

Entrepreneurship in Mining via Innovative Technology Solutions

By: Shahram Tafazoli, Ph.D.
Founder & CEO

Motion Metrics International Corp
www.MotionMetrics.com



Presented to:
SUTA/SICAP Mining Panel Discussion
Date: Jan 23, 2011





Motion Metrics

International Corp

Agenda

- About Motion Metrics Int'l (MMI)
- **Missing tooth/adapter problem** → **ToothMetrics™**
- MMI Solutions Eco System: **TM, VM, RM, WM, FM, LM**
- Installations Worldwide
- Customer Portfolio
- Tips on Technology Entrepreneurship
- Conclusion.

The image shows a mining site at sunset. In the foreground, there are large pieces of heavy machinery, including a crane and an excavator, silhouetted against the bright orange and yellow sky. The sun is low on the horizon, creating a strong glow. The background shows a dark landscape with some trees. The logo for Motion Metrics International Corp is overlaid on the top left, featuring the company name in a stylized font with a blue and orange swoosh above it.

Motion Metrics

International Corp

About MMI

- Started as a one-person consulting business in 1997.
- Got involved in various innovative projects in open pit mining and other industrial areas.
- Incorporated as Motion Metrics Inc. in July 9, 1999.
- Continued technical consulting and applied for government funding to move projects forward with the objective of rolling out products!
- Changed the name to “Motion Metrics Int’l Corp” in July 9, 2004, and started selling systems then
- Today have ~20 full-time employees and several consultants

Motion Metrics International Corp



Motion Metrics
International Corp

www.MotionMetrics.com

Advanced Monitoring Systems for Open-Pit Mining

Motion Metrics

International Corp

Challenge: Missing Tooth/Adapter Problem



Motion Metrics

International Corp



Motion Metrics

International Corp



Crusher Incident Video:

www.youtube.com/watch?v=-Z9Cm92vfQA



Motion Metrics

International Corp

Solution:

ToothMetrics™

*= No more toothache
for your mining shovels!*



Why ToothMetrics™?

To Improve:

- **Safety:** the stuck tooth at crusher can be fired loose at tremendous speeds, creating a lethal safety risk;
- **Efficiency:** missing teeth can wreak havoc with crushers and other downstream equipment, causing downtime of hours or days each time;
- **Productivity:** missing tooth is a major unexpected interruption to production. The lost of production for a downed primary crusher can be translated to one million dollars per day!

Motion Metrics

International Corp

ToothMetrics™ Installations



Motion Metrics

International Corp

Installations on P&H Cable Shovels



Motion Metrics

International Corp

Installations on Bucyrus Cable Shovels



Motion Metrics

International Corp

Installations on Hydraulic Shovels

Day time



Night time





Motion Metrics

International Corp

ToothMetrics™ Software

The screenshot displays the ToothMetrics software interface. At the top left, the text "TOOTHMETRICS™" and "BUCKET" is visible above a grayscale image of a bucket's teeth. A white rectangular box highlights a specific section of the teeth. Below this is a zoomed-in view of the teeth, with a timestamp "2010 October 09, 03:07:55" at the bottom. To the right of the images is the Motion Metrics International Corp logo. A central control panel features a folder icon with an hourglass, surrounded by zoom navigation buttons labeled "x100", "x10", and "x1" for both left and right directions. At the bottom, there is a VNC status bar with seven green indicator lights numbered 1 to 7, a system tray showing the date "10/9/2010" and time "3:08:23", and icons for "FM", "RM", "TM", and a speaker.

Sequence of Missing Tooth Alarm

TOOTHMETRICS™
BUCKET

2008, February, 14, 08:39:19
No: 0002044

2008, February, 14, 08:39:19

V N C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

10/9/20
3:08:2

TOOTHMETRICS™
BUCKET

2008, February, 14, 08:41:11
No: 0002045

2008, February, 14, 08:41:11

V N C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

10/9/20
3:08:2

TOOTHMETRICS™
BUCKET

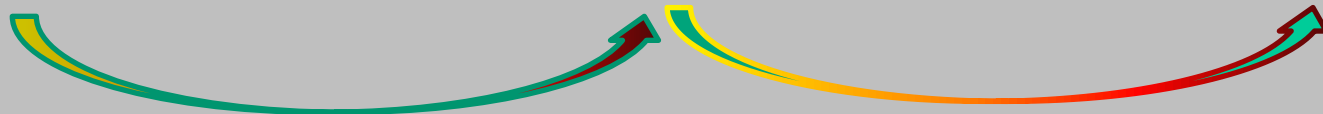
2008, February, 14, 08:44:57
No: 0002047

2008, February, 14, 08:44:57

V N C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

10/9/20
3:08:2



Motion Metrics

International Corp

ToothMetrics™

*An Automatic Missing Tooth/Adapter
Detection System*



Motion Metrics

International Corp

ViewMetrics™

A Camera-Based Surveillance System for Mining Shovels

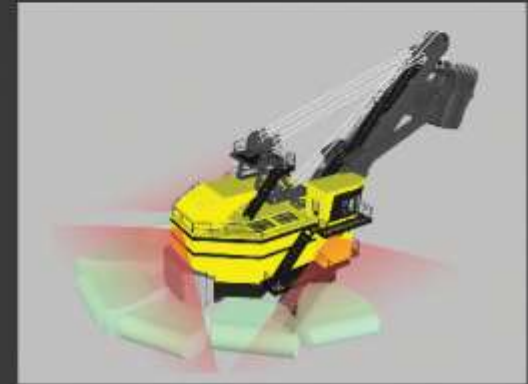
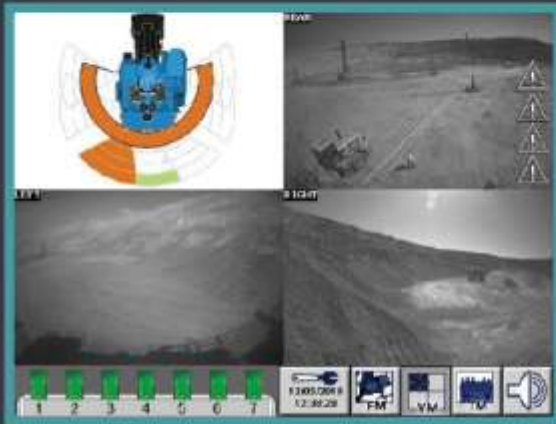


Motion Metrics

International Corp

RadarMetrics™

A Radar and Camera-Based Collision Avoidance System



Motion Metrics

International Corp

WearMetrics™

A Real-Time Tooth-Wear Monitoring System

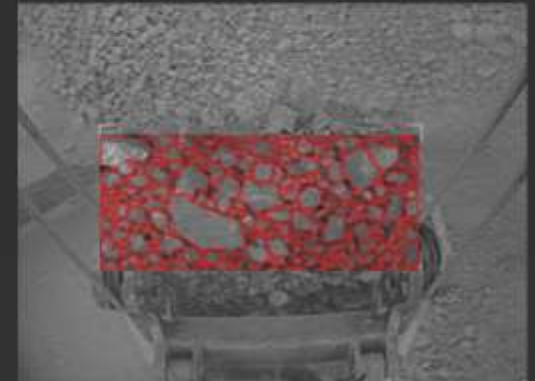
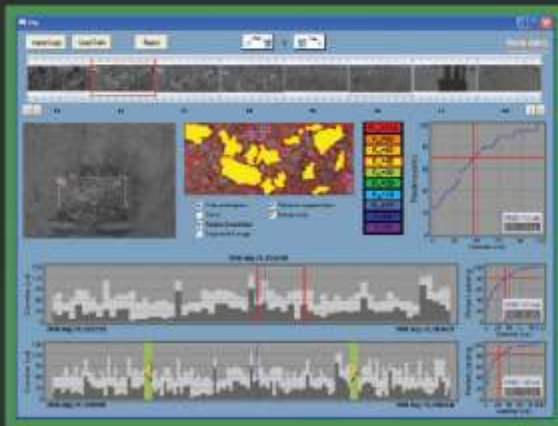


Motion Metrics

International Corp

FragMetrics™

A Shovel-Based Rock Fragmentation Analysis System



Motion Metrics

International Corp

LoadMetrics™

A Dynamic Arm Geometry, Cutting Force, and Payload Monitoring System



Motion Metrics

International Corp

Installations Worldwide



Motion Metrics

International Corp

Customer Portfolio



Teck



RioTinto

DE BEERS



Tips on Technology Entrepreneurship!

- Most business start with a dream. No idea is small.
- Believe in your instinct and do not listen to naysayers!
- Start small & with low overhead (specially for niche market businesses)
- Apply for government funding (IRAP, NSERC, Precarn, ISTP,...) and the SR&ED Initiative for eligible expenses.
- Have discipline specially if you start as home-based biz.
- Move from laboratory to field trials (beta testing) ASAP!
- You must strongly believe in your value proposition.

More Tips!

- Diversify your offerings and your customers!
- Marketing and branding are key. Use technology effectively.
- Participate in tradeshow (for 7 reasons)!
- Write interesting articles in industry magazines.
- Build a good relationship with your customers & suppliers!
- Volunteer in professional organizations (SUTA, SICAP, IEBCA,...)!
- Last but not least, surround yourself with good people!

The top of the slide features a background image of a construction site at sunset. Silhouettes of heavy machinery, including a crane and excavators, are visible against the bright, low sun. The sky is a mix of orange, yellow, and blue. The company name is overlaid on the left side of this image.

Motion Metrics

International Corp

Thank You!