

Siemens VAI helps producers maintain highest casting standards despite changing market demands.

# In Pursuit of Excellence

To remain competitive in continuous casting, producers must respond quickly to changing market conditions, increasing quality demands and greater cost pressures. This calls for highly flexible, reliable and well-engineered plants designed on the basis of experience and using the latest simulation and CAD tools.



Casting excellence as the product of experience, in-depth know-how and optimized machine design

**C**asting operations with older machines and continually changing output requirements may result in quality problems, leading to downgraded and even rejected products and additional costs. The objective is to ensure permanent production excellence on a cost-effective basis. This is where Siemens VAI can help. Thanks to our broad company experience from the implementation of more than 440 caster projects worldwide, specialists at Siemens have acquired vast technological know-how related to the pillars of simulation, component design and product quality.

### Simulations to “see” inside the strand

Numerical-simulation techniques were already developed by Siemens VAI in the late 1970s to quickly optimize the engineering of the casting process and to ensure a high level of product quality. Thanks to the enormously expanded computer capacity and improved software algorithms, company experts can analyze complex processes and conditions even in real time. Using advanced simulation techniques, it is now possible to acquire even deeper insight into the steel-solidification process as the basis for ensuring fully optimized equipment design and casting operations. The applied tools include thermomechanical investigations (mainly finite-element methods) for component design, computational fluid dynamics analyses for simulating steel flow in the tundish and mold, and thermodynamic models to replicate phase transformations.

**“Excellence is the gradual result of always striving to do better.”**

Pat Riley, well-known American basketball coach

### Longer lifetimes and reduced maintenance

The highest machine performance, flexibility and reliability can only be ensured when the installed equipment, components and systems are thoroughly designed, fully integrated with each other, and dynamically adjustable to the process requirements. While this is the case with new casters, it might not apply to older machines that have been in use for years or even decades. Special components and packages are available to enhance machine availability and to meet the greater demands with respect to new steel grades, tighter product dimensions and higher product quality. With the installation of advanced equipment, maintenance expenditures are also drastically



**Simulation of strand behavior applying finite-element methods (FEM)**

reduced. Intelligent component designs that help caster operators to earn money include dynamically adjustable molds, installation of the latest generation of rollers for longer lifetimes and reduced wear, and dynamically adjustable nozzles for optimized spray-water distribution.

### Quality – the basis for business success

Investigations of quality-related improvements in continuous casting begin with a comprehensive evaluation of all factors that can have a potential effect on product quality. This commences already with steel-making operations. Statistical evaluations of process and quality data combined with detailed metallographic analyses help to identify potential deficiencies and ensure a top condition of the cast product. Improvement recommendations are provided with respect to, for example, optimization of the casting process, use of alternative consumables (e.g., casting powder, refractories), modification of the automation system, and necessary training services for operators and metallurgists.

### Experience – the tutor of success

Expert technological support is a decisive factor for the successful start-up of new caster equipment and for the casting of top-quality products. To maintain casting excellence over the life cycle of a caster, Siemens VAI also provides professional engineering and after-sales services for any casting machine, regardless of the make. A vast wealth of experience is available to help producers maintain the highest production standards, despite continually changing market conditions. ■

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