SHRP2 R06(E): Real-Time Smoothness Measurements during Construction

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SHRP2

What have we delivered from this project?

- Validation of innovative tools for evaluating concrete pavement smoothness in real time.
- Tools that can possibly be used for quality control and process improvements.
- Process improvements as a result of timely feedback.
- Improved understanding about what construction artifacts can affect smoothness.

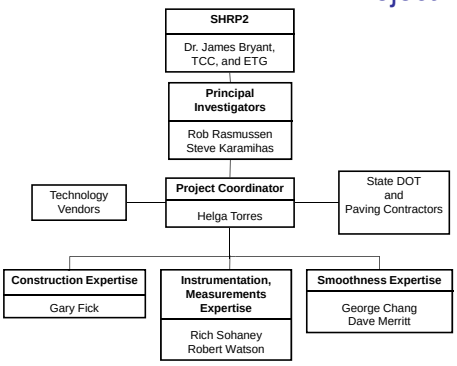
What can't we deliver from this project?

- A replacement for conventional profiling for acceptance.
- A replacement for better practices to construct smoother pavements.

Project Objectives

- Demonstrate and evaluate real-time smoothness measuring technologies for concrete paving.
- Develop draft specifications and construction guidance for use with these technologies.

Project Team



Real-Time Smoothness Technologies

Device 1: GOMACO Smoothness Indicator (GSI)

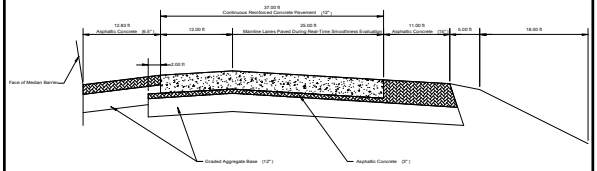
Real-Time Smoothness Technologies

Device 2: Ames Engineering Real Time Profiler (RTP)

Technology Evaluation

- I-75 Widening and Reconstruction
  - Adel, Georgia
  - May 6-12, 2010
  - CRCP

Thanks to GDOT and The Scruggs Company for all of your help!!



Technology Evaluation: Diary

- What happened in front of the spreader?

Technology Evaluation: Diary

- What happened in front of the paver?

Technology Evaluation: Diary

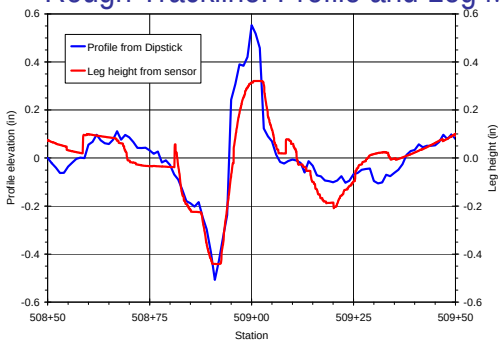
- What happened behind the paver?

Technology Evaluation

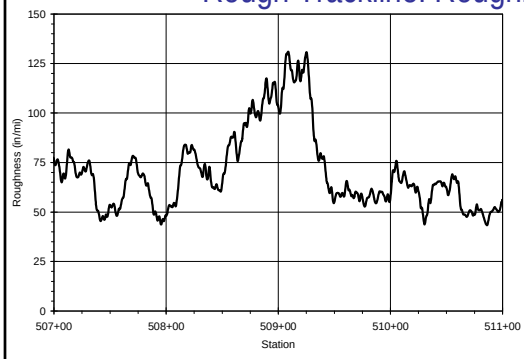
Evaluate Profiler Operation
and
Identify Construction Artifacts

Rough Trackline

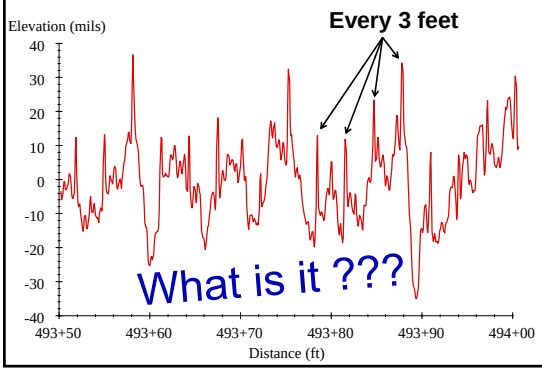
Rough Trackline: Profile and Leg Motion



Rough Trackline: Roughness



Quiz: Profile (Hardened)



Quiz: Profile (Hardened)

Technology Demonstration #1

- Project: Vilonia Bypass (New Alignment)
- Owner: Arkansas State Highway and Transportation Department
- Contractor: Interstate Highway Construction
- Real-Time Smoothness Vendor: GOMACO

- April-May 2011

GOMACO GSI Behind the Paver

DBI / OCB

GOMACO GSI Tractor Mounted

Finishing

Checking

Checking

Not Finishing

Line Sensor Adjustments

Localized Base Failures

Soft Trackline

Stringline Swap

Technology Demonstration #2

- Project: DFW Connector
- Owner: Texas Department of Transportation
- Contractor: Northgate Constructors
- Real-Time Smoothness Vendor: Ames

- June 2011


CRCP

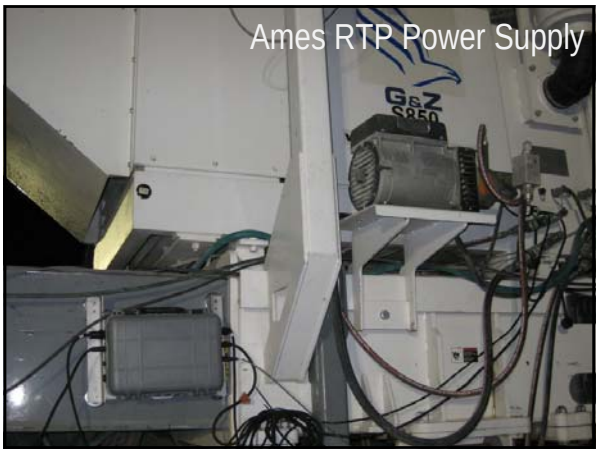

Batch Plant


Paving Train


Stringless Paving Guidance


Paver's Paradise
NORTH
TO
635
121
114
EXIT ONLY
EXIT

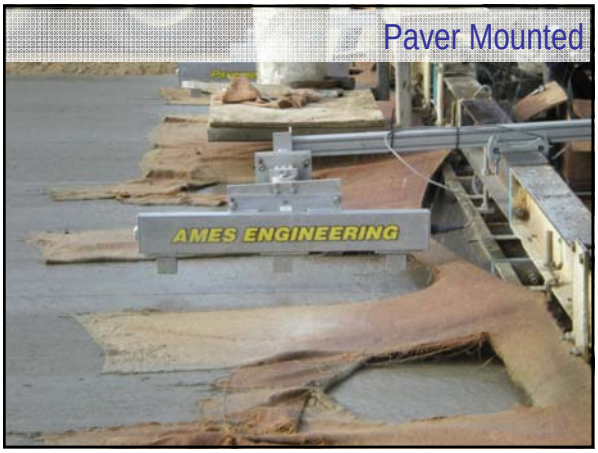

Ames RTP – Paver Mounted



Phase III, Demo #2B & #3

- Project: I-94 Reconstruction
- Owner: Michigan Department of Transportation
- Contractor: Interstate Highway Construction
- Real-Time Smoothness Vendor: GOMACO and Ames

- July 2011



Stringline Sensor Moved off Line

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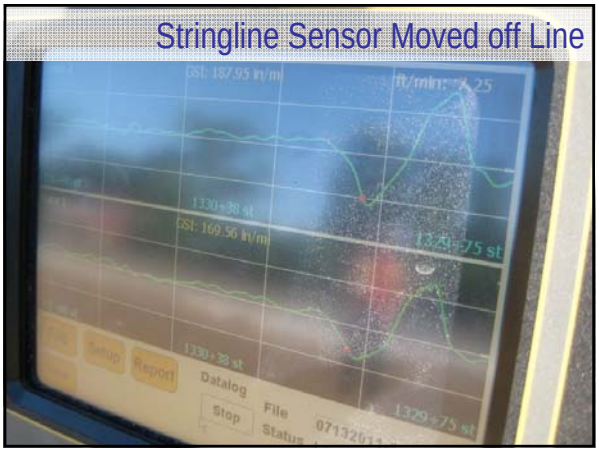
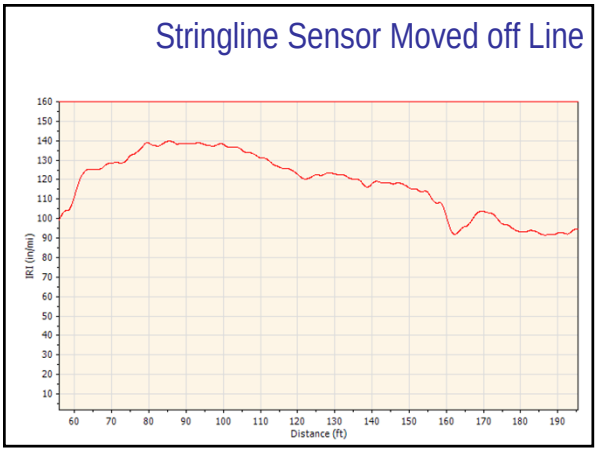


Stringline Sensor Moved off Line



Paver Adjustments

Paver Adjustments

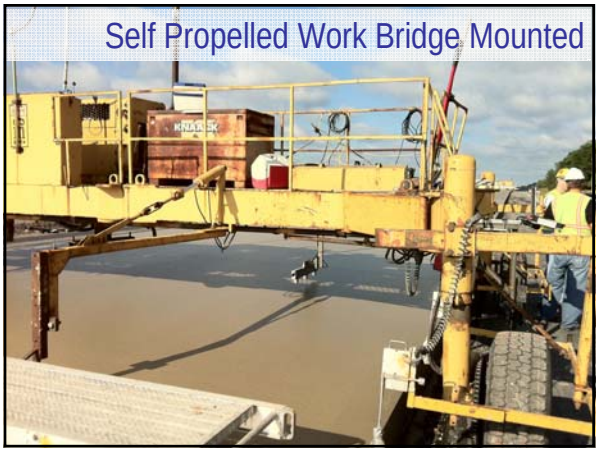
Phase III, Demo #4

- Project: I-90 Reconstruction
- Owner: New York State Thruway Authority
- Contractor: Cold Spring Construction
- Real-Time Smoothness Vendor: Ames

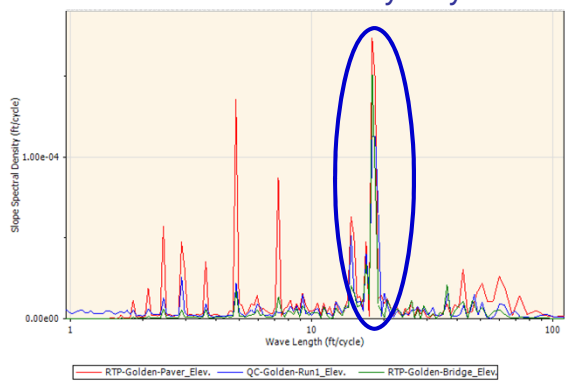
- August 2011

Paver Mounted

Self Propelled Work Bridge Mounted



The Mystery at 18 ft.



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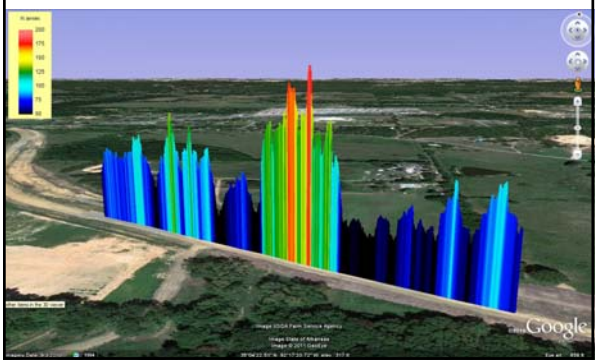
Findings – Visualization



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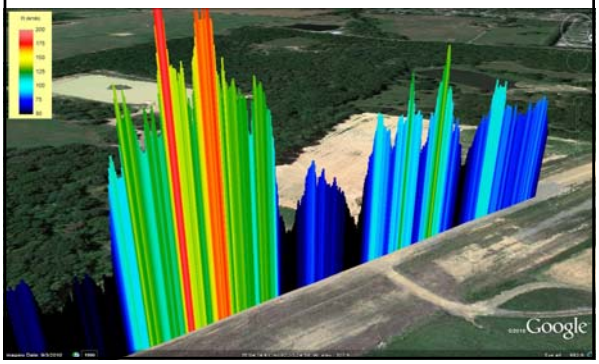

Findings

- Both vendors made some changes, but others are recommended
- Mounting to the paver is not always the best
- Paving crews embraced the technology
- RTS technology is well suited for:
  - Identifying impacts on smoothness
  - Tuning the paver
  - Quality control

Project Deliverables

- Model Specifications
- Guidelines
- Documentation of profiler performance and recommendations

Thank You!

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