PiT Navigator®

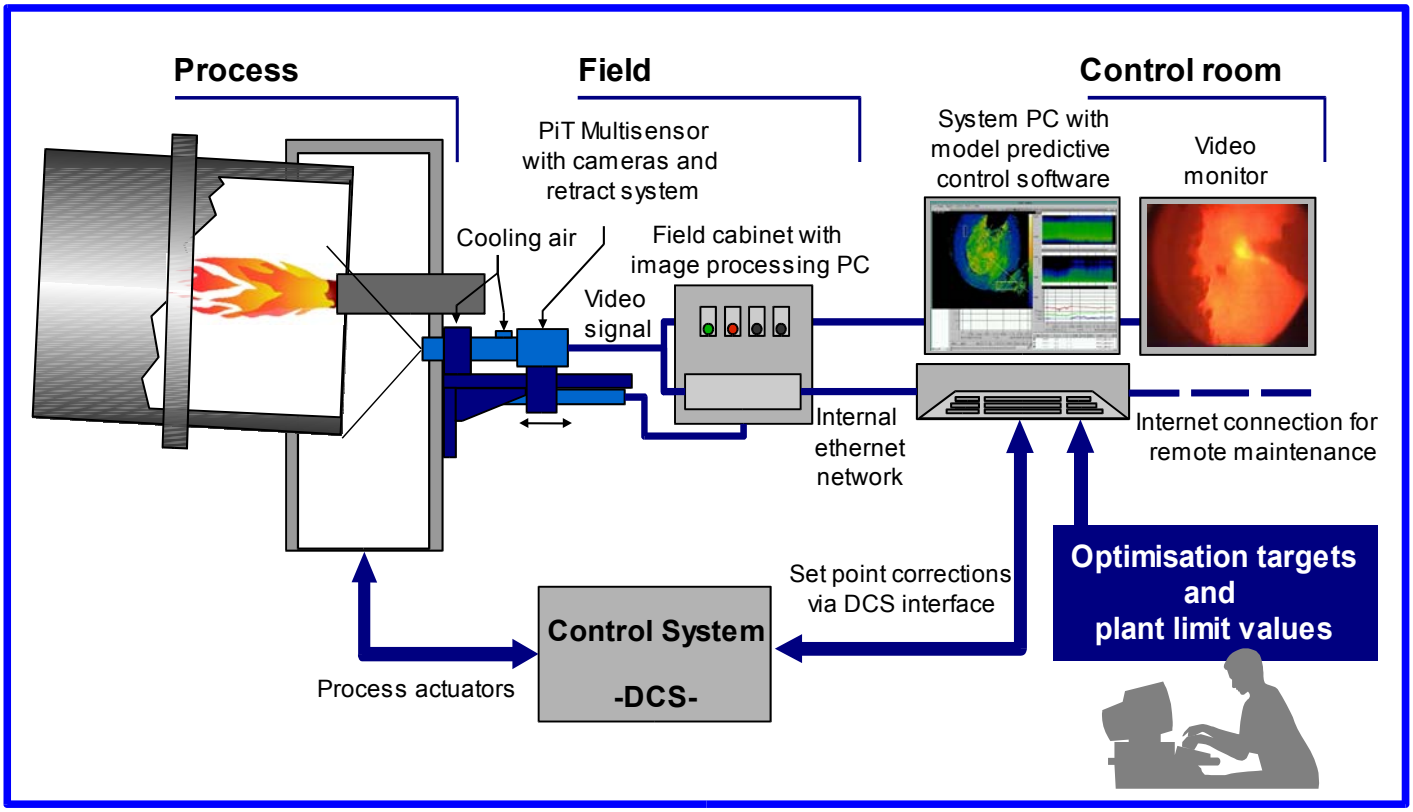
Process Optimisation with Re-training Model Predictive Control for Rotary Kilns in the Cement Industry

System Overview:

Powitec's PiT Navigator controls and optimises the complex clinker production process in rotary kilns. Powitec's state-of-the-art kiln control combines a self-learning, re-training software based on neural networks (NMPC – Non-Linear Model Predictive Control) and digital image processing of the sintering zone.

Contrary to expert systems and conventional NMPC optimisers the PiT Navigator needs no manual re-training in case of changes in the process conditions (e.g. wearing of plant components, equipment modifications etc.). Powitec's PiT Navigator automatically adapts to these changes, determines their influence on the process results, re-adjusts the process models and steers the process according to the given targets. Even competing targets can also be controlled simultaneously!

The PiT Navigator computes the ideal settings of the process actuators and automatically transmits set-point corrections to the DCS.



The PiT Navigator's optimisation approach combines existing conventional control values with the information gained by digital image processing via the PiT Multisensor at the kiln hood.

The optimisation targets are individually defined by the operator and can be changed flexibly.

The PiT Navigator executes the set point corrections so that i.e. the radial air or amount of fuel (main burner or calciner) is adjusted.

The result is an optimally controlled sintering process.

The PiT Navigator is an upgrade of the thermography system PiT Indicator

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High consumption of primary fuels
Inhomogenous alternative fuels
Process with severe fluctuations, e.g. in free lime or NOx
Complex process with strong interdependencies

Powitec's PiT Navigator guarantees an optimal sintering process despite fluctuating calorific values (especially regarding use of alternative fuels), inconsistent raw material and quickly changing process conditions:

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+ Optically based intelligent process control
+ Self-learning and re-training NMPC
+ Easy to use with low follow up costs
+ Burner control

= Reduction of primary fuel consumption
= Increase alternative fuels
= Low complexity and reduction of work load for operating personnel
= Stable clinker quality with low fluctuations

= Major cost savings! Payback within 12 months!

PiT Navigator:

- **'Seeing' and 'learning' control**
- **Intelligent burner adjustments**
- **Permanent prediction of free lime or other key parameters**
- **Easy to operate and maintain**
- **Applicable to any existing DCS**
- **Low follow up costs**
- **Open and flexible solution**
- **Fast success and payback**

Powitec's systems have been proven in several international reference applications, both in cement and lime plants. For a detailed reference list, please contact info@powitec.de.

Set point corrections with the PiT Navigator