Wabtec CORPORATION

Wabtec Digital Mine
Product Bulletin Sheet

StoneThree
The Future of Work. Now.

Stone Three
Truck Particle Size Analyzer

Mining Load and Haul: Truck Particle Size Analyzer
A Digital Mine Solution from
Wabtec's Digital Mine and Stone Three

The Truck Particle Size Analyzer, PSA, system is a reliable and robust machine vision-based system from Wabtec Digital Mine and Stone Three used to measure the size distribution of bulk material such as mineral ore on haul trucks. This system makes use of the latest industrial high-resolution and wide dynamic range camera technology for superior accuracy and robustness.

Typical Operational Challenges

- Blast fragmentation variation: Oversize material reaching the crusher causing blockage, premature wear and damage
- Operator inexperience: Loading oversize material
- Haul Truck Stability: Uneven load distribution

Key Benefits

According to global mining industry studies, oversize material can lead to decreases in productivity of up to 20%
The PSA system significantly reduces the risk associated with oversize material by automatically identifying and scanning each truck before and during the tipping process to provide detailed data on the ore received and has the following benefits:

- It is automated, real-time and statistically representative
- Measurement turnaround is fast and allows for rapid intervention, for example rerouting of trucks with oversized material by alerting dispatch.
- Automatic deep learning-based truck and ore region detection enables the system to operate on any truck size or model
- 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.
- Can be used in conjunction with Truck Volume Analyzer for a comprehensive payload management solution

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.

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.

Capabilities:

The PSA solution scans the truck load before tipping to identify any oversized material in the top layer before offload. During the tipping process it analyses multiple images in order to analyze not only the top layer but all subsequent layers. This enables the construction of a better representative PSD and allows for the detection of hidden oversized particles. High resolution cameras with wide dynamic range capabilities are used for robustness against varying outdoor operating lighting conditions and high intensity floodlights enables high quality images during night- time. The PSD data is made available for integration into the client's FMS, Production Accounting, SCADA Accounting, SCADA, historian and control systems using industry standard protocols such as OPC.

Benefits

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

- Optimization of blasting by measuring run of mine ore PSD
- Optimization of primary crusher operations
- Identifying and re-routing trucks that contains oversized material to prevent crusher damage and blockages

Technical Support

Wabtec Digital Mine and Stone Three 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.