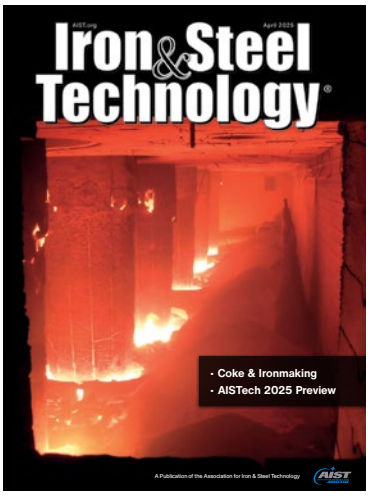
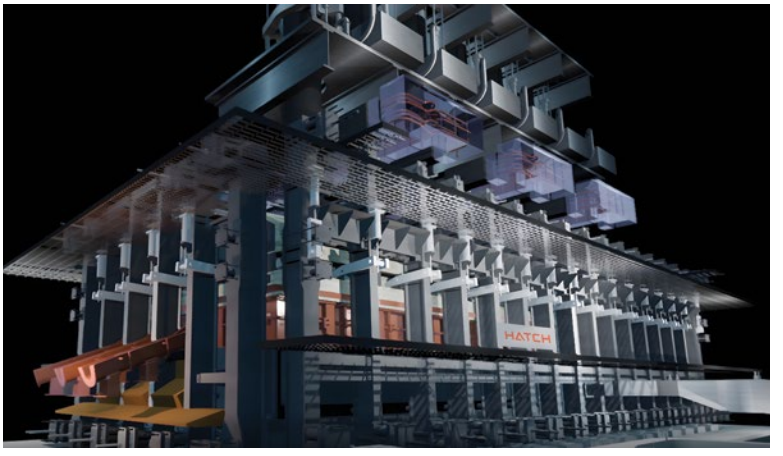


Inside the Cover

BlueScope's New Zealand Steel



The steel industry is looking for solutions to transition from coke-based blast furnace ironmaking to cost-effective and lower-emission options, while maintaining quality and production goals. The shift to direct reduced iron (DRI) plants feeding electric arc furnaces (EAFs) provides significant advantages, but this process relies on scarce high-grade pellets to enable cost-effective operation. The use of lower (blast furnace)-grade DRI with electric smelting furnaces (ESFs) has gained increasing interest as steelmakers seek a cost-effective, commercially ready solution to this problem.

Unlike traditional EAFs, ESFs are large, stationary, fixed-roof furnaces. ESFs have a relatively quiescent process, allowing for higher iron yield efficiency, and operate continuously to maximize production. Due to the ESF's reducing atmosphere in ironmaking mode (like a blast furnace), the slag produced is virtually the same as saleable blast furnace slag. ESFs can process DRI from lower-grade ores and efficiently feed existing downstream steelmaking operations. This provides an opportunity for significant operating cost savings compared to a DRI-EAF process.

There is over a century of industrial experience in ore-based iron production using electric furnaces. The first commercial application took place in the 1930s smelting iron ore at Tysland Hole. Hatch's involvement began in the 1950s to 1970s, when Rio Tinto Iron & Titanium and Richard's Bay Minerals started major iron smelting operations. Additional applications include BlueScope's New Zealand Steel (as shown on the cover), Highveld Steel and Iron Dynamics. In the 2000s, the ESFs at New Zealand Steel and Highveld were upgraded by Hatch to substantially increase reliability and productivity.

ESFs are the dominant technology used at scale in the ferronickel, ilmenite (iron and titania), ferroalloys, and platinum group metals industries and Hatch has been designing and delivering ESF technology for 70+ years in these industries. During the past 20 years, Hatch developed Continuous Reduced Iron & Steelmaking (CRISP+) to process DRI from lower-grade ores in an ESF for use in the steelmaking industry. These developments and commercial applications enable single furnace throughputs exceeding 1.5 million tons/year.

Traditional EAFs have been used for decades to melt high-grade DRI and make steel, but there are significant limitations when processing BF-grade feeds. With the application of ESFs, the industry now has a low-risk and economically viable solution to utilize more widely available BF-grade ores. ✦

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