4 AUTOMATION

papers will be presented by Primetals Technologies specialists at the ESTAD Congress covering the topics of process optimization, condition monitoring, the Process Expert system and intelligent warehouse logistics.

ENHANCED DIAGNOSTIC CAPABILITIES WITH THE INTEGRATION OF DIGITAL MODELS INTO A CONDITION-MONITORING SYSTEM

Principal author: Arno Haschke
Paper number: 231

Offline simulation is often used by plant builders for the design of metallurgical plants and to ensure that performance expectations are met. Whereas some simulation models cover operations across the complete plant (e.g., throughput calculations), smaller simulation models focus on individual topics such as closed-loop control, vibration behavior and the functionality of single components. The concept of using offline simulation in an online mode for plant operation is not new. Nonetheless, the necessary steps for its application are complicated and time-intensive. This requires extensive technological know-how, the buildup of digital models (using, for example, Matlab or Simulink) and the compilation of software that is ready to be used in the automation platform or in a condition-monitoring system.

As a plant builder with IT competency, Primetals Technologies has mastered this challenge and has defined a concept known as Control Builder. As described in this paper, Control Builder allows the reuse of offline digital models or simulations in the condition-monitoring system (CMS). These digital models support condition-based maintenance activities by providing deep insight into parameters that cannot be measured directly (soft sensor methods), or by comparing complex operation states with design parameters. An example is the monitoring of hydraulic closed-loop control and the associated cylinder to determine the degenerative status of valves or the presence of internal cylinder leaks. Key performance indicators (KPIs) that are the output of such simulations can be further monitored with the condition-monitoring system, and they also serve as an additional indicator for root causes.

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The JSW Steel Vijayanagar plant in Toranagallu is the first integrated steel plant in India to reach a 10 million t/a steelmaking capacity at a single location.

COMPREHENSIVE PROCESS-OPTIMIZATION SYSTEM FOR JSW STEEL TORANAGALLU, INDIA

Principal author: Rudolf Hubmer
Paper number: 203

JSW Steel Ltd. has become India's largest private-sector steel company with an installed capacity of 14.3 million t/a. The JSW Steel Vijayanagar plant in Toranagallu is the first integrated steel plant in India to reach a 10 million t/a steelmaking capacity at a single location. In October 2013, the company placed an order with Primetals Technologies for the installation of a comprehensive Level 2 process-optimization system at this site for more than 20 existing production facilities from various suppliers. For Steel Melting Shop I (SMS-I), new Level 2 systems were provided for two hot metal pretreatment stations, three hot metal desulfurization stations, three ladle furnaces, two single-strand slab casters, a ladle-tracking system as well as a shop supervisory system. Additionally, the existing Level 2 system for one single-strand slab caster is being upgraded in the course of the project. In SMS-II, new Level 2 systems for the seven hot metal desulfurization stations, four ladle furnaces, the new RH vacuum degasser, the ladle-tracking system and a shop supervisory system were supplied. The acceptance test was passed in July 2014, and the commissioning of the single facilities started less than 12 months after the contract became effective. The process-optimization systems and their integration into JSW Steel's automation environment are discussed in this paper in addition to project progress and achieved results.

PROCESS EXPERT – FROM COST-EFFICIENT AND MODULAR PROCESS AUTOMATION TO THE EXPERT SYSTEM

Principal author: Paul Riches
Paper number: 227

While in the past process-automation systems were used to control complex industrial production processes, in recent times those tasks have been extended even further. It is now essential to continuously record, evaluate and analyze the performance of the product, the plant and the operator team to reveal areas for optimization. Ideally, key performance indicators (KPIs) are defined and seamlessly recorded and supervised. The Process Expert system from Primetals Technologies provides the tools necessary to monitor and evaluate the performance of a plant, and it is even possible to compare different plant facilities around the world.

Optimization of a long-rolling facility can cover many areas: improvement of product quality and quantity; increased plant and machine availability for higher plant output; higher product flexibility and development of new products; reduction of material and consumables; measures to save energy; and other activities to increase profitability. The Process Expert system for a long-rolling facility collects data through the full product lifecycle from the billet yard management for incoming raw material stock to the finished-product storage yard, including the auxiliary processes such as maintenance management and roll shop management. It can also be linked to the enterprise resource planning (ERP) system of a company, which then builds a bridge to ordering and purchasing raw materials, consumables and tools. A connection is also established to customer orders for shipping the final products. Furthermore, the Process Expert system features a modular architecture and its functionality can be easily extended. It has an operator-friendly user interface, provides access via web and smartphone, can be configured by the user, and is able to create and send messages and e-mails. Finally, a safety and protection mechanism is included to protect the Process Expert system and the recorded long-term data, and it has a remote interface for fast and easy help and maintenance support.

The Process Expert system from Primetals Technologies provides the tools necessary to monitor and evaluate the performance of a plant, and it is even possible to compare different plant facilities around the world.

Slab storage area at ArcelorMittal Eisenhüttenstadt, Germany

STORAGE IMPROVEMENT BY INTELLIGENT WAREHOUSE LOGISTICS AT ARCELORMITTAL EISENHÜTTENSTADT, GERMANY

Principal author: Rene Grabowski
Paper number: 233

Steel producer ArcelorMittal Eisenhüttenstadt GmbH uses a new storage logistics system from Primetals Technologies in its finishing department. This system for warehouse logistics now provides the company with a precise picture of its stock at all times and the over 40,000 slabs that pass through the slab storage area each year. It not only supports the crane operator to stack slabs in an ideal sequence on the basis of their composition and the order processing schedule, it also automates logging of manual restacking operations. The solution thus improves workflows and simplifies stock control. Cycle times have also been reduced because the slabs can be fed to the rolling mills at a higher temperature. The expandable, modular system is based on the Simatic IT and Primetals Technologies' IT4Metals Logistics product platform. It provides a large number of organizational and commercial metrics in the form of clear graphics and tabular evaluations. For example, the system can show how many crane movements have been made per shift for any category of slab, so that the time and cost for each operation can be calculated exactly. This paper outlines the features and additional benefits of the logistics system on the basis of operational experience.