SIMETAL\textsuperscript{CIS} CC Optimization

Benefit from our automation experience to optimize your caster production

Metals Technologies
The challenge:
Older or outdated slab caster automation systems face various challenges that require immediate attention in order to enhance and improve the production process. Some of these pressing issues include insufficient documentation regarding the casting process, along with poor tracking of quality-related data. Due to automation system instability, failures in production occur and maintenance costs continue to rise due to outdated legacy systems.

Other serious problems that need addressing include the “black box systems” (which lack access to system parameters), the non standard solutions that require individual support, and the paramount area of safety in the production process.

Our solution:
Siemens VAI has developed a stable process optimization system that is based on the application of already well proven packages.

Safety is our priority, and we are well on our way towards “manless casting” – a fully automatic production with only quality and safety-related operator interaction on the HMI.

Flexible process models allow off-line tuning and simulation prior to release to the production system. Therefore no software modifications are needed to adapt model behavior.

With Siemens VAIQ solutions, a totally quality assured production process is supported.

To complete the spectrum of services we provide worldwide metallurgical and automation assistance via remote links as well as local Siemens representatives.
Good reasons for SIMETAL® CC Optimization:

- **Easy integration** –
  A comprehensive range of metallurgical models and packages which can be easily integrated into any existing automation environment

- **Short project completion** –
  Connect & Cast® products with full functionality right from the first heat ensuring short project completion times

- **Short downtimes** –
  Minimum plant downtime through maximized utilization of pre-tested, pre-configured and proven components

- **Maintenance and assistance** –
  Immediate metallurgical, maintenance and automation assistance through secure data connections

- **Dedicated HMI packages** –
  Operation and maintenance support through dedicated HMI packages

- **Service and support** –
  Service and support for upcoming system extensions after start-up period
**Introducing SIMETAL\textsuperscript{CIS} CC Optimization**

Assemble your caster optimization with Siemens VAI products

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**Software design**

The well proven Siemens VAI automation products provide sophisticated capabilities for optimizing and supervising the casting process. Their state-of-the-art component-based architecture offers a high degree of variability.

Based on a multi-layer software design, the database is only used to obtain system and model parameters and to access historical or quality-related data. Human machine interface applications are also separated from the database via an object layer.

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**Main functionalities of SIMETAL\textsuperscript{CIS} CC Optimization**

Basic functionality of SIMETAL\textsuperscript{CIS} CC Optimization is production plan handling as well as heat and slab tracking from the first announcement of a heat until the last slab has left the caster run-out area. Production events (e.g., heat changes, turret and tundish movements) as well as quality-related information are tracked by the system. A close connection to the basic automation system (SIMETAL\textsuperscript{CIS} CC Control) ensures proper signal processing and reaction of the caster models and experts.

Data received from higher level automation systems as well as other production units in the steel plant are processed and used for tracking, heat pacing or quality assessment purposes.

The model output is automatically forwarded to the basic automation system in order to optimize the production process.

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**Maintenance and simulation system**

Siemens VAI provides an all-in-one tool for setup, testing and maintenance as an integral part of the package. It features:

- Software deployment, configuration, start, stop, restart, as well as permanent supervision and troubleshooting of caster optimization processes
- Online check of basic automation data and an overwrite functionality in emergency cases
- The “Link Analyzer” that facilitates long-term monitoring of basic automation data consistency during cold test or parallel runs with legacy systems

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State-of-the-art design for optimized continuous casting processes
Simulation and testing philosophy
The “Simulator” provides the necessary functionality for testing and training operators in an off-line environment in order to achieve smooth system start-ups.
Simulations include:
- Communication to other automation systems
- Replay and testing of various casting scenarios using predefined script files
- Replay of cut-to-length optimization steps even in actual production situations
- Predefined long-term stress tests in order to document the effects of software modifications

Human machine interface (HMI)
The HMI guides operators through the production process. Casting operator interaction is limited to quality and safety-related topics.
- An overview of important information is presented on the main display – details can be easily accessed in a comprehensive set of dedicated screens
- Operator screens are presented in the customer's language and units
- The system administrator is entitled to grant access rights for applications or single screens
- Siemens VAI process explorer comprises of a configurable set of applications
- The user can select predefined texts instead of inputting them
- The caster production overview provides web-based presentation of current data

Online support
Siemens VAI provides support and services to customers via secure online connections all over the world, and trains local Siemens representatives as well as customer maintenance personnel to provide first level support. Service contracts ensure assistance in the rare case of system problems that cannot be handled locally.
Due to the open system architecture, the caster process automation software can be subsequently extended with other Siemens VAI products without major implementation work.
Models and experts
Integrated know-how ensures quality and productivity

Dynacs®
Dynacs ensures a stable surface temperature profile even in transient casting conditions, by:
- Highly accurate online strand-surface temperature control based on an elaborate physical model
- Avoiding reliance on maintenance-intensive infrared sensors
- Featuring a powerful offline simulation package for developing optimized cooling strategies

DynaGap
DynaGap, in conjunction with SMART® Segments, provides fully dynamic strand-taper control resulting in:
- Substantial internal product-quality improvements as a result of reduced center segregation
- Automatic determination of the target casting gap profile on the basis of online strand condition modeling

MoldExpert
MoldExpert provides a detailed look into the mold and beyond. It features:
- Sticker breakout prevention with 4 independent, auto-adaptive algorithms
- Temperature and oscillation monitoring
- Friction and heat-flux supervision
- MoldLevelExpert for detailed analysis of influences on mold level stability
- Dynamic bulging and roll impact detection
- “Hot-spot” and “hot-area” visualization
- Tailored breakout prevention systems for stainless steel
Intermix
Intermix determines the chemical composition of strand areas in case of analysis variations between two heats.
- A flow model of the tundish, mold and strand areas is used, taking into consideration the actual tundish content and strand speeds
- Information is given as to whether a certain strand section meets the analysis specification of a heat or not

Metallurgical modeling – new solutions for tomorrow’s quality demands
- Metallurgical strand width model to ensure correct cold-slab width
- Nitride precipitation model for crack prediction and prevention
- Hook-depth model for prediction of macro-inclusions

Siemens VAIQ quality assurance / control
- Online quality control and alarming
- Quality tracking and prediction
- Continuous improvement of know-how and production practices with VAIQ discovery
- Increased hot-charging rate with automatic quality disposition

YieldExpert
YieldExpert provides tailored strategies for yield improvement.
- Optimization of product length or product weight
- Scheduling of mold width adjustments
- Scrap section allocation algorithms
- Heat sequence or productionplan-based philosophy
- Different optimization steps can be switched on and off online

EquipmentExpert
EquipmentExpert supports preventive maintenance through:
- Generic definition of machine equipment
- Automatic and configurable tracking of equipment life according to number of heats, time, cast length or special events
- Alarms to operators or maintenance personnel if life-time criteria are exceeded

Delay and production recording
- Heat pacing model for sequence break prevention
- Recording of production and downtimes
- Automatic and manual recording of deviations in the production schedule
For further information, please contact:

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