Contribution ID: **465** Type: **Oral**

Cu+: A New Standard in Slab Mould Plate Design for Cost-Effective Steel Production

Tuesday 7 October 2025 18:20 (20 minutes)

Steel manufacturers are increasingly challenged to deliver high product quality while simultaneously lowering operational costs to remain competitive. One key metric in evaluating performance is the cost per ton of steel produced.
This work aims to develop a mould plate design that provides measurable advantages in terms of cost per ton, without compromising on heat conditions, quality or reliability. By rethinking existing designs, we seek to offer a solution that enhances economic and operational efficiency in continuous casting.
This work began with an in-depth analysis of current market demands, which clearly indicated the need to extend lifetime in order to address increasing cost pressures.
Several conceptual approaches were evaluated to achieve this goal, including the use of thicker coatings and increased overall plate thickness. Ultimately, a decision was initially made to focus on a thicker mould plate, enabling more rework cycles and an increasing operational lifetime.
The key challenge of increasing plate thickness was presented: it leads to varying cooling conditions between the beginning and the end of the mould plate's lifetime. As a result, the steel solidifies differently over time, potentially impacting process stability and product quality.
To overcome this issue, we developed the concept of variable cooling channel geometries, implemented using interchangeable filling pieces. They are replaced once during scheduled maintenance, enabling two distinct cooling geometries over the plate's lifetime. This approach ensures that known and stable cooling conditions are maintained at all times.
Thermal simulations confirmed that this approach can theoretically enable an increase in plate thickness of up to 50%, directly translating into longer plate lifetime. Based on these findings, a mould plate design was developed according to the new Cu+ concept.
Finally, the performance of the Cu+ mould plate is benchmarked against existing standard plate designs, highlighting its advantages in both longevity and economic efficiency.

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Session Classification: Mold Technology & Nozzle Performance

Track Classification: Steelmaking - Continuous casting, near-net shape casting and ingot casting