PAUL WURTH
SMS group

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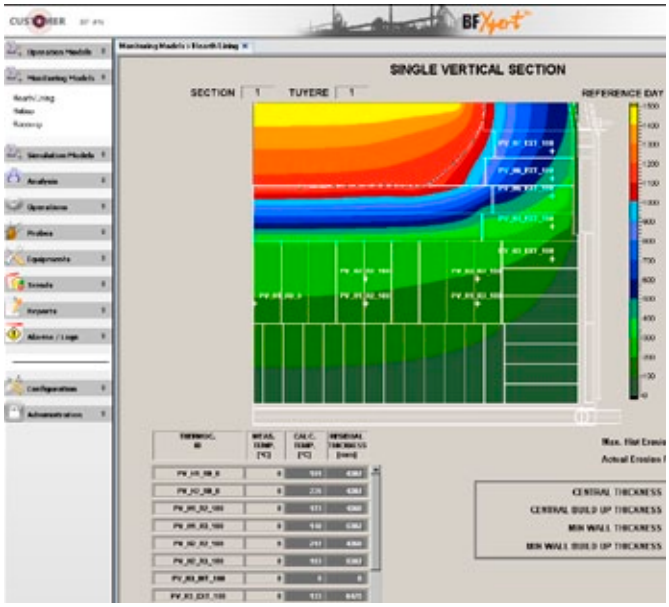
HEARTH LINING EROSION PREDICTION



Hearth Lining Model screen for the 2-D visualisation of model results

FOR SAFE AND STABLE BF OPERATION!

Efficient hearth management and adequate understanding of the internal state of the hearth are essential for safe and stable blast furnace operation.

The latest process models and tools developed in-house by Paul Wurth provide the required continuous assistance to achieve top class hearth performance.

Process models are part of BFXpert™, Paul Wurth's blast furnace level-2 system.

The application of the hearth lining monitoring model as an off-line tool for the erosion prediction gives useful information in the management of the hearth condition.

BFXpert™

BFXpert is Paul Wurth's advanced process control system: a modular set of powerful control, simulation and monitoring models on a common platform, including SACHEM® expert system and other utilities.

BFXpert covers all areas of blast furnace ironmaking, i.e. charging, blast and injection, tapping and supervision, providing diagnostics and recommendations to assist blast furnace managers, process engineers and operators in their daily tasks to safely achieve the target production.

Models related to the hearth management are the Hearth Lining Model, the Hearth Liquids Model (HeLiMo) and various functionalities included in the expert system SACHEM.

HEARTH LINING MODEL

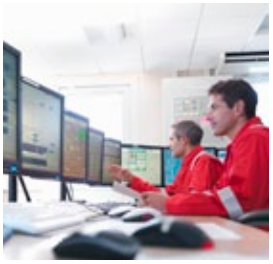
Online Model

The Hearth Lining Model included in BFXpert is an on-line and adaptive mathematical model which uses hearth temperature measurements to monitor the hearth thermal status and provide an estimate of the hearth lining wear profile. In case of wear, the blast furnace operator is thus able to take appropriate counter-measures in due time, before the hearth wear becomes critical.

This is a crucial issue in particular at the end of the furnace campaign, when the actual wear profile may be critical and the moment for a blast furnace shutdown has to be decided accordingly.







HEARTH LINING EROSION PREDICTION

Off-line application

The Hearth Lining Model can be applied off-line to study the end-of-life conditions of the hearth. This may be required in case of existing furnaces and old installations to support plant managers and process engineers by providing useful information for their decision-making and for the preparation of the shutdown procedure.

The offline application of this model requires thermocouple data acquired during the blast furnace campaign. This data are analysed by Paul Wurth experts in order to validate them and to identify a set of important events that will be used to feed the model so that it can rebuild the history of the lining and identify the current status.

Results are normally less accurate than the ones obtainable with the application of the online version but still crucial for the estimation of the current erosion profile. Accuracy can be increased by feeding the off-line model with a bigger set of data representing more events in the furnace lifetime.

Why to realise this kind of studies?

- Evaluation of the erosion profile in order to plan some interventions or actions that help the reconstruction of the lining and may thus prolong the furnace campaign.
- Evaluation of the erosion profile and available hearth volume to support the definition of the drilling conditions for salamander tapping. These values will be used for the planning of the drilling hole and for the evaluation of the salamander volume to be discharged.

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