

**CP Road Map Mix Track Technical Advisory Committee
Electronic/Conference Call Meeting
Feb 13, 2009**

Attended:

Committee:

Todd Hanson, IA DOT
Rod Montney, KS DOT
John Staton, MI DOT
Brett Trautman, MO DOT
Mike Brinkman, NY DOT
Andy Naranjo, TX DOT
Jim Parry, WI DOT

Absent:

Gina Ahlstrom, FHWA

CP Tech Center:

Peter Taylor, CP Tech Center
Dale Harrington, CP Tech Center

The Mix Track Pooled Fund TAC meeting utilized an electronic PowerPoint presentation along with attachments for the meeting. Peter Taylor started the meeting by briefly reviewing pertinent Mix Track research work such as the Indiana's permeability study, Michigan's air void system and South Dakota's joint distress research.

Peter briefly reviewed the Pooled Fund project statement for the Mix Track. The pooled fund tasks are subtracks to the CP Road Map track items. He discussed the tasks and the overall budget. To date seven states have signed up for the pooled fund and the goal is to have eleven states at \$15,000.00 per year for a three year period.

One of the subtracks is testing. Peter stated the need for cost effective, fast and reliable tests that measure the properties we are really interested in, both for incoming materials and for the mixture itself. Some are quality control and some are quality assurance. The committee discussed how the tests tie directly to the need for good specifications to insure that the owner is given the highest probability of getting what they paid for while affording suppliers and contractors a reasonable opportunity to optimize their decisions and minimize their risks. To accomplish this Peter reviewed the following tests and the year it is planned to be accomplished.

1. Tests – to be completed within the next 2 years depending on funding. Emphasis
 - Mix Proportions in fresh concrete Year 1
Portable XRF devices are reportedly available and may prove invaluable to verify the mix delivered to a site contains the correct material in the given proportions used in the verification testing. Literature review will be done first, then field tests to verify the lab results.
 - Set time..... Year 1
Calorimetry and/or acoustic methods – Monitoring the rise in temperature due to hydration of a fresh mixture provides a tool to assess the uniformity between material and concrete batches, as well as indicating setting times useful for saw-cutting operations. An alternative approach that may be more fundamentally sound is to use acoustic methods to determine when the speed of sound in a mixture starts to accelerate, thus indicating that hydration is affecting the microstructure of the system.
 - Rheology test (need 10 states to fund before starting) Year 1
There is a need to develop a simple field test for measuring how much a paving mixture will move when vibrated (viscosity) and whether it will be prone

to edge slump (yield stress). Some work has been conducted in this field in the past with limited success. A pilot investigation into alternative approaches to this issue is needed. It is planned that the results of the test will allow for a more definitive description of the workability of a mixture. ISU is using roller compacted rheology

- Foam Drainage Test Year 2
This test shows promise as a means of assessing the risk of air void loss based on the ingredients in the mix. The correlation between lab data and field performance needs to be established.

Committee Comments:

- Rheology may not work with slip form paving.
- XRF – we need to know if this will allow us to have a pavement pay item not based on strength.
- XRF- There was a concern regarding its ability to detect changes since most of the materials are calcium rich. As an example, changes in gypsum (CaSO4. 2H2O) to hemi hydrate or anhydrite can affect workability and or admixture compatibility, but would not be detectable by XRF. We can get the sulfur, but we can't detect the change in the water.

2. Peter reviewed current tests development that is being covered elsewhere

- Foam index test
- AVA
- Coefficient of Thermal Expansion (CTE)
- Permeability

3. Models (if funding is available) Peter stated that modeling is tied to the need for tests in order to correlate test results with long term performance of concrete systems. At present, we lack the models to be able to predict the potential life of a pavement based on accelerated or early age performance data. Other models needed include development of more robust predictions of fresh concrete properties based on the properties, proportions and interactions of the ingredients. Air tests are essential for assessing the air void system in fresh concrete. Therefore, if AVA does not prove to be useful, considerations should be given to investigate alternate methods of assessing air.

Models – Peter reviewed the following completion times with the committee. After some discussion the committee agreed with Peter's approach.

- Models
 - What air do we really need Year 1-2
 - Mix proportioning Year 1
 - Paste content and shrinkage Year 2
 - Standard data Year 2
- Other models if funding is available:
 - Minimum working temperatures
 - Interaction Hyperdoc
- Specifications
 - Guide specification Year 1-2
 - Check sheets Year 2

Committee Comments:

- The importance of proper air testing cannot be overlooked particularly with the application of deicing chemicals which may require us to increase the air content and measure the spacing factors.
- There is a need to develop a computer based tool that allows us to understand "if we do this what are the consequences?"
- The committee agreed with the above testing, approach and timelines.

4. Communications – Peter reviewed with the committee the importance of proper communication by staying abreast of innovations being developed under the pooled fund. The potential for problems are increasing and staff levels are being reduced. Thus, it is important that we emphasize training of states based off of the information learned from this pooled fund project. The following are the communication timeline approved by the committee.

- Communication Year 2-3
 - Field trials for
 - New tests
 - New models
 - New specifications
 - Training materials as needed

5. Budget – Peter reviewed the following budget with the committee and they approved of his budget proposal.

a. Costs

• Mix Proportions Test	\$50,000
• Set time test	\$45,000
• Rheology test	\$0
• What air do we really need	\$35,000
• Mix proportioning	\$100,000
• Guide specification	\$75,000
• Oversight	<u>\$40,000</u>
Total	\$345,000

b. Income

• From Pooled fund	\$110,000
• From Cooperative agreement	<u>\$235,000</u>
Total	\$345,000

c. Distribution of Funds

• CPTech	\$218,000
• Subcontractors	
– Trinity (Proptns, Guide)	\$67,000
– Fugro (Guide spec)	\$35,000
– OK State (Air system)	<u>\$25,000</u>
Total	\$345,000

Minutes by Dale Harrington