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Improving Direct Reduction Operation efficiency through Roller Screen technology

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Steel production through the Direct Reduction (DR) route presents a more sustainable alternative to conventional blast furnace processes. However, the generation of fines during raw material handling and intermediate processing stages creates significant operational challenges. These include decreased process efficiency, reduced plant throughput, increased energy consumption, and diminished product quality in DR modules and Electric Arc Furnaces (EAF) operations.
Roller screens, a well-established technology in iron ore pelletizing operations, effectively minimize the fines content in the pellets charge compared to traditional vibrating screens. The benefits of using a lower fines content in the DR modules is translated in a better bed permeability, leading to improved gas flow and metallization rates, reduction of intermediate processes such as briquetting and supplementary screening, reduced downtime and maintenance requirements due to the robust design of roller screens.
In EAF shafts, the reduction of fines content using roller screens may provide additional operational advantages, such as a decrease on pellet breakage, resulting in lower slag formation and improved melting efficiency, reduced electrode consumption and lower specific energy requirements, enhancing the overall process efficiency and cost-effectiveness.
This paper examines the adoption of roller screen technology as a replacement for traditional vibrating screens within the DR process, exploring the screening performance and fines content achieved in industrial trials and evaluating its effects on both Direct Reduced (DR) shafts and Electric Arc Furnace (EAF) operations.

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