Wabtec CORPORATION

Wabtec Digital Mine
Product Bulletin Sheet

StoneThree The Future of Work. Now.

Stone Three
Conveyor Particle Size Analyzer

Bulk Material Handling: Particle Size Analyzer
A Digital Mine Solution from Stone Three and Wabtec's Digital Mine

A Digital Mine solution offering from Stone Three and Wabtec's Digital Mine offers its latest deep learning Particle Size Analyzer (PSA) to help improve accuracy. The PSA system is a reliable and robust machine vision-based system used to measure the size distribution of bulk material such as mineral ore on a conveyor belt. The PSA makes use of the latest industrial high-resolution laser and camera technology for superior accuracy and robustness.

Key Benefits

Traditional particle size distribution (PSD) sampling methods typically entails manual, labor intensive belt cuts and material sieving. This process is prone to human error and provides only a snapshot measurement and it is often impractical to get a representative sample. In addition, the challenges with legacy cameras and Monte Carlo analysis introduce a new set of obstacles for PSD. The benefits of on-line PSD analysis are:

- It is real-time and continuous; this enables a measurement that is statistically representative.
- The continuous measurement is ideal for trending PSD changes and enables process performance monitoring.
- It is also a very valuable input to Advanced Control Systems for process stabilization and optimization.
- The machine vision-based measurement is non-contact and therefore robust and low maintenance.

Machine Learning Performance:

The Digital solution now utilizes the latest deep learning particle segmentation technology. This enables particle detection performance, significantly better than traditional water shedding approaches. The ore region is automatically detected for increased performance since areas containing fines are automatically identified and included in the PSD analysis. Large rock detection performance is also increased since this method can detect partially hidden particles and are robust against the presence of sunlight, dust and shadows on the imaging area. Graphical Processing Unit (GPU) hardware is leveraged for faster analysis frequency.

Benefits:

The PSA solution has proven to add significant benefit in the following applications:

- Optimization of crushing operations ranging from simple reduction ratio monitoring and operator intervention to automated crusher gap control
- Optimization of blasting by measuring run of mine ore PSD
- Preventing downstream blockages by robust oversize detection
- Product quality control before shipment of material to avoid penalties
- Optimization of grinding operations through feed forward control or feed blending strategies

Capabilities:

The PSA solution has been proven on a multitude of ore types including iron, copper, platinum, nickel, zinc, bauxite, kimberlite and coal. The system has been used in a wide range of applications - from Run-of-Mine streams with large variations in PSD to product streams with a very narrow PSD. The PSD data is made available for integration into the client's Production Accounting, FMS, SCADA, historian and control systems using industry standard protocols such as OPC or via bespoke integration
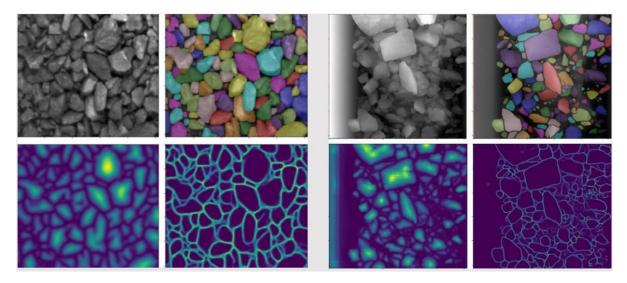
Health Monitoring:

Our first in class technologies continuously monitor system health for sensor issues with communication, camera or light equipment. Server health monitoring includes disk space, CPU usage, Memory usage, and OPC health monitoring.

Volumetric Measurement:

The laser-based PSA provides real time volumetric flow measurement of the material on the belt. The system includes auto-calibrating functionality which means it does not require frequent calibration common to belt scales. This measurement is ideal where a belt scale is not practical or to complement a belt scale to identify scale drift or to monitor changes in bulk density

Technical Support:

Stone Three & Wabtec Digital Mine places significant emphasis on timely, consistent and accurate technical support and has developed reliable and cost-effective systems to achieve this objective. Our digital solutions provide comprehensive technical support plans as part of the value adding service. Technical support includes remote support and routine site inspections. Weekly reports are sent to the client detailing system uptime, OPC health and PSD performance indicators.