Road Building Equipment

The Past, Present and Future
Participants

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Wayne Evans – Wirtgen
Brodie Hutchins – Wirtgen
Terry Sharp - CAT
Joseph Musil – Terex
Todd Mansell – Sakai
John Irvine – Roadtec
Eric Baker – Roadtec

And many others to numerous to list.
Equipment

- Cold planers or mills
- Tack distributors
- Material transfer vehicles
- Laydown machines or paver/finishers
- Compactors or rollers
Goal near-zero NOx and PM

- Next generation electronics
- Enhanced fuel systems
- Exhaust gas diversion and cooling
- Next generation air management
- Durable after-treatment technologies
- Regeneration technologies
- Fuel and lubricant requirements
Cold Planers or Mills

- Lacked precision
- Poor gradation
- Separate clean-up
Cold planers or mills
Cold planers or mills
Current milling technologies

- Drum textures
- Folding conveyors
- Flexible cutting technology
- Parallel to surface drums
- Vacuum systems
- Tooth holder developments
Cutting drum textures
Folding conveyors
Flexible cutting widths
Parallel to surface drums
Automatic grade and slope
Silica dust vacuum systems
Teeth and holders
Enhanced serviceability
Tack distributors
Joint heaters
Material Transfer Vehicles
Now you see it, now you don’t
Segregation without remix
Remix makes a difference
Windrow Pickup Machines
Laydown or Paver/Finishers
Mix fumes control systems
Operator environment
Ergonomic controls
Efficient material handling

- Independent auger and conveyor feed
- Narrow conveyor housings
- Hydraulic front aprons
- Various plates and adjustable flights
- Auto conveyor tensioning
Improved hopper designs
Independent material feeds
Robust control systems

Individual conveyor sonic

Individual auger sonic

Height controls

Synchronized Hydraulic tunnels
Designed to carry mix

Excellent Suspension for Hopper Insert

- Patented bogie design
- Individual oscillating wheel suspension
- Hydraulic ride levellers
- Uniform wheel load
- Less wear & tear
- Less tire sink into the grade
- High ground clearance
Better undercarriages
Independent auger controls
Auger improvements
Conveyor tensioning systems

Auger Conveyors Have Hydraulic Tensioning System Which Minimizes Maintenance And Ensures Proper Tension
Precision leveling systems
High ambient cooling

Better Paver Cooling Packages

- Large tiered intake
- Vertically stacked coolers
- Variable speed fan
- 62.5 gallon hydraulic reservoir
Power for accessories

Pavers Now Have On Board Generators Used To Heat Screed And Power Balloon Lights
Hydraulic adjustable screeds
Vibrating screeds
Tamping screeds
Electric screed heating

Electrically Heated Screed Has Replaced Diesel Fired Heat
Compactors or Rollers
What Goes Around...

- 3-wheel static rollers and steel-wheel tandems have not disappeared
- Pneumatic-tire rollers use has increased; newer technologies available
“Modern” 3-wheel rollers
Pneumatic rollers
Vibratory Compactors
Vibratory compactors
Rollers sized to panel width

84” x 2 Passes

84” & 79” x 2 Passes

79” x 2 Passes

67” x 3 Passes
Emerging Technologies

- Nutating drums (unique to Sakai)
- Oscillation (unique to Hamm)
- High Frequency – 70 Hertz or higher
- Split-drums and pivot-steering
Nutating or oscillating drums
High frequency 70 Hz
Impact spacing cruise control
Accessories on rollers

- Infrared temperature sensors
- Global Positioning Systems GPS
- Object alert or avoidance
Infrared temperature sensors
GPS and connectivity
Object presence alert
The Future

Save the world! Use technology to reduce environmental impact.
The Future - Mills

- More automation
- Higher precision
- Improved equipment reliability
- Increased levels of technology
Mill and/or recycle
The Future - Pavers

- More automation
- Higher density from screed
- Improved reliability from self-diagnostics
- Operator environment improvements
Inline paving
Thin lift paving
Paver of the 21st century?

http://www.youtube.com/watch?v=8BoAtlIPiAQ
The Future - Rollers

- Pass counting and mapping
- Density measurement real-time - IC
- Feedback systems for density/smoothness
Pass or temperature mapping
Roller technologies IC
Intelligent Compaction
The Future - General

- Certification of equipment operators
- Self-diagnosis of mobile equipment
- Wireless data transfer of machine condition for pre-emptive production equipment repair/replacement to limit down-time
Operator certification
Equipment monitoring

Improved Product/Data
on Contractors Back-Office

Pictures / Video of Jobsite or Traffic-Cams around Jobsite
Alternative: Job-Site Details, Weather forecast, etc.
Alternative: Bills, Accounts, etc..

Position of Machines and Trucks
Alternative: GPS based Fleet Tracking

Actual Status of Supply Chain to and from Jobsite
The Future - General

- Increased use of thermal imaging
- More emphasis on work zone safety (for workers and motorists)
- Better lighting for mobile equipment
- Autonomous paving
### Temperature monitoring

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<th>Mean</th>
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* >275.7°F
* <68.0°F

<table>
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<th>Temperature (°F)</th>
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<tbody>
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Work zone safety awareness
Better Lighting

- Balloon Lights
- Electro-luminescence
- Light Emitting Diodes (LED) and High Intensity Discharge (HID)
Balloon Lights
E-L, HID and LED
Autonomous paving?

AUTONOMOUS  “existing and functioning as an independent process”
Thank you for your attention!

“Road Building”:
The Past, Present and Future