

Conveyor Bulk Measurement System

Accurately and safely maximise conveyor loading using real-time laser volumetric analysis



The Conveyor Bulk Measurement System (CBMS) is a complete turnkey solution to the problem of detecting, reporting and logging of ore volume, available capacity and belt drift on conveyor systems.

The system provides key metrics on bulk conveyors that when incorporated into the site control system, can provide real productivity and throughput gains to material handling operations.

The system incorporates laser scanning technology to reliably:

- > Profile the bulk material to determine flow rates
- > Measure the bulk edges relative to the belt edges so as to maximise loading capacity
- > Monitor belt location and alert on belt drift
- > Detect potential ore spillage and assist in avoiding it
- > Communicate key measures, alarms and status to the Control System PLC

- > Record all measured data for failure mode analysis and preventative maintenance plan;
- > Support the operator in taking corrective actions to either adjust loading rate, loading point or conveyor speed

BENEFITS

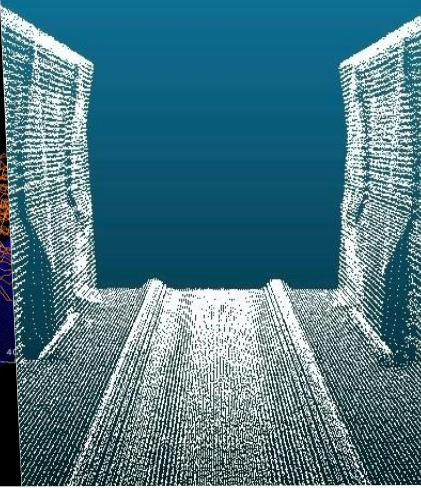
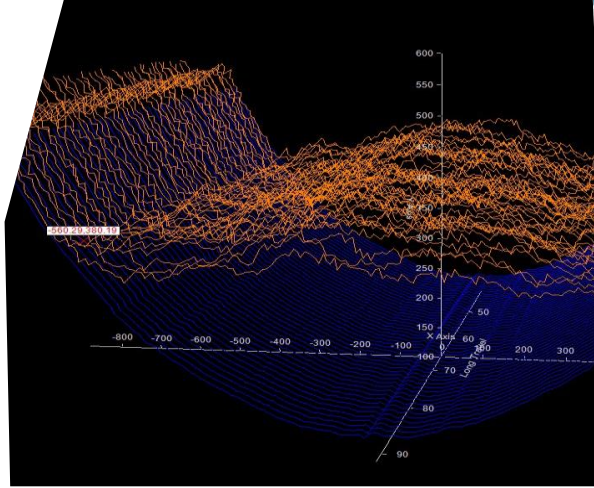
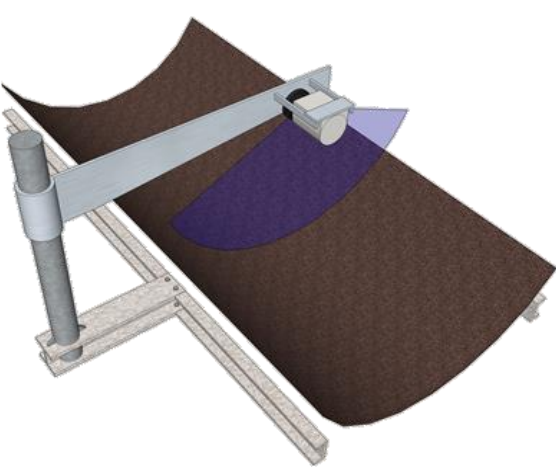
The benefits of CBMS over traditional mass based sensors are:

- > Accurate ore loading statistics
 - Real-time volume & mass flow rates.
- > Bulk Handling Control Optimisation
 - Increased ore throughput, maintaining daily tonnage requirements
 - Increased belt loading efficiency reducing ship load times
 - Tighter control loops on belt feeders
- > Preventive Maintenance
 - Monitoring of belt movement for belt position control
 - Reduction of wear & stable operation
 - Increased life expectancy of belts

KEY FEATURES

- > Accurate measurement of belt and bulk material
- > Non-contact measurement
- > Complete turnkey system delivered, installed and commissioned
- > Remote software configuration tools
- > Self-diagnostic, calibration, and 2D and 3D visualisation tools for operator assistance and diagnosis
- > Fully functional in all weather conditions (rain, dust & fog)
- > Historical data recording of key data metrics
- > Data recording and play back of real-time scan data

Cardno BEC can also complete the integration of the system into the site PLC control system



PRINCIPLES OF OPERATION

The CBMS acts as a standalone sensor input to the control system by providing key measures of the conveyor profile. It consists of a laser scanner mounted above the conveyor and a processing unit that interfaces to the plant control system.

The CBMS continually scans the sampled cross-section to calculate the ore volume, the empty space between the ore and the conveyor edge, the conveyor tracking position, and the centre of gravity of the ore profile relative to the belt centre.

The CBMS receives the conveyor belt speed from the Plant Control System PLC to calculate the volume flow rate of the product. Ore density can also be provided so mass flow can be determined.

All data values are communicated to the plant control system PLC for live operator display, plant control and logging for long term trending.

Operational and maintenance usage within the plant control system includes:

- > Applying operational set points
- > Responding to status indicators and alarms when conditions are exceeded
- > Conveyor interlocking
- > Optimising ore loading on the conveyor
- > Adjusting chutes and shuttles
- > Detecting issues with conveyor tracking frames
- > Calculating the product density with the data collected from weightometers

INTERFACES

The CBMS is able to communicate to a wide range of PLCs which support the following communication protocols:

- > Modbus TCP/IP
- > Ethernet/IP
- > GE SRTF

User Interface

CBMS includes a standalone web-based dashboard to view the system data. A 3D visualisation interface is also available to provide a visual graphic of the conveyor segment.

OTHER APPLICATIONS

Cardno BEC applies this technology for many other applications including:

- > Collision avoidance systems for mobile machines
- > Volumetric wagon loading profiles
- > Empty wagon profiling (partially dumped ore-cars)
- > Fill profiling for bins, stockpiles, hatches
- > Vehicle/rolling stock detection and identification

ABOUT CARDNO BEC

Cardno BEC has a long and successful history of providing value added solutions to clients in the mining and materials handling industries. Cardno BEC is in the unique position of being able to combine its industry experience, technical expertise and available technology to deliver first class results and ensure real value to our client's business

Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company, listed on the Australian Securities Exchange [ASX: CDD].

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Bulk Profile

