Model-Based Optimisation for Efficient Use of Resources and Energy

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Model-Based Optimisation for Efficient Use of Resources and Energy (MORSE)

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- Funding scheme: IA
- Duration (months): 48
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The mission of the Morse project is to develop model-based, predictive raw material and energy optimisation tools for the whole process route.

Morse will be demonstrated in steel industry, to increase yield and product quality in production of high-strength carbon steels, stainless steels and cast steels.
Building blocks of the MORSE concept

Through process applications
• Production management system
• Plant-wide cost-optimisation system
• Operator Support System
• Online quality monitoring tool

Unit process models and applications
• Static energy and mass balance and dynamic process models
  • Electric Arc Furnaces (EAF)
  • Argon Oxygen Decarburization (AOD)
  • Blast Furnaces (BF)
  • Blast Oxygen Furnaces (BOF)
  • Composition Adjustment by Sealed argon bubbling – Oxygen Blowing (CAS-OB)
  • Slab Management models
• On-line Nonlinear Model Predictive Control (NMPC)
Demonstrators include **3 pilot cases** each having several use cases

- **15 use cases** defined in total
- Each use case may have several partner working on it, furthermore use cases having interfaces with each others
Integration of information flows from steelmaking to hot rolling to gather all the needed quality information for optimal decision making and root cause analysis throughout the process.

**Extended quality information**
Updated process models, new Steel cleanness and Thermocouple models, new data driven slab analysis.

**Quality gate for slabs**
The quality data of processed slab is generated and transferred for hot rolling process.

**Quality gate for coils**
Composed, real-time quality information for each coil based on actual measurements and historical data analysis.
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