

## **Mining Load and Haul Truck Volume Analyzer A Digital Mine Solution from Wabtec's Digital Mine and Stone Three**



The Truck Volume Analyzer system is a reliable and robust machine vision-based solution from Wabtec and Stone Three, used to measure the volume and tonnage 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 and laser technology for superior accuracy and robustness.

### **Typical Operational Challenges**

- Production Capacity Correlation (FMS/Production Accounting)
- Inconsistent operator performance when loading / tipping
- Operational inefficiencies such as Overloading and Underloading
- Safety considerations such as uneven loading or driving with skip tipped
- No access to strut pressure or data load cell data
- Lacking access to real-time production data

### **Key Benefits**

The system automatically identifies and scans each truck to provide high accuracy data on the ore received and has the following benefits:

- It is automated, real-time and statistically representative
- High accuracy volumetric measurement. Inferred tonnage using bulk density factor
- Detection of overloading and uneven loading to avoid fleet damage and increased maintenance cycles
- Detection of underloading to avoid suboptimal fleet utilization and enable operator behavior improvement
- Ideal for totalizing material received during a period (shift, day, week, month) and comparing with mining plan or fleet contractor obligation
- More cost effective than truck load cells, simplified calibration
- Can be deployed within 2 months after hardware installation
- The machine vision-based measurement is non-contact and therefore robust and low maintenance
- Can also incorporate a Particle Size Analysis Solution to provide detailed data on the ore received

### **Machine Learning Performance:**

The Digital solution now utilizes the latest deep learning detection technology. This allows for automatic identification of different truck types, e.g. Cat 777 vs Komatsu 785 and accurate detection of the truck bucket. The deep learning models are robust against the presence of sunlight, shadows and dust on the imaging area. Machine vision technology is used for detailed truck motion tracking to compensate for non-linear motion, e.g. curved parking at crusher.

### Capabilities:

The TVA solution scans the truck as it moves underneath the system. A high-resolution 3D point cloud is constructed by combining the depth profiles from a line scanning laser with the velocity tracking measurements from the camera data. Each truck type is uniquely identified so that the 3D model can be compared with the empty 3D model of that truck type in order to calculate the payload volume. Tonnage is inferred using a bulk density factor.

High resolution cameras with wide dynamic range capabilities are used for robustness against varying outdoor lighting conditions and high intensity floodlights enables high quality images during night-time. The data can be made available for integration into the client's FMS, Production Accounting System, SCADA, historian and control systems using industry standard protocols such as OPC.

### Health Monitoring:

Our solutions continuously monitor the TVA 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.

### Technical Support:

Wabtec Digital Mine and Stone Three place significant emphasis on timely, consistent and accurate technical support and we have developed reliable and cost-effective systems to achieve these objectives. Our digital solutions provide comprehensive technical support plans that can be tailored to customer requirements as part of the value adding service. Technical support can include remote support and routine site inspections. Weekly reports are sent to the client detailing system uptime, OPC health and TVA System performance indicators.

