Motion Metrics

Ecosystem for Mines

Since 2004, Motion Metrics has used smart, rugged cameras to monitor your mine and transform that data into actionable information.
The mining challenges we tackle

Mining productivity has decreased by 28% over the last decade¹

Resource extraction is 3X faster than 50 years ago²

197 countries have signed the Paris Climate Agreement³

70% of digital transformation initiatives do not reach their goal⁴

To meet these challenges, mining companies need:

- Agnostic technologies that interface with existing mine systems
- Customized solutions that consider every unique operating condition
- Easy and simple to use for operations teams

Benefits and operational impact

G.E.T. Detection\(^1\)  \(\uparrow 1.5\%\)
- Safety improvement
- Efficiency improvement

G.E.T. Wear Monitoring\(^2\)
- Safety improvement
- Efficiency improvement

Particle Size Distribution\(^3\)  \(\uparrow 6.0\%\)
- Safety Improvement
- Efficiency Improvement

Boulder Detection\(^4\)  \(\uparrow 1.0\%\)
- Safety Improvement
- Efficiency Improvement

Payload & Volume Monitoring\(^5\)  \(\uparrow 6.0\%\)
- Efficiency Improvement

Load Alignment Monitoring\(^6\)
- Safety Improvement
- Efficiency Improvement

Carry-Back Sensing\(^7\)  \(\uparrow 1.2\%\)
- Efficiency Improvement

Up to
$30,000,000

total estimated savings per year\(^*\)

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1 According to several studies at various copper mines in the US, Chile, and Kazakhstan, missing G.E.T. components can cause more than five days of crusher downtime per year.

2 According to an earlier study, the average direct and indirect costs of an unplanned shovel tooth change-out can be up to $40K per set.

3 Mines can improve production by up to six percent by adjusting the crusher gap. Results study that included plant validation by authors Gauti Asbjörnsson, Erik Hulthén, Magnus Evertsson, “Modelling and simulation of dynamic crushing plant behavior with MATLAB/Simulink” (2012).

4 According to case studies of both a Peruvian and Kazakh copper mine, brief crusher delays caused by oversized material can add up to multiple days of lost production per year.

5 According to a case study at a Kazakh copper mine, on average, a shovel fills 90% of a truck’s available capacity. Load volume monitoring can decrease the remaining 10% of lost carrying capacity over time.

6 Load misalignments can cause significant damage to truck structure and suspension while causing loose material to fall from the truck bed.

7 According to a study in Kazakhstan, production loss and extra fuel costs due to carryback can represent two percent or more of a mine’s production costs per year.

* Productivity impact and cost saving estimates based on a medium-sized gold mine in Latin America.
Our Fully Managed Solution

Detailed, on-demand reports at every stage of the comminution process bring critical mine-to-mill data to life.

The Motion Metrics Ecosystem for Mines integrates several key data solutions at every stage of the mining process.

Our systems work together to create a detailed view of mining productivity and efficiency while increasing safety and decreasing operational downtime associated with crusher jams and equipment maintenance.

Drill & Blasting

Production

Haulage

Processing

Secure cloud computing and data storage:

- Unlimited storage and computing power
- Authorized users can access data from any machine, anywhere
- Complex analysis and report generation
- API connectivity to mine systems (on/off premise)
- AI algorithm for automatic delineation of rock fragments and G.E.T. detection

Premium support services, on-site and remote:

- Intuitive technology with remote and on-site training/support
- Automatic custom report generation and KPI monitoring
- Productivity/safety improvement partnership
- Process/discrete control system integration
- No manual calibration needed for fragmentation analysis

www.MotionMetrics.com
Productivity

Productivity is king at mines, making equipment downtime one of the costliest problems our customers face. Motion Metrics provides a range of solutions that pay for themselves by reducing crusher, shovel, and loader downtime caused by G.E.T. components.

- **6.0%** Optimize comminution with particle size analysis.
- **1.2%** Minimize carry-back with haul truck monitoring.
- **6.0%** Monitor and optimize haul truck payload with volume monitoring.

Safety

Researchers found that incidents involving crushers are the second most common cause of fatalities caused by stationary machinery at U.S. mines.

- Jammed crusher incidents always present a serious safety issue for any mine due to the tremendous amount of stored kinetic energy.
- Motion Metrics mitigates the main culprits of crusher obstructions by providing industry-leading G.E.T. monitoring for teeth and lip shrouds.

Downtime Reduction

Estimated productivity outcomes:

- **1.5%** Mitigate equipment downtime caused by broken G.E.T. components.
- **1.0%** Keep oversized material out of the primary crusher with boulder detection.

We use industrial cameras and distributed AI to deliver continuous G.E.T. Detection + G.E.T. Wear Monitoring.

Sustainability

To limit global warming to 2°C, all sectors need to reduce GHG emissions from 2010 levels by at least 50 percent for 2050. Right now, only 2.5% of the mining sector’s electricity comes from renewables. Switching to renewables will take time, but mines can start fighting climate change today while saving up to $30M per year with Motion Metrics non-interruptive mine-to-mill energy efficiency service.

www.MotionMetrics.com
## Drill & Blasting Stage

All Motion Metrics products interface with our centralized data analysis platform, MetricsManager Pro. Users with authorized credentials can access particle size data from anywhere to verify and improve the effectiveness of blasting parameters.

### PortaMetrics™

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<td>Particle Size Analysis</td>
<td>Blast optimization</td>
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<td>No Manual Calibration</td>
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<td>Keep personnel safely away from benchface</td>
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### ShovelMetrics™

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6.0%

Particle size analysis optimizes each stage of comminution.

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Productivity impact & cost saving estimates medium-sized gold mine in Latin America
Production Stage

ShovelMetrics interfaces with our centralized data analysis platform, MetricsManager Pro. Users with authorized credentials can receive automated SMS and email event notifications, in-depth performance reports, equipment activity logs, and particle size data from anywhere.

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Shovel detection by ShovelMetrics

6.0% 1.5%

Particle size analysis optimizes each stage of comminution.

Mitigate equipment downtime caused by broken G.E.T. components.

Productivity impact & cost saving estimates medium-sized gold mine in Latin America.

www.MotionMetrics.com
### Haulage Stage

As part of the Motion Metrics solution ecosystem, users with authorized credentials can receive SMS and email boulder notifications, monitor truck volume for insight into shovel operator performance, and access particle size data from anywhere.

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1.0%
Keep oversized material out of the primary crusher with boulder detection.

6.0%
Monitor and optimize haul truck payload with volume sensing.

1.2%
Minimize haul truck carry-back with TruckMetrics monitoring.
## Processing Stage

BeltMetrics can provide critical particle size analysis at several stages of the processing operation. Users with authorized credentials can access data summaries, in-depth performance reports, equipment activity logs, and particle size data from anywhere.

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<td>Optimize screen + crusher maintenance</td>
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<tr>
<td>Boulder Detection</td>
<td>Improve belt life</td>
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<td>- - -</td>
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<td>Empty Belt Detection</td>
<td>Identify blockages</td>
<td>Minimize crusher maintenance</td>
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Particle size analysis by BeltMetrics

**6.0%**
Particle size analysis optimizes each stage of comminution.

**1.0%**
Keep oversized material out of the primary crusher with boulder detection.

Productivity impact & cost saving estimates medium-sized gold mine in Latin America.

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Motion Metrics
Ecosystem for Mines

Our helpful representatives are present everywhere you do business. Contact your local office.

CANADA  Headquarters
+1 (604) 822-5842
headquarters@motionmetrics.com
101-2389 Health Sciences Mall
Vancouver, B.C.
V6T 1Z3 Canada

BRAZIL
+ 55 (31) 3308-9331
brazil@motionmetrics.com

AUSTRALIA
+61 (8) 6141 3126
australia@motionmetrics.com

BOTSWANA
(+27) 53 0 040 333
botswana@motionmetrics.com

RUSSIA
+7-495-797-37-52
russia@motionmetrics.com

CHILE
+56 (2) 29693279
chile@motionmetrics.com

SOUTH AFRICA
(+27) 53 0 040 333
southafrica@motionmetrics.com

PERU
+1 (604) 822-5842
peru@motionmetrics.com

MEXICO
+52 (662) 169 0869
mexico@motionmetrics.com

KAZAKHSTAN
+7 (771) 403-27-26
kazakhstan@motionmetrics.com

Visit our website
www.MotionMetrics.com

For additional information, advice, or support, please contact our team of solutions experts whenever you need them. Our helpline is open 7 days a week and you can visit our website for online support or product information.