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
IC Field Demo Schedule

- Mini demo
- 2 demos

States: MN, KS, TX, WI, ND, NY, PA, GA, WI

Years: 2008, 2009, 2010
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)

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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

Bomag America

Caterpillar

Dynapac

Sakai America
Participating Asphalt Rollers

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

Which tests can be used as companion tests to RMV?

- Impact Force From Rollers
- 300 mm LWD/FWD
- 200 mm LWD
- Nuclear Density Gauge
- Dynamic Cone Penetrometer

Influence depths are assumed ~ 1 x B (width)

Distance = Roller travel in 0.5 sec.

Area over which the roller MV’s are averaged

In-situ spot test measurements

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