Contribution ID: **44** Type: **Oral Presentation**

Simulation Based Training for Industrial Operations: Interactive Learning for Complex Tasks

Tuesday 12 May 2026 09:10 (20 minutes)

Training Electric Arc Furnace operators requires time, controlled conditions, and supervised exposure to plant operations. Many critical events cannot or should not be observed during live training because they carry safety risks or depend on rare process conditions. Simulation based training addresses this gap by reproducing the operational environment without exposing personnel or equipment to danger.

The paper presents a simulation-based training environment designed to accelerate the preparation of operators in electric arc furnace plants. The system combines structured learning modules, multimedia training material, and a fully interactive 3D model of the EAF to reproduce the operational sequence from charging to tapping. The platform relies on a backend that records user actions and evaluates progress, but its central function is practical, simulation driven familiarization with real operating conditions.

Training begins with guided content that introduces the fundamental process steps, equipment configuration, and safety constraints of the furnace area. This establishes the technical baseline before the user moves to hands-on simulation.

Indeed, the core component is the embedded 3D interactive model. It provides a direct, operational representation of the furnace and auxiliary systems, allowing the trainee to perform critical tasks such as deslagging, control of foamy slag formation, tapping, tilting etc. Because the environment is simulated, users can also experience the direct consequences of wrong decisions without putting personnel or equipment at risk. This enables learning by doing, including deliberate exposure to rare, hazardous, or cost-sensitive scenarios that cannot be reproduced safely in the production plant. The full furnace phases sequence can be observed, manipulated, and repeated, supporting both procedural understanding and situational awareness.

The system serves steel plants where long-standing operational practice must coexist with modern methods. It reinforces traditional training by offering a realistic, repeatable, and risk-free reproduction of key tasks, while adding the advantages of data collection and performance tracking. The result is a unified tool that standardizes operator onboarding, strengthens safety culture, and improves the transfer of operational know-how across teams.

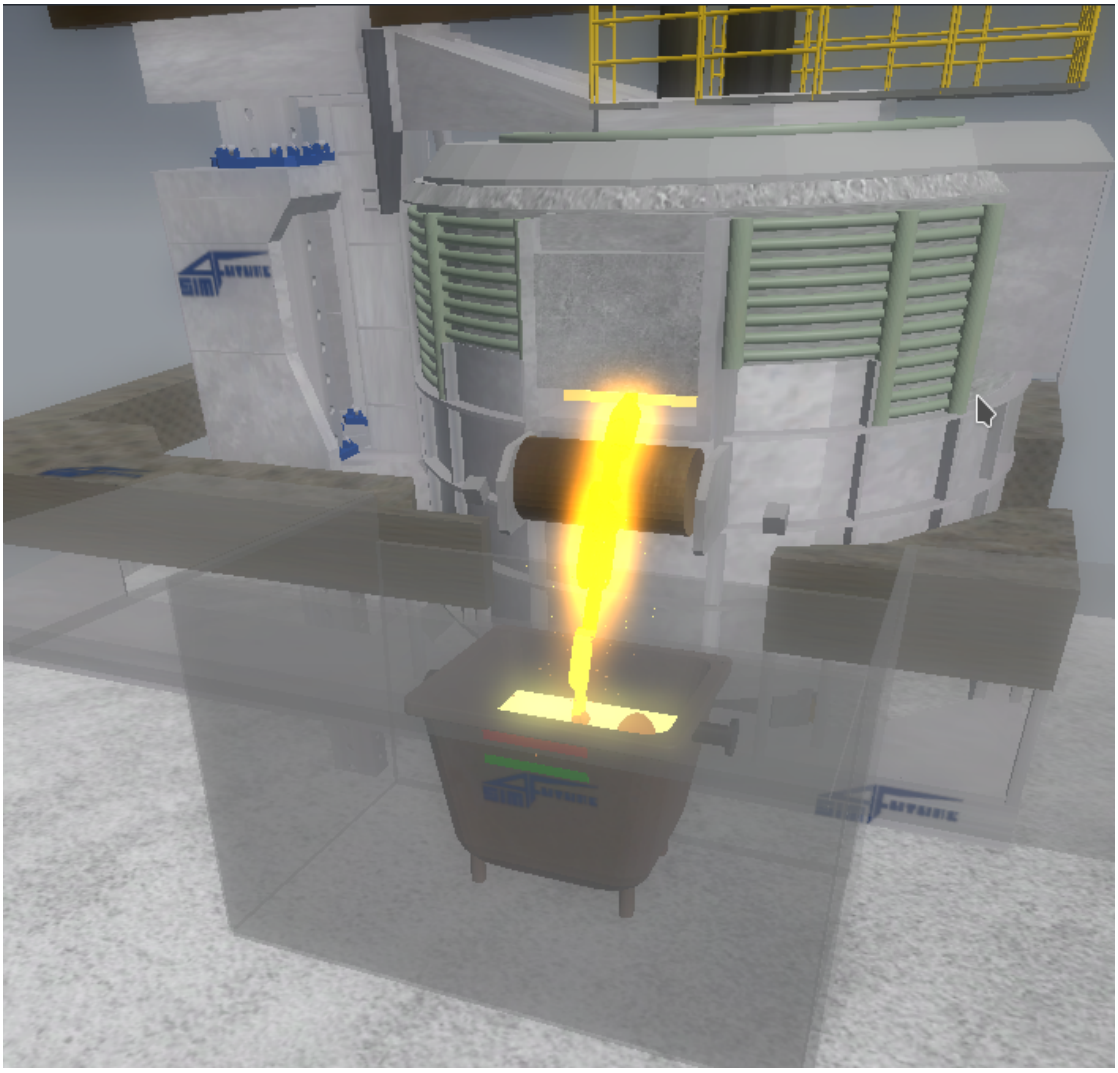

Figure 1: Deslagging phase simulation

Speaker Country

Italy

Speaker Company/University

SIM4Future srls

Primary author: MASSEI, Marina (SIM4Future srls)

Co-author: Dr SINELSHCHIKOV, Kirill (SIM4Future srls)

Presenter: MASSEI, Marina (SIM4Future srls)

Session Classification: Safety and Training I

Track Classification: EEC 7 - Safety and Workforce Development: EEC 7.B Training and skill development for the workforce