistry of EAF steemaking.



Attendees had the opportunity to tour Big River Steel.

look for ways to better control and refine the melting and chemistry.

"As we make advances in instrumentation and our understanding of raw materials, we're gradually starting to pay more attention to the process itself," he said.

But Stephan Ferenczy, the meltshop manager at Steel Dynamics Inc.'s structural and rail mill in Columbus City, Ind., USA, reminded the group that they also need to pay attention to the equipment itself, reminding them that a proper maintenance program and attention to detail are essential.

"If we don't respond to the little alarms, trips, changes in pressures, flows, leaks, etc., there will be consequences," he said during his presentation.

Ferenczy told the audience that neglecting the small details can lead to significant losses and downtime.

As an example, he recalled one instance in which a section of chain link fence around an unnamed facility had been taken down during a maintenance project, but not reinstalled. The opening allowed a wayward raccoon to enter an energized substation, giving rise to the following radio call:

"I'm at the substation, and there's a critter in the static VAR 2nd harmonic filter and he's still on fire. How do we put him out?"

The incident took the substation down for 18 hours and caused an 8-week slowdown in production while they waited for spares to arrive. In the end, the accident cost the facility US\$5.5 million.

And it could have all been avoided, he said, had someone taken a few minutes to restore the fence.

Attendees also heard from Mike Grant, a senior steelmaking expert with Air Liquide, who presented on furnace gas and carbon injection systems. During his presentation, he said operators ought to take a more strategic approach to their oxygen lancing practice.

"There is a natural tendency to inject lancing oxygen as soon as we can because we want to go fast. However, this often means that we run out of bath carbon too early," he said, adding that energy gains arising from the early lancing are lost when the furnace roof is opened to back charge.

"In fact, it is better to wait before injecting lancing oxygen so that we can conserve the carbon in the bath. This carbon will be useful at the end of the heat when we need to keep our slag iron oxide content down and keep our slag foaming."

The seminar typically includes a tour of a mill, and this year, attendees were able to have a look at Big River Steel's mill in Osceola, Ark., USA. The sheet mill is the newest flat-rolled facility in the U.S. and became fully operational last year. The mill is highly automated, and one of its distinguishing features is its use of a Ruhrstahl Heraeus (RH) degasser, something more commonly associated with the steel shop of an integrated facility.

Attendees heard from Big River product development director Denis Hennessy, who discussed the ramp-up and offered a peak at the millions worth of investment that is to come in the facility.

In between the tour and presentations, attendees had plenty of time to compare notes and exchange business cards.

"I was able to meet some people from different plants in my own company as well as some people from other plants," said Colin Meidell, of Steel Dynamics Inc. "We all have common issues that we all have to face, and it was good to hear someone else's perspective on how they approach it at their plants," he said.

All told, the seminar drew about 150 operators and suppliers both in North America and abroad.

"Anyone who didn't come away with at least one or two new ideas wasn't trying very hard," said Jones. ♦