U.S. Department of Transportation
Federal Highway Administration

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Implementation Support for Real-time Smoothness Measurements on Portland Cement Concrete Pavements During Construction

As part of the Federal Highway Administration's (FHWA) implementation of SHRP2 products, the National Concrete Pavement Technology Center (CP Tech Center) is leading an effort to further the use of real-time smoothness (RTS) systems on portland cement concrete pavement construction projects. A key aspect of this effort is to demonstrate the benefits of RTS systems through an equipment loan program. Through this program, FHWA-owned RTS systems will be loaned to concrete paving contractors for projects selected by the participating agency in order for the agency and contractor to evaluate the system. The CP Tech Center team will provide technical support for installation and operation of the RTS system, and will document lessons learned from the equipment loan.

A total of eight equipment loans will be facilitated between now and July 2017 with five of the eight equipment loans reserved for the Lead Adopter states identified by FHWA.

Real-Time Smoothness for Concrete Pavement Construction

RTS systems enable real-time monitoring of concrete pavement smoothness during construction by measuring the pavement profile directly behind the paver. During the original SHRP2 R06E research project, there was consensus among contractors that the real-time smoothness measurement technology represents a valuable process control tool in that the ability to have real-time feedback from intentional process changes has the greatest potential to make lasting improvements in the smoothness of concrete pavements.

While the current state of the practice is to cautiously make an equipment/process change and wait approximately 24 hours for feedback when the hardened pavement can be profiled, real-time smoothness measuring devices allow the contractors to make adjustments to their concrete equipment and/or processes while the concrete is still in a plastic state, minimizing more costly corrections later.

Equipment Loan Program

During the equipment loan, a real-time smoothness system will be installed on a contractor's slipform paver or work bridge and technical support will be provided to the contractor and agency on how to best utilize this quality control tool. Contractors and agencies participating in the equipment loan program should expect the following:

- Use of a real-time smoothness system (Gomaco GSI and/or Ames Engineering RTP) for approximately 10 paving days.
- On-site technical support and training from the CP Tech Center team (Gary Fick, Rob Rasmussen, David Merritt, and Tony Babcock) for up to two weeks.
- On-call technical support for the duration of the equipment loan.

- Analysis of data and feedback from the CP Tech Center team regarding pavement profile issues identified by the RTS system.

The equipment loan program is provided by FHWA at no cost to participating agencies and contractors. However, the following items are critical requirements for participation in the equipment loan program:

- Identification of a portland cement concrete pavement construction project with at least 10 consecutive days of slipform paving (more than 10 consecutive days is preferred). Ideally, this would be a project that would allow the contractor to pave for 3 to 5 days before installation of the real-time smoothness system. This provides the CP Tech Center's on-site team with baseline smoothness measurements for identifying potential process control recommendations.
- Coordination of scheduling between the agency, contractor and CP Tech Center.
- Motivated contractor and agency personnel who will actively support use of the real-time smoothness system on their project.
- Contractor support personnel to assist with installation the real-time smoothness system (e.g., someone to start and move the paver as needed for the installation process).Note that installation of the real-time smoothness systems takes approximately 4 hours and can be performed at night or right before paving commences.
- Profiling (preferably with a lightweight inertial profiler) of each day's completed concrete pavement by the contractor or agency. Copies of these profiles shall be provided to the CP Tech Center's on-site team for analysis in order to guide their technical support to the contractor and agency.

Agencies can request to participate in the equipment loan program by contacting any of the following:

Gary Fick
GFick@trinity-cms.com
+1 (405) 823 2313

David Merritt
DMerritt@TheTranstecGroup.com
+1 (512) 451 6233

For information on other SHRP2 products, contact:
Stephen Cooper
Stephen.J.Cooper@dot.gov
+1 (410) 962 0629

National Concrete Pavement Technology Center

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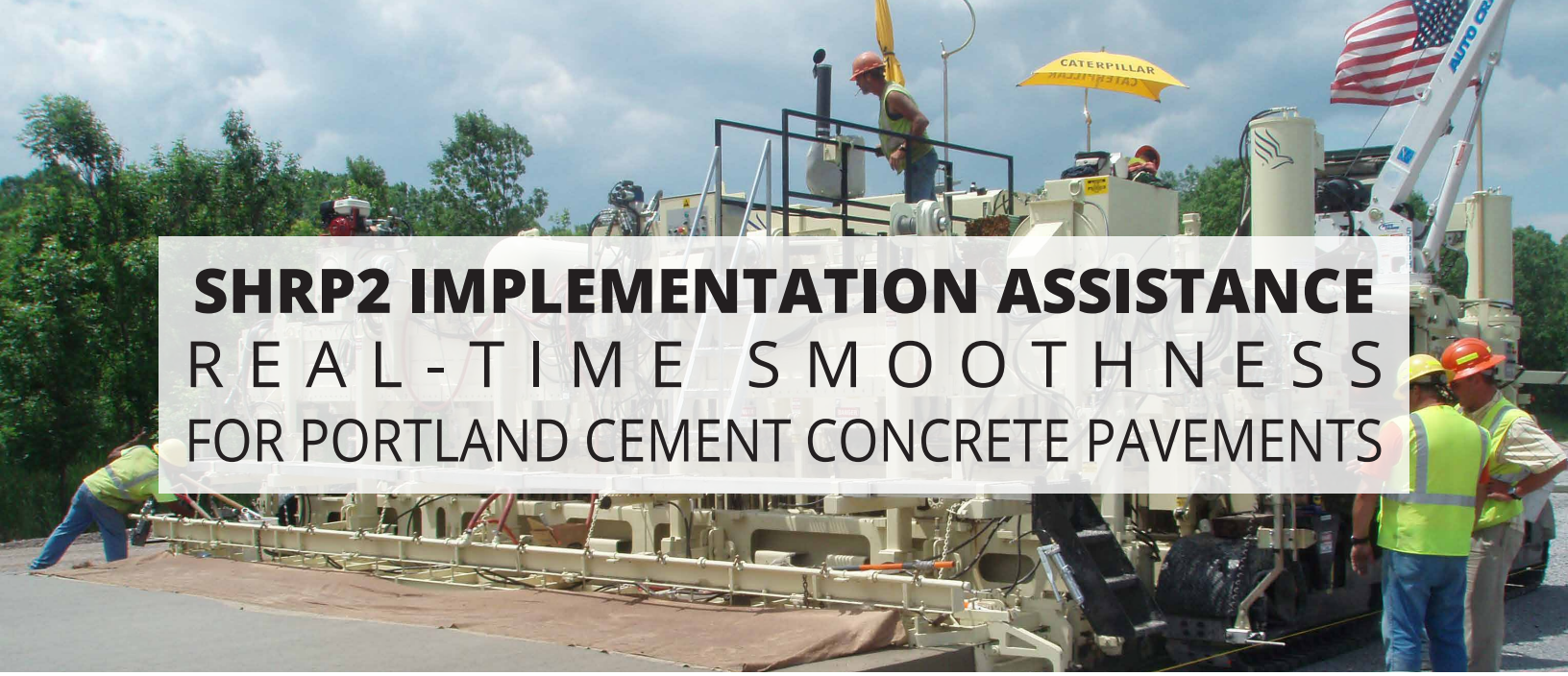

SHRP2 IMPLEMENTATION ASSISTANCE

REAL-TIME SMOOTHNESS FOR PORTLAND CEMENT CONCRETE PAVEMENTS

SHRP2's R06E *Real-Time Smoothness Measurements on Portland Cement Concrete Pavements During Construction* evaluated two commercially available devices that provide real-time feedback during concrete paving. On-site evaluations confirmed that these devices—GOMACO GSI and Ames Engineering RTP—provide reliable measurements and have the potential to improve PCC pavements' initial smoothness when used as a process control tool.

State highway agencies can gain exposure to this technology through SHRP2's Implementation Assistance Program. The National Concrete Pavement Technology Center is leading a team of experts in the next round of assistance, which includes: field demonstrations with training, regional workshops, case studies, and specification refinement activities in an effort to provide agencies and contractors with the tools necessary to evaluate and implement real-time pavement smoothness.

Agencies and contractors can participate in the following Implementation Assistance activities:

EQUIPMENT LOAN PROGRAM

The agency and contractor will have full use of a real-time smoothness system on a concrete paving project for two weeks at no charge. Up to eight agencies can participate.
These systems are mounted on a slipform paver or work bridge spanning the pavement. Mounting is typically a six-hour process with assistance from the contractor. A team of experts will be on site during the program to provide training, feedback, and suggestions for improving the paving process.

LOCAL/REGIONAL WORKSHOPS

Five workshops will be delivered across the U.S. to provide contractors, inspectors, and engineers with practical information aimed at improving concrete pavements' initial smoothness through better construction and inspection practices and the use of real-time smoothness measurements.

PROJECT SHOWCASE

A one-day national showcase will provide attendees with implementation strategies and an opportunity to observe real-time smoothness systems in use on a construction project.

HOW TO PARTICIPATE

Openings are still available for the equipment loan program. Agencies that are interested in participating in any of the implementation assistance activities are encouraged to contact the project team as soon as possible.

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

National Concrete Pavement Technology Center
Tech Center

Inquiries should be directed to:

Gary Fick
GFick@trinity-cms.com
+1 (405) 823 2313

David Merritt
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+1 (512) 451 6233

For information on other SHRP2 products, contact:

Stephen Cooper
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SHRP2 IMPLEMENTATION ASSISTANCE

REAL-TIME SMOOTHNESS

FOR PORTLAND CEMENT CONCRETE PAVEMENTS

WORKSHOP

USING REAL-TIME SMOOTHNESS MEASUREMENTS TO IMPROVE CONCRETE PAVEMENT QUALITY AND SAVE MONEY

WORKSHOP OBJECTIVES

Attendees will be educated on the fundamentals of concrete pavement smoothness measurement and interpretation. Pavement practitioners will discuss the International Roughness Index (IRI) and the importance for ride quality. This workshop will reinforce best practices for concrete paving operations to achieve ride quality requirements, and will demonstrate Real-Time Smoothness technology as a tool for improving concrete pavement smoothness.

WORKSHOP INSTRUCTORS

Gary Fick
Trinity Construction Management Services, Inc.

David Merritt
The Transtec Group, Inc.

Robert Rasmussen
The Transtec Group, Inc.

Helga Torres
The Transtec Group, Inc.

WORKSHOP OVERVIEW

Session 1: Welcome and Overview

Session 2: Fundamentals & Importance of Pavement Smoothness

Session 3: Real-Time Smoothness Measurement Technology and Practices

Session 4: Fundamentals of Ride Quality and Current Practices for Concrete Pavement IRI Specifications

Session 5: Best Practices for Concrete Paving Operations

Session 6: Using RTS Technology to Improve Concrete Pavement Smoothness

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FOR MORE INFORMATION

Please visit the website:
http://www.fhwa.dot.gov/goshrp2/Solutions/Renewal/R06E/Tools_to_Improve_PCC_Pavement_Smoothness_During_Construction

CONTACT

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WORKSHOP

USING REAL-TIME SMOOTHNESS MEASUREMENTS TO IMPROVE CONCRETE PAVEMENT QUALITY AND SAVE MONEY

REAL-TIME SMOOTHNESS TECHNOLOGY SHOWCASE
AUGUST 9, 2016
SALT LAKE CITY, UTAH

Morning Workshop: Little America Hotel
500 South Main Street
Salt Lake City, Utah
Afternoon Showcase: I-15 work site (transportation provided)

INFORMATION and REGISTRATION

Sharon Prochnow
National CP Technology Center
515-294-3781
prochnow@iastate.edu
http://www.cptechcenter.org/RTSshowcase

SHOWCASE OBJECTIVES

This no-cost FHWA sponsored showcase hosted by the Utah DOT will introduce agency and contractor personnel to real-time smoothness (RTS) technology for concrete pavement construction. Attendees will have the opportunity to hear from users of RTS technology and how it can help contractors to achieve pavement smoothness requirements. Attendees will also have the opportunity to observe RTS technology in action with a site visit to paving project utilizing an RTS system.

SHOWCASE OVERVIEW

Morning Program

- Agency and contractor perspectives on transitioning to IRI acceptance criteria
- Use of real-time smoothness equipment to improve initial pavement smoothness
- I-15 project discussion and details from Utah DOT and the contractor
- Real-time smoothness — lessons learned from equipment loans

Noon: Board buses for site visit. Box lunch will be provided.

Afternoon Program

- Site visit at the I-15 site north of Ogden, Utah
- Observe project construction and real-time smoothness equipment
- Return to hotel; arrive no later than 5:00

REGISTRATION

There is no cost for the workshop and showcase, but registration is required. Please register at: http://www.cptechcenter.org/RTSshowcase
Please bring hard hats and safety vests; they are required at the work site.
A block of rooms is available until July 9th at $108 (government rate) or $139/per night.

Little America Hotel
500 South Main Street
800.437.5288
Room block: RTS Showcase.

Travel assistance for State Department of Transportation representatives is available on a limited basis. Contact the National CP Tech Center:

Sharon Prochnow or	Denise Wagner
515-294-3781	515-294-5798
prochnow@iastate.edu	dfwagner@iastate.edu

SHOWCASE SPONSORS

UDOT Keeping Utah Moving
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For more information on Real-Time Smoothness technology, please visit the website:

http://www.fhwa.dot.gov/goshrp2/Solutions/Renewal/R06E/Tools_to_Improve_PCC_Pavement_Smoothness_During_Construction

Project contact for *SHRP2 Renewal R06E Real-time Smoothness Measurements on Portland Cement Concrete Pavements during Construction:*

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REAL-TIME SMOOTHNESS TECHNOLOGY SHOWCASE

AUGUST 9, 2016

SALT LAKE CITY, UTAH