FHWA/TPF
Intelligent Compaction Study

By
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Transportation Pooled Fund #954

“Accelerated implementation of intelligent compaction for embankment subgrade soil, aggregate base, and asphalt pavement material”

3-year IC study for all the above materials

12 participating States

12+ field demonstration
Objectives

- Accelerated development of QC/QA specifications for subgrade soils, aggregate base and asphalt pavement materials
- Develop an experienced and knowledgeable IC expertise base within Pool Fund participating State DOTs
- Identify and prioritize needed improvements to and/or research of IC equipment and field QC/QA testing equipment
Prioritization of IC Improvements

- Simplifying IC usage
- Achieving greater IC value, cost benefit, etc.
- Improved accuracy
Task Working Group (TWG)

- **Pooled Fund State Representatives**
  - Dr. George K. Chang, P.E.
  - Transtec Group, Inc.
  - PI

- **Mr. Victor Gallivan**
  - FHWA
  - COTR

- **IC Roller Vendor Representatives**
  - Mr. Bob Horan
  - Asphalt Institute
  - IC Facilitator

- **Mr. Larry L. Michael**
  - Asphalt Technology Consultants
  - Co-PI

- **Mr. David White**
  - Iowa State University
  - Co-PI

- **Mr. Jason Dick**
  - Transtec Group, Inc.
  - Programmer

- **Dr. Rob O. Rasmussen, P.E.**
  - Transtec Group, Inc.
  - Project Management Support

- **Mr. David Merritt and Mr. Dennis Turner**
  - Transtec Group, Inc.
  - Technical Writers
Application of Material Types

- Type I: Non-cohesive subgrade soil
- Type II: Cohesive subgrade soils
- Type III: Aggregate base material
- Type IV: Asphalt pavement material
- Type V: Stabilized base material
IC Roller Requirements

- Continuous roller-integrated measurement system
- Real-Time Kinematic (RTK) Global Position System (GPS) based mapping
- Real-time onboard display and integrated software reporting system
- (Optional) Feedback control
Participating Soil/SB Rollers

- Ammann/Case
- Caterpillar
- Bomag America
- Dynapac
- Sakai America
Participating Asphalt Rollers

- Ammann/Case
- Bomag America
- Caterpillar
- Dynapac
- Sakai America
In-Situ Testing Methods

Which tests can be used as companion tests to RMV?

Impact Force From Rollers

In-situ spot test measurements

Distance = Roller travel in 0.5 sec.

Area over which the roller MV's are averaged

Influence depths are assumed ~ 1 x B (width)

300 mm LWD/FWD

200 mm LWD

Nuclear Density Gauge

Dynamic Cone Penetrometer

Courtesy of Dr. David White
In-Situ Test Methods for HMA

- NG
- NNG
- LWD-a
- PSPA
In Situ Test Methods for Soils/SB/STB
Key Findings

- Values of mapping existing support before construction or overlay
- Significant improvements of rolling patterns, thus, consistent products
- Improvement of roller operators’ accountability
Key Findings (cont’d)

- Construction process-control greatly improved
- IC-MVs correlate to various in-situ point measurements
- Measurement influence depth varies depending on technology and site conditions
- Machine operation parameters influence MVs
IC Clearing House

www.IntelligentCompaction.com