Application Note
Sector : All

POUDRES DURABLES

AUTOMATIC SIEVE BREAKAGE DETECTION THROUGH PARTICLE ANALYSIS

Context

The quality and control of finished products is essential in all industries. Sieving ensures precise particle size separation, provided that the sieve remains intact. Because sieves are not easily accessible, visual inspection is complex, making breakage difficult to detect. Moreover, the breakage is gradual: only a few contaminants escape at first. So it is difficult to detect! The economic impact of reprocessing costs is significant. Early detection of this issue helps to minimise the quantity of rejected or reprocessed batches.

Customer Installation : Vibrating sieve

Objective : Ensure quality control

Methodology

❶ Installation of an Online Granulometer
❷ Configuration of the alarms

Phase ❶

An Insitec laser granulometer (dry method) is installed under the sieve at the outlet of the fraction of interest (conforming product with the finest particles).

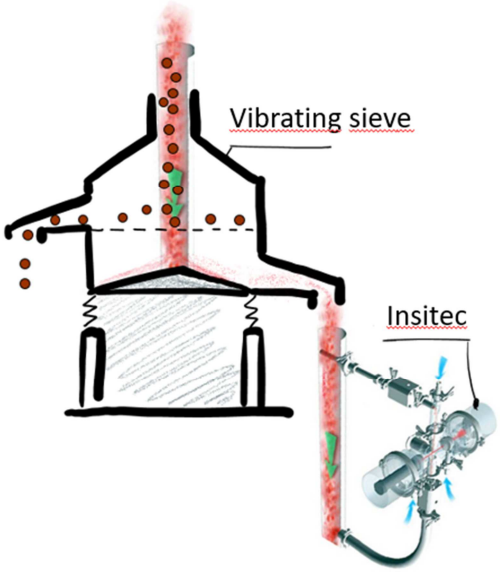

Fig. 1 : Installation of the Insitec (Malvern Panalytical) on the sieves discharge flow

Continuous and real-time monitoring of the particle size distribution is carried out using the RTSizer software.

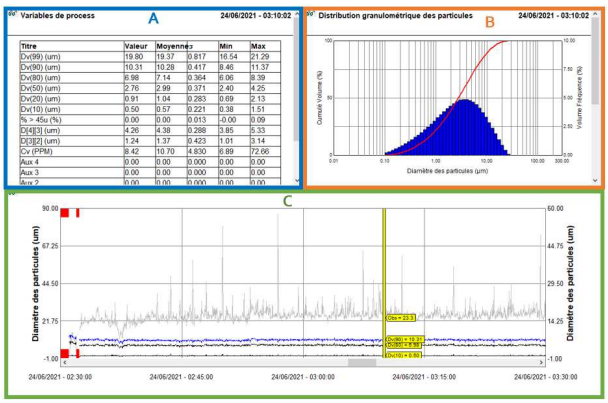

Fig. 2 : Visualisation of measurements on the RTSizer software (WindowA : process variables, Window B : real-time particle size distribution, Window C : monitoring of particle size indicators over time

The Insitec's sensitivity and speed of measurement mean that even small percentages of out-of-specification particles can be detected very quickly.

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Phase ❷

The setting of the sieve breakage detection alarm is done through the configuration of the RTSizer and Malvern Link II software.

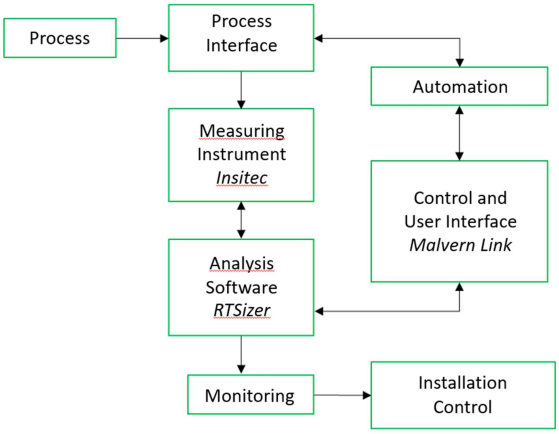

Fig. 3 : Functional representation :
- On-line process and measurement -

- RTSizer enables real-time particle size measurement. The quantity of oversized particles is controlled by focusing on variations in Dv99 (the diameter below which 99% of the particles fall). By adjusting the acquisition parameters, the sensitivity of the device can be increased, allowing for the early detection of oversized particles.

- With Malvern Link II, the percentage of oversized particles is counted, enabling the sensitivity of the alarm to be adjusted. Thanks to the Malvern Link II interface, the alert is automatically transmitted to the process control system, allowing the operation to be stopped, the product to be isolated, and the sieve to be changed as early as possible.

Results

Dv95 is not a sufficiently sensitive indicator for detecting sieve breakage. As shown in the following figure, it remains stable after the sieve has broken, unlike Dv99.

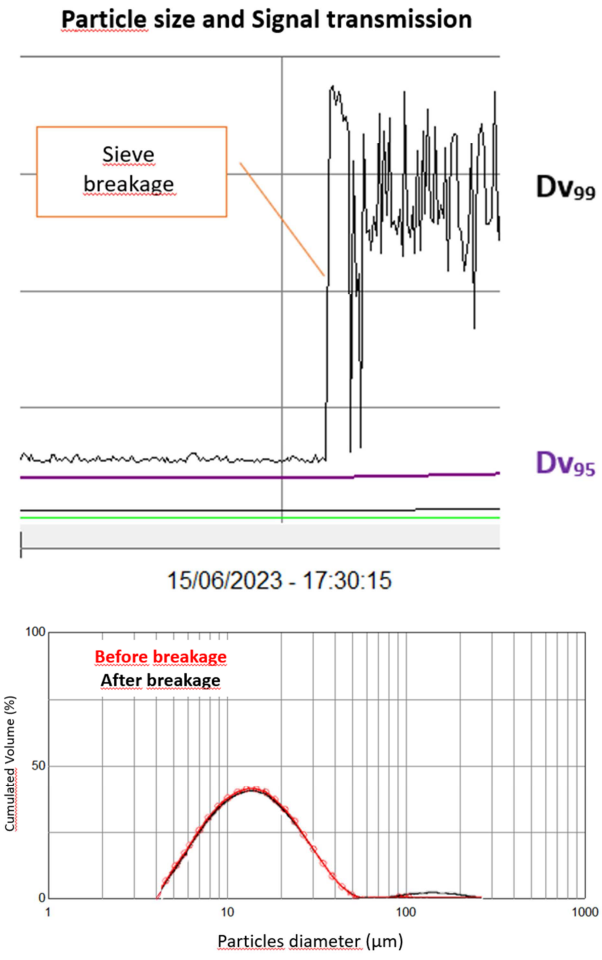

Fig. 4 : Increase in the quantity of coarse particles when the sieve breaks - displayed on RTSizer

Conclusion

Sieve breakage can be detected early and automatically through online particle size analysis, ensuring continuous product quality.