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NEW AGE SOLUTIONS

Practical Use of Innovation and New Age Technologies

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NEW AGE SOLUTIONS

PRACTICAL USE OF NEW AGE TECHNOLOGIES

- Not technology for technology's sake
- Useful tools to help lower owning and operating costs

Simple solutions to help operators do their job easier and more efficiently.

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NEW AGE SOLUTIONS

AS SIMPLE AS:
The clothing your crew wears- safety and comfort

AS COMPLEX AS:
Utilizing satellite mapping and base stations to ensure accuracy and productivity on the jobsite

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OPPORTUNITY: SAFETY

NUMBER ONE FOCUS AT CATERPILLAR
Everyone home safely, everyday.

SAFETY AT CAT PAVING

Safety Continuous Improvement

Injuries **significantly and steadily** reduced since 2004

- Safety Recipe Established
- Set Safe Behavior Expectations
- Engaged Safety Committee
- Leader Safety Walks
- Transition from G&D to Global Paving

Global Paving Minneapolis

Year	RIF	LTCFR
2003	13	4
2004	13	4
2005	11	3
2006	9	2
2007	4	2
2008	3	2
2009	2	1
2010	2	1
2011	1	1
2012	1	1

2013 YTD
RIF = .49 LTCFR = .37

PRACTICAL APPLICATION: SAFETY

Hi-tech Jobsite Clothing

- Day-glo and reflective materials for high visibility
- Dryfit materials for cool performance in high ambient temperatures
- Special materials and treatments makes clothes easy to clean and resistant to asphalt stains

Personnel are cool, comfortable and easy to see, allowing them to safely focus on work.



OPPORTUNITY: PRODUCTIVITY


*HOW TO MAKE MY CREW MORE PRODUCTIVE
Make work simpler and more consistent.*

PRACTICAL APPLICATION:

Compaction Control Technology

Three technological components

- MEASUREMENT**
 - Asphalt: Mat Temperature
 - Soil: Indications of soil stiffness
- MAPPING (GPS)**
 - Pass count, coverage
 - Ties measurement to precise location
- DATA ANALYSIS:** utilizing software to harvest the data



*When you have all three components, you have **INTELLIGENT COMPACTION***

COMPACTION CONTROL TECHNOLOGY: MEASUREMENT

Compaction Meter Value (CMV)

Measures ground response to being struck by vibrating drum to indicate soil stiffness

- Improves uniformity, enhances quality of work
- Makes consistency easy, like a video game
- Eliminates human guesswork
- Maximizes efficiency and optimizes fuel use
- Measures deep, from 1 to 1.5 m; ideal on granular soils




*Helps find buried objects that affect compaction.
Gives operator confidence to move on to next job.*

COMPACTION CONTROL TECHNOLOGY: MEASUREMENT

Machine Drive Power (MDP)

Measures energy required to overcome rolling resistance to indicate soil stiffness

- Improves uniformity, enhances quality of work
- Makes consistency easy, like a video game
- Eliminates human guesswork
- Maximizes efficiency and optimizes fuel use
- Measures less deep, the depth of a lift

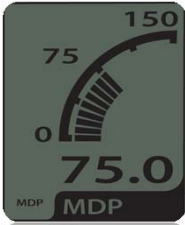



*Helps find buried objects that affect compaction.
Gives operator confidence to move on to next job.*

COMPACTION CONTROL TECHNOLOGY: MEASUREMENT

Machine Drive Power (MDP)

- Measures with vibe system on or off
- Works well in all soil types, granular and cohesive, clay
- Can be used with smooth drum, padfoot or padfoot shell kit
- Can be correlated to plate load test



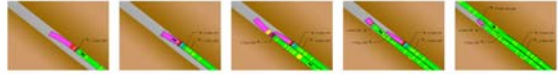


*Wider application range than CMV.
Accomplishes tasks that CMV can't.*

COMPACTION CONTROL TECHNOLOGY: MAPPING

Pass Count, Measurement Mapping

- Ensures 100% coverage
- Asphalt and soil applications
- Improves uniformity, enhances quality of work
- Makes consistency easy, like a video game
- Eliminates human guesswork
- Maximizes efficiency and optimizes fuel use

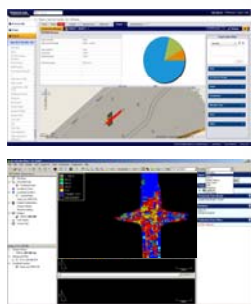
Personnel can complete their work with confidence and move on to the next job

COMPACTION CONTROL TECHNOLOGY: DATA ANALYSIS

Vision Link™ Software

Data analysis drives improvement

- Data maps can provide quality control documentation
- Can highlight trouble areas when they are easier to fix
- Can show opportunities to improve efficiency



Compaction is an in-expensive way to reduce costs and improve overall job quality.



PRACTICAL APPLICATION:

Eco-mode

- Simple operation ensures use
- Reduces fuel burn under normal operating conditions
- Provides efficiency that could not be otherwise achieved



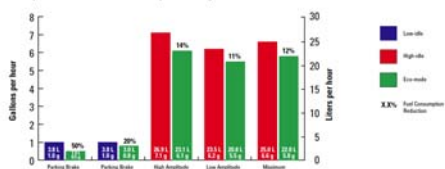
Less day-to-day fuel use without sacrificing production



ECO-MODE: EXAMPLE OF FUEL SAVINGS

Vibratory Soil Compactors

Example of Eco-mode Fuel Consumption Savings*



Less day-to-day fuel use without sacrificing production

* Example data from HSC2000 with Cat engine 171.8kW (230Hp). Actual results may vary based on machine or application.



PRACTICAL APPLICATION:

Fleet Management: Product Link™

- Remote monitoring of fleet
- Fuel status, consumption
- Machine location: jobsite, theft prevention
- Fault codes



Provides "big picture" of fleet asset use, health. Promotes uptime and reduces waste.



Provides "big picture" of fleet asset use, health. Promotes uptime and reduces waste.

OPPORTUNITY: EFFICIENCY

LEVERAGING NEW TECHNOLOGY
Increasing uptime, productivity.

PRACTICAL APPLICATION:

NovaPick Road Milling Technology

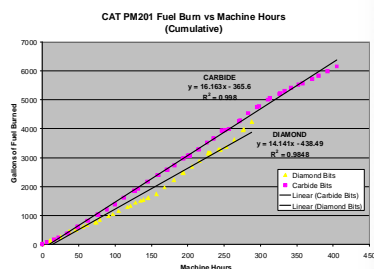
- Industrial diamond coated picks
- Last up to 40 times longer than conventional carbide
- Reduces fuel burn, labor costs
- Increases uptime, productivity



Reduces cost per ton. Promotes uptime and reduces waste.

NOVAPICK TECHNOLOGY: REDUCED FUEL BURN

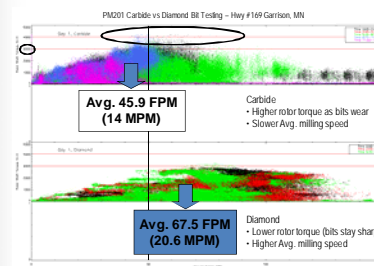
EXAMPLE:



- Reduced drag coefficient
- Lower rotor torque
- Reduced load on engine.

NOVAPICK TECHNOLOGY: GREATER PRODUCTIVITY

EXAMPLE:



- Reduced drag coefficient
- Lower rotor torque
- Higher average speed

NOVAPICK TECHNOLOGY: KEY BENEFITS

NovaPick vs Carbide

- Reduced labor costs – *fewer change-outs*
- Reduced fuel consumption – *sharper longer*
- Greater productivity – *faster operating speed, more uptime*
- Higher quality milling – *sharp bits cut cleaner, uniformly*

Lower cost per ton.

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NEW AGE SOLUTIONS - Summary

PRACTICAL USE OF NEW AGE TECHNOLOGIES

- Not technology for technology's sake
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*Simple solutions to help operators do their job
easier and more efficiently.*

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NEW AGE SOLUTIONS

TAKEAWAYS

- Safe, practical, common sense applications of New Age technology and solutions
- Useful tools to help lower owning and operating costs

*Improve your competitiveness
and profitability.*

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QUESTIONS?

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Thank you



Back up slides

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PRACTICAL APPLICATION:

Operations Training

- Enhances skills of inexperienced crew
- Reinforces good technique for experienced crew
- Ensures entire crew working as one unit
- Helps retain employees and keep them working safely
- Helps you get the most out of your investment

*Promotes teamwork, improves understanding,
keeps crew sharp and safe.*

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CAT