"With LASE TVM-3D, we not only improved our production reporting but also identified bucket wear before it became a major issue. This helped us avoid a costly crusher shutdown and kept production on track."

-Mine Production Superintendent

LASE TVM-3D SYSTEM FOR SURFACE DUMP TRUCK VOLUME MEASUREMENT

LOCATION:
SURFACE MINING OPERATION

YEAR OF PROJECT:
2025

SOLUTION:
LASE TVM-3DM (Truck Volume Measurement - Motion)

INDUSTRY:
Mining – Load & Haul Operations

LASE
Industrielle Lasertechnik GmbH

BACKGROUND

Accurate and reliable measurement of haul truck payload volumes is a cornerstone of efficient open-pit mining operations. Many operations rely on estimated bucket counts and average fill factors, which can cause production reporting variances and inefficiencies.

The client required a robust, automated solution that would:

- Deliver precise volume measurements for every truckload in real time.
- Integrate with existing dispatch systems to improve reporting and reconciliation.
- Provide actionable insights for maintenance teams to reduce unplanned downtime and crusher blockages.

CHALLENGES:

1. Inaccurate Volume Tracking: Manual calculations and estimates were leading to significant discrepancies between mined and processed material.
2. Inefficient Operations: Overloaded and underloaded trucks were common, causing suboptimal cycle times and reduced productivity.
3. Maintenance Blind Spots: Truck buckets often sustained damage, with loose or peeling panels going unnoticed until they failed, risking damage to downstream equipment like crushers.
4. Safety Risks: Manual inspections exposed personnel to dangerous conditions along active haul roads.

SOLUTION IMPLEMENTATION

The LASE TVM-3D system was installed along the main haul road to automatically scan every truck as it passed through.

System Highlights:

- 3D LiDAR Scanning: Captures a full 3D profile of every truckload.
- Real-Time Volume Calculation: Provides instant, highly accurate volumetric data.
- Automated Integration: Seamlessly links with the mine's dispatch system for live production reporting.
- Bucket Condition Monitoring: The detailed 3D scans highlight inconsistencies in bucket shape or liner wear, helping maintenance teams identify damage early.
- Load Compliance Alerts: Notifies operators when trucks are under- or over-loaded, allowing for immediate corrective actions.

RESULTS:

METRIC	Before LASE TVM-3D	After LASE TVM-3D
Volume Accuracy	±10-15% (estimated)	±1% (real-time measured)
Survey Requirements	Manual spot checks required	Fully automated, no field surveys
Safety Exposure	Frequent surveyor presence near haul roads	Zero exposure – fully remote
Truck Bucket Health	Visual inspections only, often missed damage	Continuous automated monitoring during every pass
Crusher Risk	Bucket panels occasionally fell into crusher, causing costly downtime	Early detection significantly reduces risk of panel failures

ADDITIONAL BENEFITS: MAINTENANCE & SAFETY

One of the key advantages of the LASE TVM-3D system is its ability to monitor truck bucket health over time:

- **Early Detection of Damage:** Scans reveal deformation, missing liners, or peeling panels before failure occurs.
- **Reduced Downtime:** Proactive maintenance scheduling prevents unexpected breakdowns.
- **Crusher Protection:** Avoids catastrophic events where bucket panels fall into the primary crusher, reducing repair costs and lost production time.
- **Improved Asset Life:** Identifying excessive wear early helps prolong the life of truck bodies and liners.

BUSINESS IMPACT:

- **Improved Production Tracking:** Accurate data for better reconciliation and planning.
- **Higher Efficiency:** Optimized truck loading and improved haul cycle times.
- **Enhanced Maintenance Strategy:** Data-driven inspections and reduced unplanned downtime.
- **Safety & Compliance:** No need for manual inspections near active haul roads, reducing exposure.
- **Lower Operating Costs:** Fewer crusher shutdowns and maintenance callouts.

CONCLUSION

The implementation of the LASE TVM-3D system transformed the client's surface haulage operations by combining precision payload measurement with real-time truck health monitoring. This dual benefit improved production efficiency, enhanced maintenance planning, and protected critical downstream assets like crushers, ultimately leading to higher productivity and lower operating costs.