Contribution ID: **145** Type: **Oral Presentation**

Implementation of Recycled Zr Slag band layer in submerged entry nozzle

Tuesday 12 May 2026 15:20 (20 minutes)

Refractory recycling has emerged as a key strategy in reducing the environmental impact of the steel and cement industries, where spent refractories often pose significant disposal challenges due to the presence of hazardous components such as bauxite, copper, magnesite, and chrome-bearing materials1,2. In line with its sustainability roadmap, RHI Magnesita is actively pursuing circular economy solutions to lower the carbon footprint of refractory products. Recycling not only conserves critical raw materials but also offers substantial CO_2 savings—up to 60% for mixed refractory linings and nearly 90% for unshaped products—compared to primary raw materials3.

This study presents a practical example of integrating recycled material into production: the partial substitution (50%) of standard raw material with High Zirconia Fused Cast (HZFC) material in the SEN slag band formulation. The modified product, containing approximately 10% recycled content, was trialed at the Bonnybridge plant. Material integrity and microtextural stability were preserved, with physical specifications comparable to those of the standard product produced using virgin raw materials. Subsequently, trials conducted using components produced with the recycled formulation confirmed consistent performance under industrial operating conditions, validating the feasibility of high-quality refractory recycling in practice.

This work underlines the strategic importance of recycling in refractories, not only from an environmental perspective but also for securing long-term raw material supply.

References

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Session Classification: Slag control and refractories II

Track Classification: EEC 3 - Materials and Raw Materials: EEC 3.D Recycling and circular economy in steelmaking