

Meeting Minutes: NRRRA Intelligent Construction Technologies (ICT) Team

(Agency & Associate Member Meeting)

Date: November 5, 2020
 Minutes prepared by: Rebecca Embacher
 Location: Skype

Attendance

Agency Members

Participated	Affiliation	State Contact	e-mail
<input checked="" type="checkbox"/>	California	Deepak Maskey	deepak.maskey@dot.ca.gov
<input type="checkbox"/>	California	Ragu Thangavelautham	raguparan.thangavelautham@dot.ca.gov
<input type="checkbox"/>	Illinois	Brian Hill	Brian.Hill@illinois.gov
<input checked="" type="checkbox"/>	Iowa	Chris Brakke	Chris.Brakke@iowadot.us
<input checked="" type="checkbox"/>	Iowa	Jeff De Vries	JEFF.DEVRIES@iowadot.us
<input type="checkbox"/>	Minnesota	Rebecca Embacher	rebecca.embacher@state.mn.us
<input type="checkbox"/>	Minnesota	Kyle Hoegh	kyle.hoegh@state.mn.us
<input type="checkbox"/>	Missouri	Jen Harper	Jennifer.Harper@modot.mo.gov
<input checked="" type="checkbox"/>	Missouri	Dan Oesch	Daniel.Oesch@modot.mo.gov
<input checked="" type="checkbox"/>	North Dakota	Curt Dunn	cdunn@nd.gov
<input type="checkbox"/>	North Dakota	Amy Beise	abeise@nd.gov

Associate Members

Participated	Affiliation	Contact	e-mail
<input type="checkbox"/>	American Engineering and Testing, Inc.	Derek Tompkins	dtompkins@amengtest.com
<input checked="" type="checkbox"/>	Braun Intertec	Mohammad Sabouri	msabouri@braunintertec.com
<input type="checkbox"/>	Braun Intertec	Heidi Olson	holson@braunintertec.com
<input type="checkbox"/>	California State University, Los Angeles	Mehran Mazari	mmazari2@calstatela.edu
<input checked="" type="checkbox"/>	Caterpillar Global Paving	Brian Nagel	Nagel_Brian_D@cat.com
<input type="checkbox"/>	Caterpillar Global Paving	Todd Mansell	mansell_todd_w@cat.com
<input type="checkbox"/>	Concrete Paving Association	Matt Zeller	mjzeller@cpamn.com
<input type="checkbox"/>	GSSI	Roger Roberts	roger@geophysical.com

<input type="checkbox"/>	GSSI	Rob Sommerfeldt	sommerfeldtr@geophysical.com
<input type="checkbox"/>	Infrasense	Ken Maser	kmaser@infrasense.com
<input type="checkbox"/>	Leica Geosystems	Brad Adams	brad.adams@leicaus.com
<input checked="" type="checkbox"/>	Mathy Construction	Erv Dukatz	ervin.dukatz@mathy.com
<input type="checkbox"/>	Mathy Construction	Matt Oman	matt.oman@mathy.com
<input type="checkbox"/>	Midstate Reclamation & Trucking, Inc.	Dan Schellhammer	dans@midstatecompanies.com
<input type="checkbox"/>	Midstate Reclamation & Trucking, Inc.	John Peterson	johnp@midstatecompanies.com
<input type="checkbox"/>	Minnesota Asphalt Paving Association	Brandon Brever	bbrever@mnapa.org
<input checked="" type="checkbox"/>	Moba	Paul Angerhofer	pangerhofer@moba.de
<input checked="" type="checkbox"/>	Moba	David Shelstad	dshelstad@moba.de
<input checked="" type="checkbox"/>	National Asphalt Pavement Association	Brett Williams	bwilliams@asphalt pavement.org
<input type="checkbox"/>	The Transtec Group, Inc.	George Change	GKChang@TheTranstecGroup.com
<input checked="" type="checkbox"/>	Topcon Positioning Systems, Inc.	Evan Monroe	emonroe@topcon.com
<input checked="" type="checkbox"/>	Topcon Positioning Systems, Inc.	Jim Preston	jpreston@topcon.com
<input checked="" type="checkbox"/>	Trimble	Kevin Garcia	kevin_garcia@trimble.com
<input type="checkbox"/>	Trimble	Devin Laubhan	devin_laubhan@trimble.com
<input checked="" type="checkbox"/>	The University of Texas at El Paso	Nazarian Soheil	nazarian@utep.edu
<input type="checkbox"/>	Wirtgen Group	Tim Kowalski	Tim.Kowalski@wirtgen-group.com
<input type="checkbox"/>	Wirtgen Group	Nars Laikram	Laikram.Narsingh@wirtgen-group.com
<input type="checkbox"/>	WSB & Associates	Mike Rief	mrief@wsbeng.com
<input type="checkbox"/>	WSB & Associates	Andrea Blanchette	ablanchette@wsbeng.com

Friends

Participated	Affiliation	State Contact	e-mail
<input checked="" type="checkbox"/>	FHWA – MN	Kevin Kliethermes	Kevin.Kliethermes@dot.gov
<input checked="" type="checkbox"/>	Minnesota	Curt Turgeon	curt.turgeon@state.mn.us
<input checked="" type="checkbox"/>	Minnesota	Ben Worel	ben.worel@state.mn.us

<input checked="" type="checkbox"/>	Minnesota	Lauren Dao	Lauren.Dao@state.mn.us
<input checked="" type="checkbox"/>	Minnesota	John Siekmeier	john.siekmeier@state.mn.us
<input checked="" type="checkbox"/>	Minnesota	Eyoab Zegeye Teshale	
<input checked="" type="checkbox"/>	Minnesota	Shongtao Dai	shongtao.dai@state.mn.us
<input checked="" type="checkbox"/>	North Dakota	Jordan Nehls	jnehls@nd.gov
<input type="checkbox"/>	North Dakota	Darin Lindblom	dlindblom@nd.gov
<input type="checkbox"/>	North Dakota	Carey Schreiner	
<input type="checkbox"/>	North Dakota	David Bruins	
<input type="checkbox"/>	North Dakota	Nathan Haaland	

Other Attendees: none

Decisions Made

- None at this time.

Action items

- Assist with advertisement of NRRRA Phase II
- Brainstorm research ideas for NRRRA Phase II
- Send any Veta wish list items to Embacher
- Review funded projects for 2020 Call for Innovation to determine if interested in joining as technical advisory panel (TAP) member. Select link on project page, or let Embacher know if interested.

Agenda

- NRRRA Phase II Solicitation update
- NRRRA Phase II Research Ideas
- 2020 Call for Innovation | Funded Projects
- TPF-5 (334) | Veta Enhancements
- E-Ticketing
- AASHTO Provisional Updates

- ISIC – NA Chapter Update
- TPF-5 (443) Continuous Asphalt Mixture Compaction Assessment using Density Profiling System (aka Dielectric Profile Method)

Next Meeting

Date: December 3, 2020

Time: 10:30-11:30AM Central Time

Location: Skype and Conference Call for Audio

Agenda items: Finish agenda items from last meeting: TPF-5 (334) Veta Enhancements, E-Ticketing, AASHTO Provisional Updates, ISIC – NA Chapter Update, TPF-5 (443) Dielectric Profile Method

Meeting Notes

Phase II – Membership (Worel)

- Push to join
- Work with each of your states on joining in on the pooled fund website if you have not done so.
- Reach out to other States / Industry to join / questions give us a call

Solicitation:

<https://www.pooledfund.org/Details/Solicitation/1531>

5 States that have Committed Funding

- Minnesota
- Mississippi
- Missouri
- North Dakota
- Wisconsin

Commitment Details:

- Joining Entire NRRRA Initiative
 - State SPR larger than MN (\$150K/yr)

- State SPR smaller than MN (\$75K/yr)
- Includes participating in Veta Enhancements (\$25K/yr goes to Veta)
- Only Joining Veta (continuation of TPF-5 (334))
 - Commit money to participate in Veta only (\$25,000)
 - Participate on ICT team
 - Not on Executive Committee
- Associate Members (\$2K/yr)

Phase II Research Ideas (Worel / Embacher)

- Brainstorm research ideas
- Research call in February
- Veta Enhancements – send “wish” list items to Embacher

- Possible Topic Areas:

Proposed By	Description	ICT Team Comments
Erv Dukatz	Enhance data cellular communication for transfer of ICT data (e.g., IC, E-Ticketing, etc.) from equipment to remote storage	No action needed. Worldwide changes coming in 2021/2022 which will allow for pushing of data using base stations. Base stations will be used to create networks for data connectivity, in lieu of conventional data cellular data plans that have areas of limited to no cellular signal.
Soheil Nazarian	Cost Benefit Analyses of ICT (review project with and without technology with respect to performance)	More discussions would be needed. Extremely Complex to do correctly. Historically, this has been of interest to state agencies to assist with justifying the deployment of ICT with upper management, contractors, etc. Initiatives originally were going to be completed by the FHWA, but were unable to be done. Some studies have been done, but did not have an adequate amount of information (adequate matrices) to allow use as a reference by agencies. Currently, agencies are using improvements of

Proposed By	Description	ICT Team Comments
		<p>workmanship techniques and densities as a means to justify use of ICT.</p> <p>Spoke of complexities: effects of geotextiles, automatous construction equipment (operator based compaction vs. automatous compaction), large amount of variables (even though ICT technology on project – are operators using the information real-time, impact energy of rollers, rolling train, order of rollers, ambient weather conditions, paver setup, mix designs, heat loss curve, haul distances, equipment used [paver type, auger systems, material transfer devices – end dumps – pick-up machines, pickup machines with re-mixers), subbase and base conditions, time of year, water table levels, culvert replacements, other design elements, overlay vs. reconstruction, reclamation vs. OL vs. reconstruct, pavement structure thicknesses, and things just happen....</p> <p>Complexities of doing it correctly would require creation of a setup similar to the long-term pavement performance (LTPP) project which would cost millions. Curt Dunn provided example of “things happening” in the field.</p>
Dan Oesch	Quality Assurance (QA) of ICT Technologies	<p>Determine how to best complete QA on contractor supplied data from ICT. Compiling all of the data together needs to be simple and quick. Decisions for payment need to be also considered along with dispute resolution processes.</p> <p>Need to address requirements of Code of Federal Regulations (CFR) 637.</p>
Curt Dunn	Real-time use of ICT to address Workmanship Issues	<p>Address the need of real-time use of ICT measurements to fix construction activities (e.g., paver setups, flow rates, compaction efforts, etc.).</p> <p>Discussed this during past meetings. Industry was going to compile information for PMTP method with respect to workmanship (e.g., paver setups with respect to given segregation patterns, etc.).</p> <p>Not sure if able to do so (status).</p>
Curt Dunn	Real-time estimates of temperatures mid-depth in the mat	<p>Allow roller compactors to see this information as estimated from PMTP and ambient site conditions.</p> <p>Veta – provide mid-depth data (enhancements would be needed – import of ambient site conditions, generation of heat loss curve using E-Ticketing information, PMTP and IC data).</p>

(Dunn) Example of field conditions

40°F, 30 mph winds from north, extended paver stop. For information purposes only, took core 10-ft back from trailing edge of paver screed and beneath paver screed at location of paver stop. Surface temperatures were less than 200°F when started paving again. Core density was 88.7% at the location 10-ft behind the paver screed and 90.7% at the paver stop (location of screed). Screed heater was most likely on during paver stop. Recommends that PMTP system data accessible to compactors (IC systems).



2020 Call for Innovation

NRRA Team	Proposal	Groups	Lead	Total Dollars	NRRA Dollars	Team Match	Match
Rigid	Pavement-Specific Structural Synthetic Fibers	UMD FORTA Vigilant	Manik Marman Bill Coursen Cliff MacDonald	\$146,972	\$99,972	\$47,000	47%
Rigid	Enhanced Entrained Air Void System Characterization for Durable Highway Concrete	TSU	Anthony Torres	\$120,000	\$100,000	\$20,000	20%
Flexible	Understanding and Improving Pavement Milling Operations	UNH UNH WPI	Eshan V Dave Jo E. Sias Rajib Mallick	\$126,746	\$100,000	\$26,746	27%
Flexible	Novel Methods for Adding Rejuvenators in Asphalt Mixtures with High Recycled Binder Ratios	NCAT NCAT Blacklidge	Fan Yin Raquel Moraes Blacklidge	\$100,000	\$80,000	\$20,000	25%
Flexible	Impact of Polymer Modification on IDEAL-CT and I-FIT for Balanced Mix Design	NCAT NCAT NCAT MTE	Fan Yin Fan Gu Raquel Moraes Andrew Hanz	\$120,000	\$100,000	\$20,000	20%
ICT	Asphalt Real Time Smoothness (ARTS) for Asphalt Paving	Transtec	George Chang	\$123,978	\$98,978	\$25,000	25%
Geotech	Continuous Moisture Measurement during Pavement Foundation Construction	UTEP Consultant	Soheil Nazarian Mark Baker	\$214,562	\$100,000	\$114,562	115%

Asphalt Real Time Smoothness (ARTS) for Asphalt Paving (George Chang, Transtec)

<http://www.dot.state.mn.us/mnroad/nrra/structure-teams/intelligent-construction/asphalt-real-time-smoothness.html>

Chang summarized project. Measures smoothness during paving process to assist with real-time tweaking and improving smoothness. Partnering with Mathy Construction, Ames Engineering and Caterpillar to tie parameters together for smoothness. Plan to test on IC and PMTP project to provide rich analyses.

Continuous Moisture Measurement during Pavement Foundation Construction (Soheil Nazarian [UTEP], Mark Baker [Consultant])

<http://www.dot.state.mn.us/mnroad/nrra/structure-teams/geotechnical/continuous-moisture-measurement.html>

Nazarian summarized project. A lot of work to measure, correlate and show impact of moisture. Bets to measure moisture immediately after placement of material and before compaction to help improve uniformity of moisture. Working on 5-6 technologies (proprietary). Combination of resistivity and conductivity. Potential to real-time capture 100% coverage moisture measurement. Prototype being put together. Will evaluate on different types of materials. Would like equipment vendors also on TAP.

Dai stated that they are also looking for a continuous moisture measurement device for the dielectric profile method. Soheil clarified that with foundation construction a surface moisture measurement cannot be used. Some depth of penetration is required. Consequently, light technologies are not able to be used for foundation type applications.

Understanding and Improving Pavement Milling Operations (Eshan Dave [UNH], Raquel Moraes [NCAT], Blackidge)

<http://www.dot.state.mn.us/mnroad/nrra/structure-teams/flexible/milling-operations.html>

Worel summarized project. Objective of project is to quantitatively determine changes to physical and mechanical properties of asphalt pavement from milling operations, identify factors that have the most significant impacts on milling induced changes to the existing pavement, and develop best practices guidance for use in milling, design and construction specifications.

Action Items:

- Select link on project page if interested in joining TAP, or contact Embacher
- Contracts to be executed before February 2021 (to use Phase I funds)
- Project leads – provide updates and needs to team