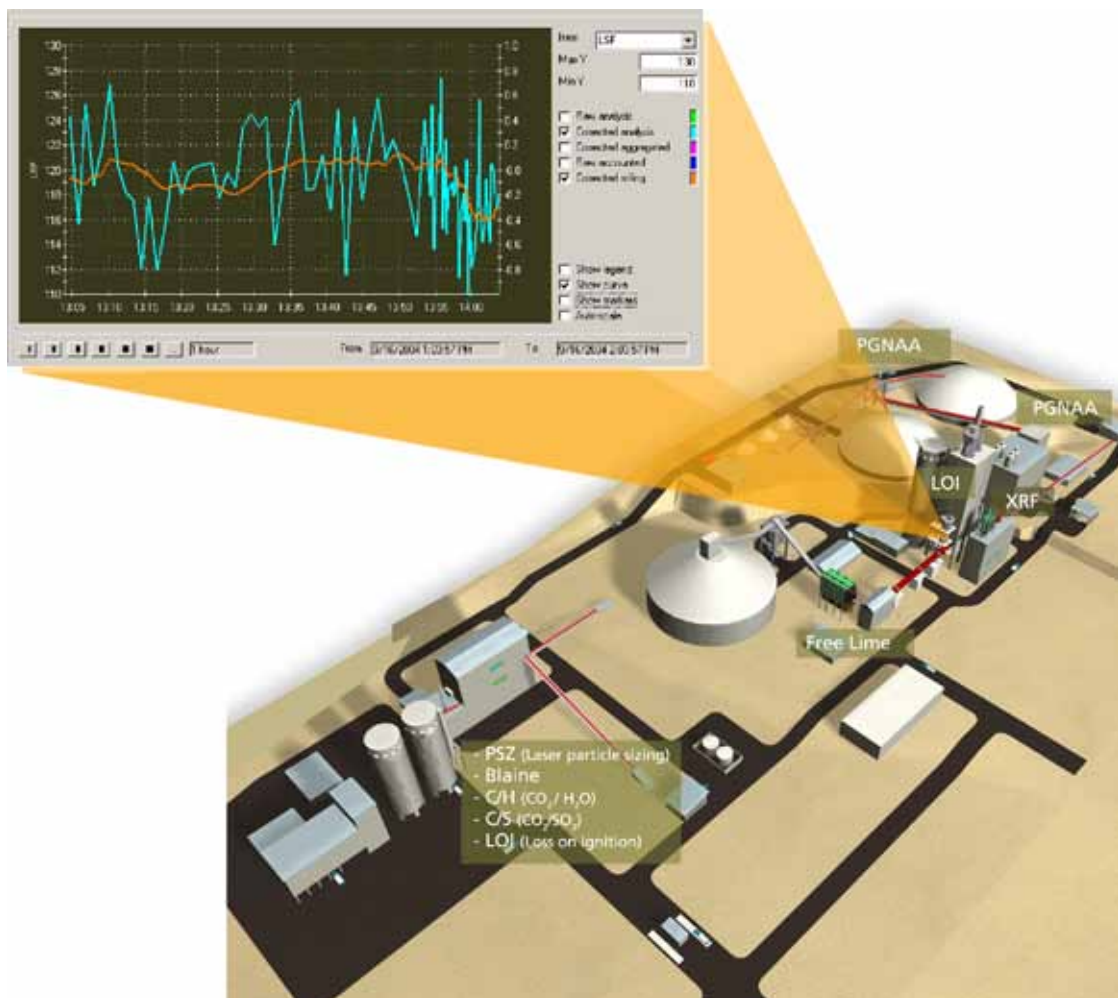
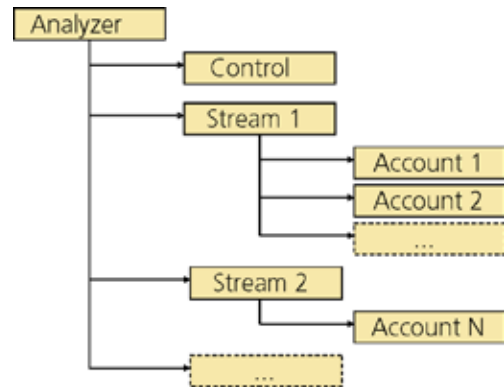
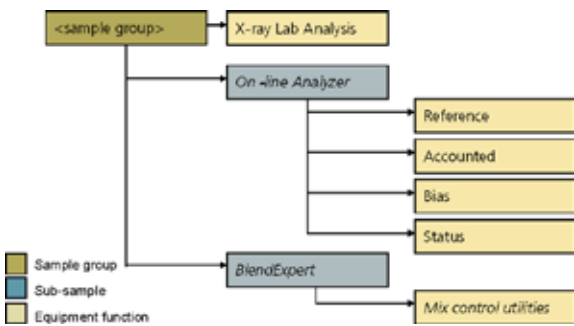
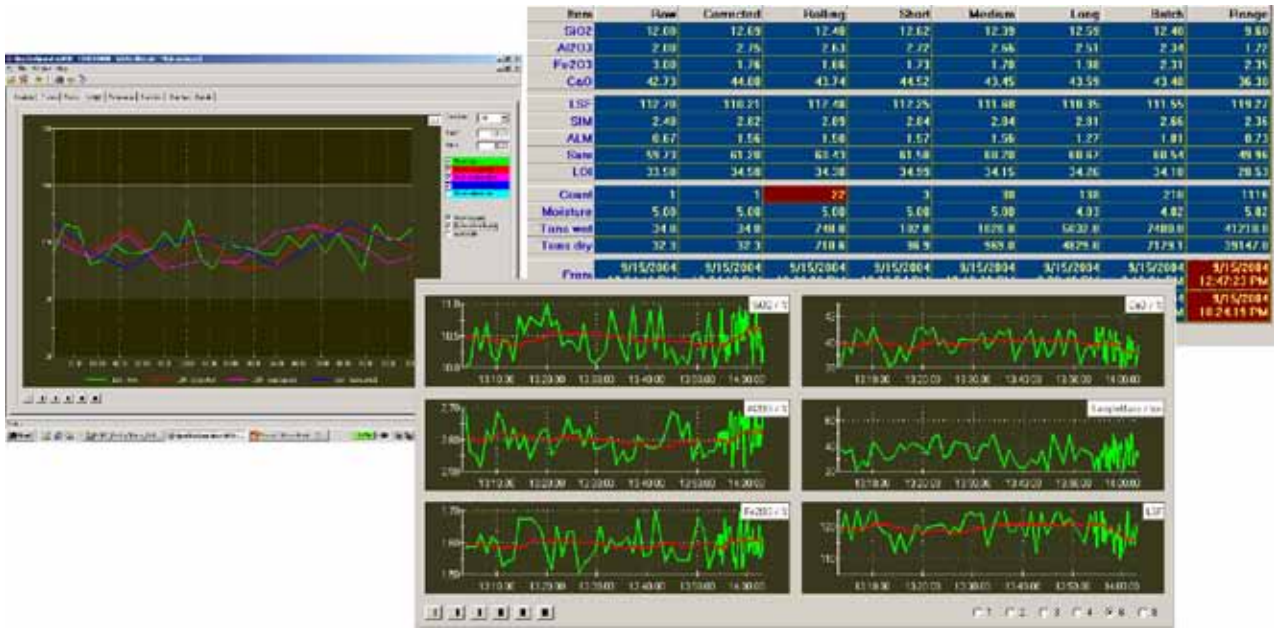


QCX/OnStream®

On-line analyzers make it possible.
QCX/OnStream make it happen...





Application

The QCX/OnStream software module supports project specific selection of on-line/in-line/at-line analyzers integrated with the QCX kernel software via the so-called 'OLA' software module. 'OLA' stands for OnLineAnalysis. In the following the term on-line analysis is used as the common description for on-line, in-line and at-line analysis concepts. On-line analysis applications often generate large data amounts with a high frequency. Compared to a traditional laboratory setup with much lower analysis frequencies, this means different requirements to the data handling software. The OLA software utilities complement the 'data handling engine' functionality of the basic QCX/Laboratory application module. OLA is designed with special emphasis of handling large data quantities arriving with high frequencies and to present the dynamic dataflow with smart data presentation techniques. QCX/OnStream naturally supports the well established on-line elemental analysis techniques PGNAA/PFTNA, EDXRF and laser particle sizing and in principle any piece of on-line analysis equipment, including emerging XRD applications. Thus, it also supports FLSmidth manufactured analysis technologies specially developed for the cement making process, such as: free lime, Blaine, Carbon-Sulphur, Carbon-Moisture, LOI etc. Not only can any type, but also any number and any combination of analyzers can be handled by one QCX/OnStream application. The OLA software is structured in a setup linking the applied analyzer(s) to process streams, product types and possible associated high level control applications, such as QCX/BlendExpert and ECS/ProcesExpert.:

OLA is the common data treatment and data presentation utility package included in the scope every time an on-line analyzer

appears in a QCX/OnStream configuration. In addition to this common software utility each analyzer needs its dedicated interface driver for equipment control and data acquisition. Applying a sub-sample structure linking back to the 'mix control sample group' (example: a raw mill) the data structure enhances the special functionalities such as bias correction and outer control loop, which are available when QCX/BlendExpert is combined with on-line analyzers like PGNAA or EDXRF:

Functionality

Facilitated by the OLA software utility the key characteristics of QCX/OnStream comprise:

- Handling of multiple analyzers
- Multiple material streams per analyzer
- General analyzer bias compensation
- User configurable data storage and presentation
- Data export to external systems
- Batch handling and reporting
- Alarm and event registration
- Dynamic analyzer status mimics

Applying state-of-the-art software techniques the intuitive graphical data presentation utilities include smart features like:

- Several charts in one window
- Several data series on same chart
- Fast toggling between different data horizons
- Easy chart configuration from drop down menus in dynamic window

The comprehensive and flexible data storage can be configured according to the users needs from these data instances: Data storage for every on-line 'sample'

- Raw analysis as received from analyzer
- Bias corrected analysis (option)
- Aggregated analysis average
- Short/medium/long term production weighted average
- Free-period production weighted average
- Rolling over last N samples (user configurable)
- Current accounted analysis
- Status information
 - Production represented by sample, incl. moisture
 - Analyzer/stream/account status
 - Sensor information (pressure, temperature ...)

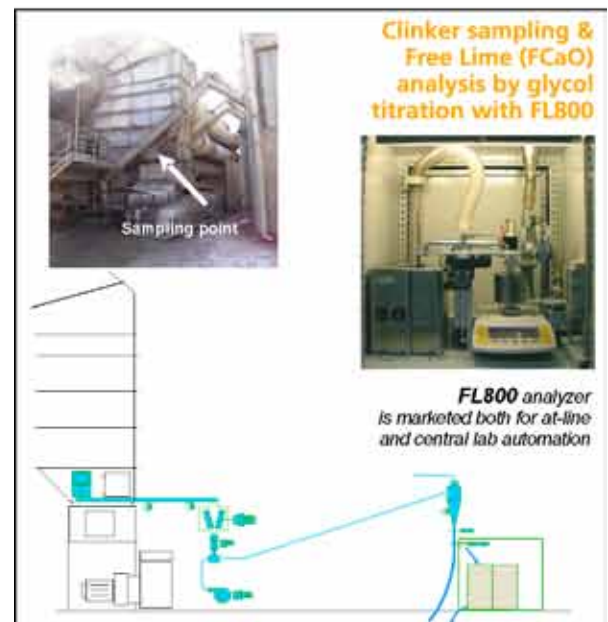
Data storage for every reference sample (if applicable)

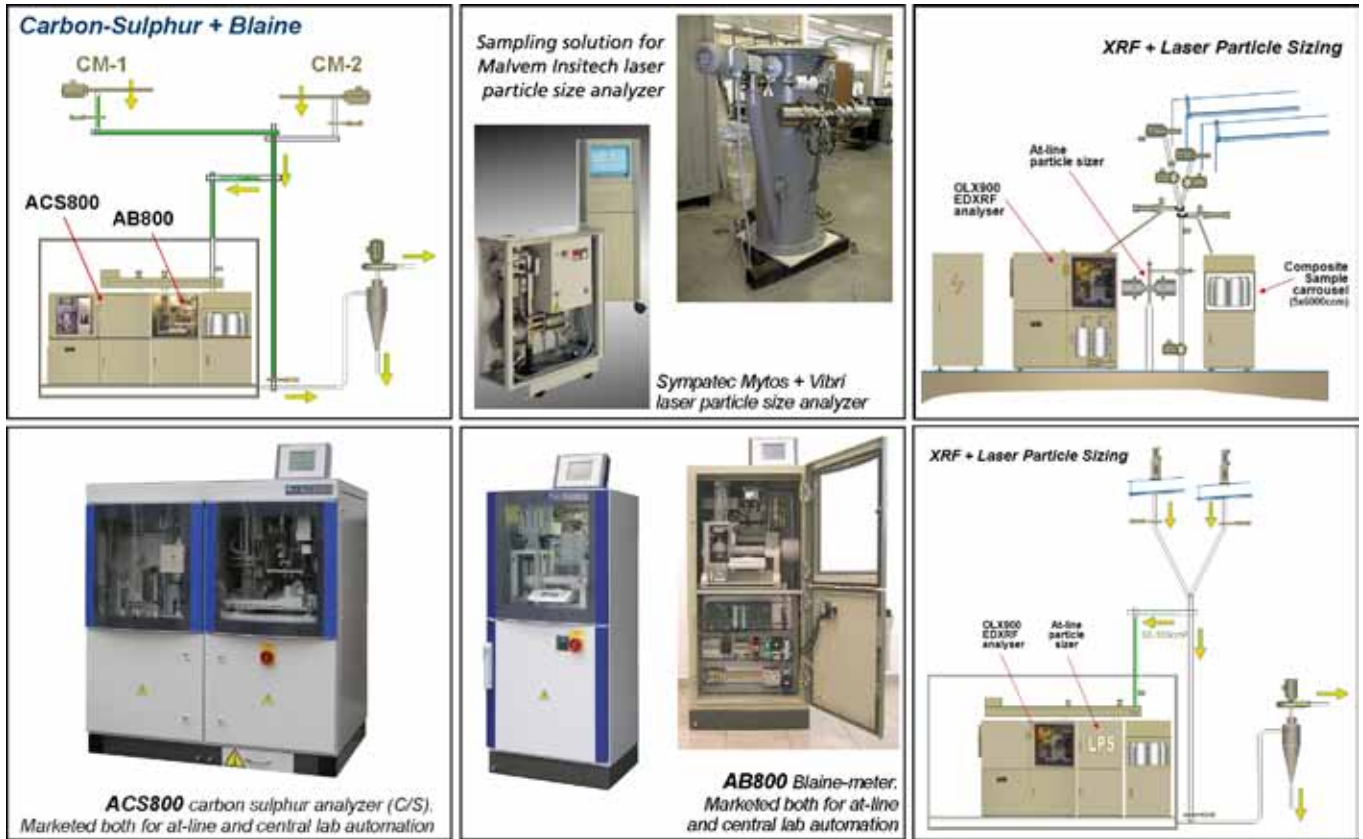
- Reference analysis
- Accounted analysis in period
- Resulting analyzer bias (option)

QCX/OnStream applications:

Of the approximately 600 QCX systems delivered worldwide some 25 % (Qrt 4 2009 figures) integrate on-line elemental analysis techniques like PGNAAP/PFTNA or EDXRF. In smaller numbers techniques like laser particle sizing and free lime analysis by glycol titration have been integrated as on-line equipment in QCX configurations. There is a strong market trend to apply more of these and other on-line analysis techniques in cement and mineral production processes. Other emerging on-line techniques comprise Blaine, Carbon-Sulphur (C/S), Loss on Ignition (LOI) and XRD. In order to meet this market demand FLSmidth has introduced a comprehensive on-line analysis product program. The main focus area is sampling and analysis applications after the raw mill, after the clinker cooler and after the cement mill. The developments undertaken in recent years means that a comprehensive software and hardware program focusing on on-line applications is now available from FLSmidth (=QCX/OnStream). The right hand column and the overleaf page give a survey of the most often applied on-line techniques applied on the modern cement plant. All solutions are available from FLSmidth, either as stand-alone systems for these particular applications or in combination with any other QCX application module linking analysis and process to an efficient quality control (QC) solution. The on-line analysis configurations shown in the right hand column all have a +10 year track record of proven and widely acknowledged operation. They are standard scope in many new cement plant projects. And an increasing number of existing plants have upgrade plans involving one or more of these technologies.

The configurations shown overleaf are dedicated to the cement grinding department, which is the newest focus area for on-line analysis solutions. The most applied application here is particle sizing installed with the objective of power savings. But also the other configurations shown overleaf are gaining increasing market interest. The flexible and modular concepts – including sampling & sample transport devices - shown above, available from FLSmidth, supports in practice any combinations of cement specific on-line analysis equipment available on the market. In addition to support multiple on-line analysis units at one sampling location one may service an optional fully automatic collection device for 24hr-composite cement samples for physical testing. And, pending a limited horizontal distance between sampling points, 2 or more cement mill sampling points may share one set of on-line analysis instrumentation.

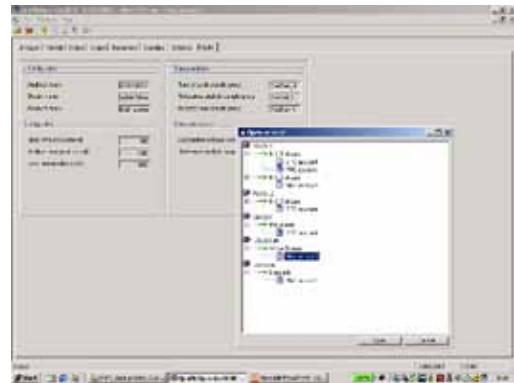




Operational benefits

The single most important argument for the market focus on on-line applications is the much reduced cycle time from sampling to analysis, which may lead to faster control response and therefore improved quality and/or operational savings. An on-line analyzer itself is just an advanced sensor generating huge amounts of data. If these data quantities shall be exploited to meet the objectives and pay back the investment, manual data processing procedures are simply too slow and inadequate.

QCX/OnStream not only supports the project specific analysis technologies with necessary basic data handling tools. It dynamically generates very relevant derived data series and presents these applying smart data presentation features. Other FLSmidth automation products such as QCX/BlendExpert or ECS/Process-Expert (or equivalent 3rd party products) can then provide the functionality to optimise quality and operation costs. Without such tools an investment in on-line analysis is hardly a justifiable investment.



Above: Analyzer selection and data configuration window

Left: A customized and configurable graphic analyzer status mimic is available for each on-line analyzer.

Front page: Superimposed trends of raw and aggregated data series is one of many available data presentation features.

Note 1: In this brochure 'on-line' is used as the common description for all types of on-line, in-line or at-line analysis applications.



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