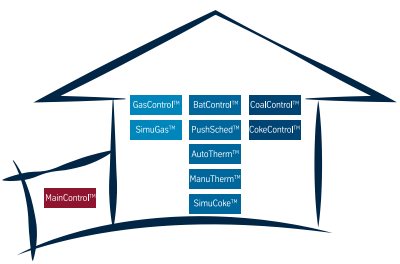
Coke Plant Automation With COKEMASTER®

Klaus-Peter Leuchtmann, Marcel Schulz

ThyssenKrupp Industrial Solutions AG (TKIS), BU Process Technologies, Coke Plant Technologies/Coke Oven Plants, 44141 Dortmund, Germany

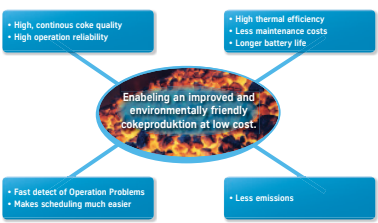
The COKEMASTER® Suite

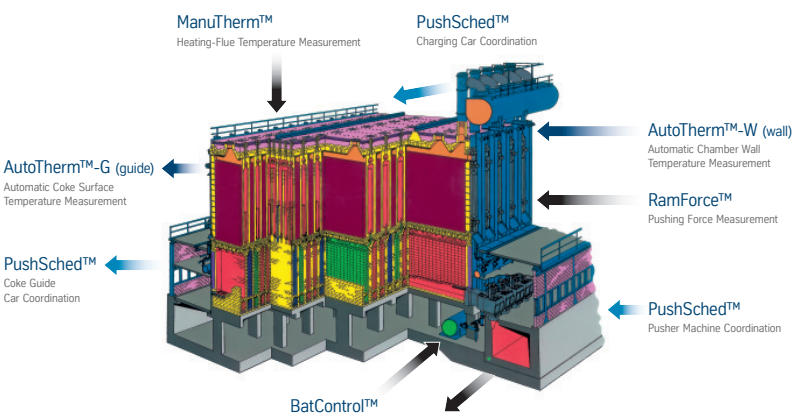
The Level 2 automation concept



Automation Products

to improve your coke oven plant
Engineered by TKIS for new and existing plants.





Conclusion

Cokemaster is an integrated concept for automation and optimization of your coke oven process. Individual hardware and software solutions developed by TKIS can be used as a combined Framework or each model as „stand-alone" system in new or existing plants. The approved design of these models are worldwide in use to increase production, improve safety and environmental performance, support the operation staff and last but not least help decision makers by providing the information they need.

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The COKEMASTER® Suite Automation Products

ManuTherm™

The temperature measuring system ManuTherm™ was especially developed for coke plants to record and evaluate heating flue temperatures on coke oven batteries in a simple and rational manner. It consists of the ManuTherm™ infrared hand-held pyrometer designed to withstand rough coke plant conditions which is equipped with an integrated data memory and the special ManuTherm™ evaluation software. The intuitional ManuTherm™ evaluation software makes it possible to evaluate and archivate longitudinal, serial, and crosswall measurements apart from data acquisition.

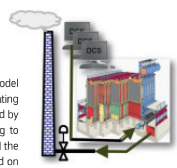
PushSched™

Process control and monitoring of coking plant operation with the advanced pushing and charging schedule program called PushSched™. Pushing and charging times for each oven are calculated and optimized, transferred to the oven machines and signaled to operators dynamically with each operation. The actual pushing and charging action is feed back to the scheduling system and automatically triggers a new calculation. PushSched™ handles normal production planning as well as all types of special operation (i.e. compensation of breakdown or decreased production). Changes in the production schedule are detected and can be automatically forwarded to BatControl™ (heating control model), to optimize the nominal heat input to the Battery instantly.

AutoTherm™-G (guide)

AutoTherm™-G is a temperature measuring system located at the coke transfer car, also called "Guide Car". Three optical lenses are located in three different heights, looking onto the coke surface through slots in the guide. Optical lenses are connected to fiber optic cables which transmit the light intensity from the measuring point to the optoelectronic receiver and amplifier. The system is air purged and requires low maintenance. The temperatures of the coke surface are measured while the coke passes through the guide. When the coke mass is travelling through the coke guide during pushing, the temperature values are averaged for a certain wall span (width of heating flue). This coke temperature profile shows a good comparability and correlation to the heating flue temperature profile.

BatControl™

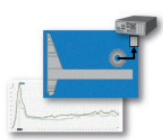


BatControl™ is a theoretical calculation model which determines the required energy for heating the battery. The model is dynamically updated by the actual production performance (adapting to delays, "speed up", lost production, etc.) and the actual heating performance (adaptions based on actual heating flue, coke or wall temperatures which are outside of the target range). The energy requirements by the BatControl™ model determines the setpoint for the heating system. The energy required for the battery heating can be controlled by changing the heating gas flow, the calorific value of the gas (by mixing) or the heating time (by variation of the pause time between reversals).

AutoTherm™-W (wall)

The AutoTherm™-W System is a chamber wall temperature measurement system via air cooled fibre optic cables and attached pyrometers mounted on the "cold" rear end ram beam of the pusher car. The temperatures of the coke oven walls are measured while the ram passes through the oven. Optical lenses are at the front-end of the fiber optic cables to focus the wall radiation into the fiber optic cables which transmit the light intensity from the measuring point to the optoelectronic receiver and amplifier. These signals are converted and evaluated to enable the supervision of the temperature and heat distribution inside the battery in longitudinal, transversal and vertical direction. This can be performed by building cross wall temperature profiles, longitudinal battery temperature profiles, temperature profiles in terms of time, which shows a perfect comparability and correlation to the heating flue temperature profile.

Ram Force™



The pushing resistance "Ram Force™" is measured by taking the motor current of the ram drive of an amperage meter or via the VVVF converter (VVVF = Variable Voltage, Variable Frequency) and by transmitting these values during each pushing sequence to the pusher machine PLC. The values are correlated with the ram travel distance gathered from the ram drive travel encoder to assign each ram force value to the position in front and within the oven chamber. The pushing force is trended for each oven. Refractory or heating problems can be detected before an oven becomes a sticker oven. Changes in the coal blend are first seen in the rise of the pushing force over the total battery before the first pushing problems appear.