



(FoMaSys-Module 4)

MiPro

The central process control system for process data analysis and archiving, quality assurance, remote control and remote maintenance in the sand plant

More than just another screen in your control room

MiPro is much more than the sum of its individual functions. As a combined modular software/hardware system, it carries out process control, data evaluation and archiving, visualisation and quality assurance tasks so that it quickly becomes an integral part in the development of a centrally managed moulding sand cycle that you will never want to miss again.

With MiPro, sand conditioning comes into your office

Everything under control - CENTRALLY and ONLINE

By networking the various technical measurement and control sub-systems in the plant to MiPro, you can control and monitor moulding sand quality from a central point in real time. All the most important information streams in from the integrated moisture measurement and sand testing systems. You can operate all the systems in 1 to 1 optics, just as if you were standing in front of the relevant machine. Your conditioning hardware (coolers, mixers, containers, conveyor belts) is visualised individually so that you can find your way around immediately and feel comfortable operating it.

What happened last week? Who changed what, when and how? How did the fines level effect compactability and required water amounts?

That is just a fraction of the questions that MiPro can answer. MiPro quickly becomes an essential tool for your short and long-term data archiving, with a number of comfortable statistical analysis functions, an alarm control management system, a system for assigning rights in order to protect unauthorised access and intrusions, and much more besides.

Making new findings useful for the production of tomorrow

Identify trends and negative developments, volumes and consumption and use these as a basis for making the right decisions for the production of tomorrow!

To realize and understand coherences

With MiPro, coherences and correlations can be displayed transparently and in a comprehensible way in real time for the first time – a prerequisite for optimization measures that are even more far-reaching.



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Remote maintenance via internet for a fast and target-oriented troubleshooting

Beside pure remote monitoring and control of connected measuring systems, the system even offers the option of system optimization and troubleshooting by remote maintenance via internet by our specialists. This feature is interesting because it can help to reduce expensive field service actions of technicians. One or two economized service technician visits can already pay off the MiPro investment. MiPro has a real cost saving potential.

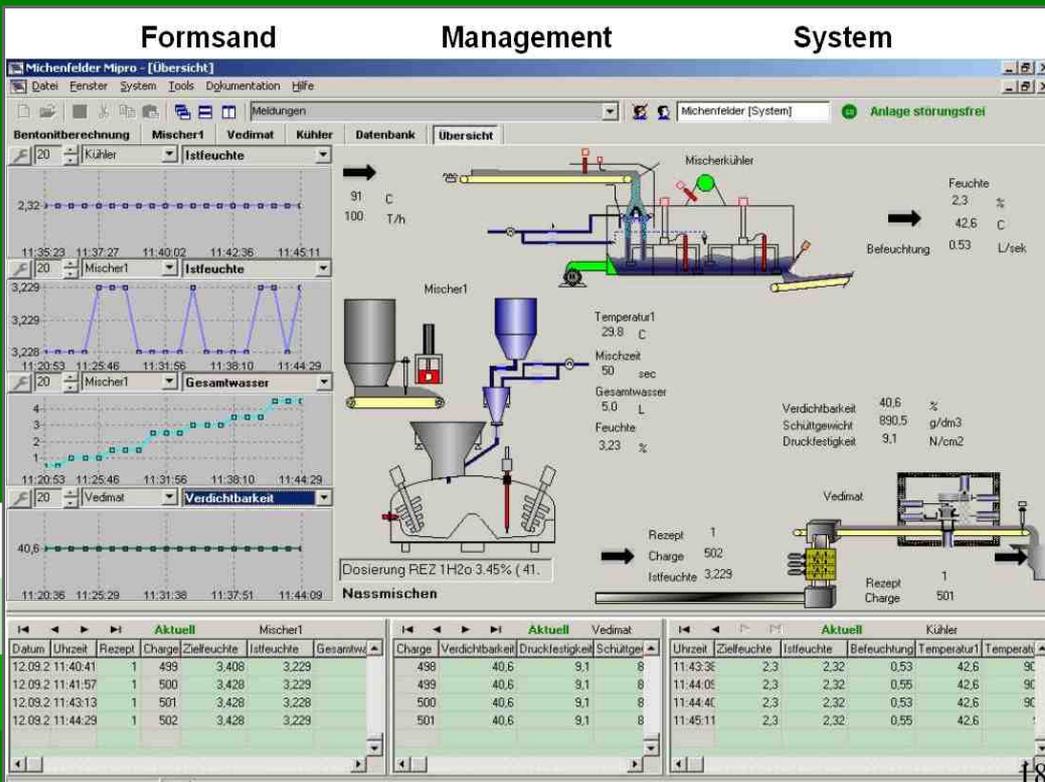
MiPro-Hardware

Due to important interface requirements MiPro will be delivered together with pre-configured desktop PC including special industry approved interfaces for connecting all single (Michenfelder) measuring systems, TFT-flat-screen, keyboard, mouse and DVD drive.

Recognising changes in the fines level and drawing conclusions on bentonit content

The measurement of the compactability and the compression strength by the online sand testing system VEDIMAT delivers reliable measuring values. These measuring values, among others, provide MiPro with the basis for the recognition of trend changes of the bentonite content and the fines level. In this way the customer can arrange for targeted counteractive solids corrections. It thus makes it possible to maintain the desired casting-specific nominal composition of the moulding sand as consistent as possible, meaning to ensure the homogeneity of the moulding sand. Expensive bentonite can also be used much more efficiently. The calculation method is based on a constant bentonite equivalent that must be determined by the user for the relevant sand plant (*correlation between standardised compression strength and active bentonite content*). The parameters for the calculation of the standardized compression strength are always to be empirically determined and

and optimized by the customer himself in a customer, system and moulding sand-specific fashion over a certain period of time following commissioning through accompanying lab measurements in order to successively formulate increasingly precise correction values.



CENTRAL PROCESS CONTROL AND QUALITY ASSURANCE SYSTEM



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MiPro – Start Screen

with customer specific sand plant configuration

(Here: 2 x Mixer Coolers, 1 x Mixer, 1 x Online Sand Testing System VEDIMAT)



Two mixer coolers, each with two moisture electrodes and two temperature probes, indicating real-time values

Batch type mixer with moisture electrode, temperature probe and additional pre-moisture measuring probe at the used sand silo, indicating real-time values

Online Sand Testing System VEDIMAT, indicating current real-time values

Individually configurable real-time indication of relevant process data in tables and graphs

Explanation: The start-up screen shows the customer's customized hardware components that have been individually integrated into MiPro in conjunction with Michenfelder measuring, control and testing systems, e.g. mixers, coolers, silos, scales, conveyors, sand-testing systems, etc. Diagrams and tables for other relevant process data can also be integrated into the start screen.

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MiPro – Visualization of patented mixing dynamic control

Keep an eye on mixer performance and the preparation of every single batch at all times



Phases of the mixing process:

Homogenization is just one of two important phases in the mixing process. Too little importance is frequently attached to the second phase, the **actual conditioning phase**, as the mix is not yet ready after only the homogenization phase. It is a "must" that it is followed by a phase in which preparation of the homogenous mix is completed. It is only at this phase of the mix that the sand achieves the quality required of it for subsequent moulding and casting processes

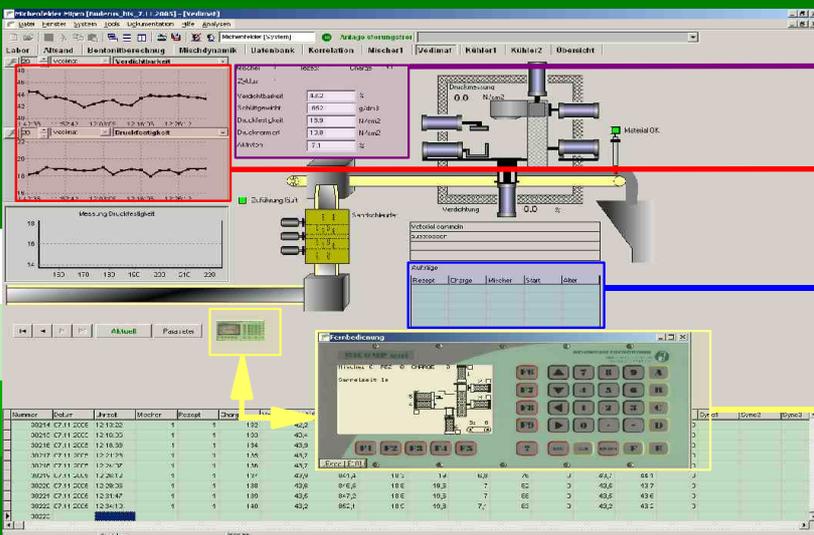
Setting for the storage frequency of preparation curves. Here: The diagram of every 100th batch

Monitoring of the preparation of each batch can be expanded to include the discharge time. This facilitates additional monitoring of the discharge time

Explanation: The diagram shows three preparation curves (green, red, blue), which were plotted at intervals of several months. Superimposed one on top of the other, they document in this case an equally good preparation and mixing dynamic for the mixer used. Understand that ongoing monitoring of the mixing dynamic is a valuable tool for monitoring your preparation. It will help you to realise in good time if the preparation output is declining, e.g. as a result of worn or misaligned mixing tools, changes in the material's initial moisture or the addition of water, and therefore allows you to respond straight away and eliminate the causes.

MiPro – Visualization of Online Sand Testing System VEDIMAT

++Compactability control++Measuring green sand strength++Monitoring the fines level trend++Remote control++



Display of the measured and calculated sand parameters with mixer, recipe and batch allocations

Individually configurable online indication of relevant process data in graphical format

Data field for viewing the batch information linked back to the moisture control system at the mixer

Zoom function for operating the VEDIMAT control unit using the mouse in a one-to-one display format

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Moulding Sand Matrix®

The navigation system for your sand preparation

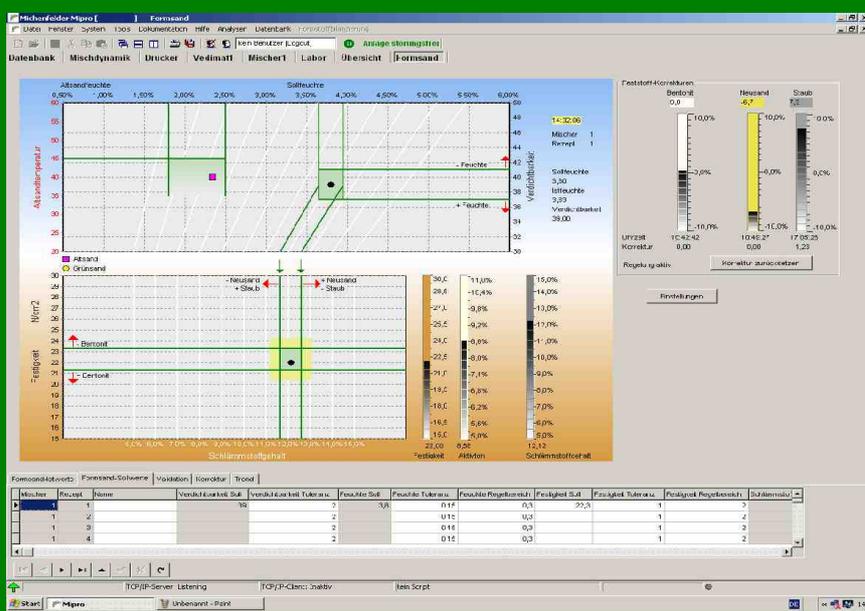
The Moulding Sand Matrix is protected by design patent

For the very first time, the Moulding Sand Matrix shows the interaction of most relevant sand parameters (used sand moisture, used sand temperature, green sand moisture, compactability, fines content, strength and active bentonite content) and their impact on overall sand quality during production in an unprecedented, innovative, useful and easy-to-understand way. Foundry man is navigated reliably by quality indication points moving within three networking quality windows. As long as the quality indication points are moving within the quality windows, sand quality is within preset quality limit values as well. If an indication point is exceeding a quality window border, the Moulding Sand Matrix offers target-oriented countermeasures in plaintext to bring it back into the window again and thus bringing sand quality back into desired and preset quality range again, too.

Corrective moulding material amounts are different from sand plant to sand plant and cannot be preset during initial commissioning. They must be determined empirically by the customer himself in the course of time and subsequently dosed under own responsibility.

The Moulding Sand Matrix and its quality navigation function by moving quality indication points, combined with automatically generated recommendations for countermeasures means to have a basic system facilitating the process of moulding materials control.

After having determined precise correction values over a certain period of time, MiPro can optionally be used for correcting moulding materials fully automatically, provided that there is an up-to-date and protocoll-controlled weighing system.



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