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Blast Furnace Hearth Relines From Concept to Construction

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This paper will discuss a systematic approach for the design and construction of a new hearth, employing an "inside-out"approach. A comprehensive diagnostic is first performed by reviewing thermocouple and operational data from the current campaign to determine expected process loads in the new campaign. Three-dimensional thermal models of the new hearth design are analyzed using boundary conditions developed from the diagnostic. The thermal models evaluate the performance of the hearth under normal and high process loads. The model also analyzes a "worst-case"wear situation, which evaluates the hearth refractory's ability to cope with additional wear during rough, high productivity operations, when the furnace may also see heavy leakage of gas, water, or steam attack. An expansion model is then developed to ensure the expansion design functions as intended. Finally, recognizing that construction is a pivotal phase of the hearth reline process, this paper will examine installation methodology and other considerations to ensure a successful hearth reline.

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