TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT
for
National Road Research Alliance (NRRA)

Lead Agency: Minnesota Department of Transportation

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # TPF-5(341) *http://www.pooledfund.org/Details/Study/590*	**Report Period:** Quarter 2 (April 1 – June 30, 2020)	
Project Title: National Road Research Alliance – NRRA http://www.dot.state.mn.us/mnroad/nrra/index.html		
Project Manager(s): Glenn Engstrom (MnDOT) Robert Orthmeyer (FHWA)	**Phone Number:** (651) 366-5531 (708) 283-3533	**E-Mail** glenn.engstrom@state.mn.us Robert.orthmeyer@dot.gov
Lead Agency Project ID: None	**Other Project ID (i.e., contract #):** None	**Project Start Date:** February 22, 2016
Original Project End Date: September 30, 2018 (29 months)	**Current Project End Date:** February 22, 2021 (60 months)	**Number of Extensions:** 1 (Approved - Dec 2017 by NRRA Executive Committee)

Project schedule status → On schedule

Overall Project Statistics:

Total Project Budget	Total Costs obligated to Date for Project	Percentage of Tim and Funding Completed to Date
$4,400,000 (State SPR Funds obligated) Includes 150K - WI partnership funding along with 150K Illinois Tollway Funding Working with States on possible 300K of additional funding for this phase-I MnDOT also has a separate MnDOT partnership fund for groups joining in as associate members – not shown in the total pooled fund dollars above.	SPR Funding Budgeted to date $4,243,604 (96%) Funds Remaining $156,396 Funding paid out to support NRRA efforts $ 2,001,473 (47% of the budget SPR $)	Time = 88% (53/60 months)

Project Description:
This pooled fund is open for new states and they can join at any time. This pooled fund will help direct and compliment the use of the MnROAD test track for local, regional and national research, tech transfer and implementation needs. Road owner agencies will provide input and participate in the decision making needed for future MnROAD construction and research scheduled in 2017. MnDOT and Missouri have funded construction in both states. MnDOT funded 2017 construction of test sections at MnROAD to support common goals. Industry and academia will also play an important role to provide critical input on long-term future trends in research and barriers to implementation, including working with their customers and members who play a direct role in implementation.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):
To date ten (10) government agencies and over fifty-five (55+) industry, associations, consultants, and academic institutions have become NRRA members to share their expertise and are learning about new tools and methods to improve and expand upon transportation systems nationally.

- NRRA short and long term research projects are all under contract and work is progressing from 2017 and 2019 along with 5 projects being completed after a call for innovation in 2019, and a 2020 call for innovation went out to the associate membership for future funding in the next quarter of this year.
- All the Long and Short term research projects all have separate online project pages under the teams that are supporting these efforts.
- NRRA members/Teams have met every monthly again this quarter which also acts as TAP meetings for each teams short and long term research efforts.
- Executive Committee meetings (See team page)
    - Illinois Tollway joined (10 government agencies)
    - Call for Innovation projects selected from 2020 waiting on this quarterly report to know how many can be funded along with some remaining funding from states. Got 20 proposals and accepted 6 for possible funding in quarter 3.
    - Teams Updates / new project ideas
    - Call for Construction sent out and ideas are being submitted.
- Monthly Research pays off webinars have been completed
- NRRA Workshop Seminars mostly have been done but a few more will be done in quarter 3.
- 2019 New Projects Ideas developed by the teams using 4-5 dollars
    - 12 new long term research efforts
    - 4 new tech transfer topics
- Budget sheet is attached at the end of this report.
- See the NRRA website for details on all the teams' activities.

Anticipated work next quarter:
The following is expected to be completed for next quarter.

- Continue to update MnROAD database with data from summer 2020 including performance & material testing data along with supplying the data to the researchers on contract with NRRA.
- See listing of contracts in attachment C – working to contract the 2020 call for innovation projects this quarter.
- 2017 - 8 Long Term Research Contracts efforts will continue with the technical advisory panels (TAP) leading the technical direction – team pages will be updated to show the progress.
- 2017 - 6 Technical teams will meet once every month that will also include TAP meetings for each short and long term project expected. New team added and being developed.
- 2019 New Projects Ideas to be developed into contracts and are being worked on
    - 12 new long term research efforts (12 contracts)
    - 4 new tech transfer topics (one contract)
- NRRA Research Pays-Off and Newsletters will be done each 3rd week of each month.
- May NRRA Workshop is being worked on by the pooled fund team and will be ready by TRB – expect this to have to be held online but may have to just focus on geotechnical topics because of the committee.
- TRB session and booth have been planned again for January 2021 but it is unsure if NRRA would benefit or not.
- MnROAD will be reconstructing cells 139,705,805 because the sections have achieved their purpose.
- NRRA members are planning for the second phase of NRRA and what the specific focus area are.

Significant Results:
Currently this pooled fund is working well for all the members. We have shared resources and technology with each other related to intelligent construction and have discuss a number to topics in the technical teams. More formal documentation will start to be developed at the contracts are awarded and this work begins.

NRRA is now up to 10 government members and at 55+ associate members. NRRA Agencies and Associates members make up the now 6 teams that play an important technical role in setting both the technology transfer and long term research needs. Each team has been active this summer meeting every two weeks to develop and prioritize ideas that fall into each of these categories above to meet both local, state, regional and national research needs. The teams report directly to the NRRA executive committee.

The initial push by each of the NRRA technical teams is to develop long term research needs and the MnROAD test sections that will be used to support these initiatives. MnDOT is providing $3.1 million of construction funding to support NRRA long term research needs to be built at MnROAD in the summer of 2017. Each team is working to get the final designs and special provisions to MnDOT so the plans can be developed and a formal construction project can be let in March 2017. Long term research includes researching HMA overlays of PCC, enhancing HMA compaction, fiber reinforced concrete, effects of diamond grinding on questionable aggregates, PCC early opening to strength, optimizing PCC cement content, compacted concrete pavements for city streets, cold central plant recycling, recycled aggregate bases, large stone subbases, maintaining HMA and PCC roadways, and PCC partial depth repair. Each topic/test section will provide a resource for future research contracts that are under development by teach team.

Other important team activities include the formation of technology transfer topics. The NRRA technology transfer team has been approved by the executive committee to fund 2 technology transfer topics from each of the four technical teams. Each topics goal is to pull together the existing state and national state of practice so that a common practice or specification can be developed by the members. Prioritized topics include longitudinal joint construction performance, tack coats, design and performance of concrete unbonded overlays, repair of concrete joint related distress, large unbound subbase materials, subgrade design, surface characteristics of diamond ground PCC, and pavement preservation approaches to lightly surfaced roadways. Currently the teams are updating the problem statements so that a MnDOT hired contractor can be hired to complete the work.

More information on these efforts including the long term research and technology transfer topics can be found under each of the team member's webpage. Summary of the projects are also attached in attachment C at the end of this report.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems)

None

Potential Implementation:
See the NRRA team pages for implementation topics that are being developed – TAP members of each of the contracts and teams will be asked to help the development of implementation for the technology transfer team to push with its members. This is a focus area that is probably the hardest part of successful research. The technology transfer team will be focused on this topic in the upcoming months.

Attachment A - NRRA Budget Summary (August 8 2020)

TPF- 5 (341) National Road Research Alliance - NRRA Pooled fund

Current		2016	2017	2018	2019	2020	Total
CA	Obligation	-	150,000	50,000	150,000	150,000	500,000
	Payment	-	150,000	50,000	150,000	150,000	500,000
IA	Obligation					150,000	150,000
	Payment					150,000	150,000
IL	Obligation	150,000	150,000	150,000	150,000	150,000	750,000
	Payment	150,000	150,000	150,000	150,000	150,000	750,000
MI	Obligation	150,000	150,000	150,000	-	-	450,000
	Payment	150,000	150,000	150,000	-	-	450,000
MN	Obligation	150,000	150,000	150,000	150,000	150,000	750,000
	Payment	150,000	150,000	150,000	150,000	150,000	750,000
MO	Obligation	150,000	150,000	150,000	150,000	150,000	750,000
	Payment	150,000	150,000	150,000	150,000	150,000	750,000
ND	Obligation	-	-	-	75,000	75,000	150,000
	Payment	-	-	-	75,000	75,000	150,000
WI	Obligation	150,000	150,000	150,000	150,000	150,000	750,000
	Payment	150,000	150,000	150,000	150,000	150,000	750,000
Illinois	Obligation					150,000	150,000
Tollway	Payment					150,000	150,000
Totals	Obligation	750,000	900,000	800,000	825,000	1,125,000	4,400,000
	Payment	750,000	900,000	800,000	825,000	1,125,000	4,400,000

Attachment B - NRRA Budget Summary (August 5, 2020)

This spreadsheet is approximate summary of income and spending – MnDOT finance has the official dollars.

				For 2020 - quarter 2 report			updated 8/5/2020
Description	Total Funding (A)	Approved Contract Funding (B)	Percent Contracted (B/A)	Avalible for new projects (A-B)	Paid Invoices (D)	Percent Invoiced (D/B)	Comment
SPR - Pooled Funds (9 agencies) - Pooled Fund + Future	$ 4,250,000	$ 4,093,604			$ 1,982,307	48.4%	
Wisconsin Partnership (State Funding used instead of SPR)	$ 150,000	$ 150,000			$ 19,166	13%	PCC Early Opening - Pitt
SPR Totals=	**$ 4,400,000**	**$ 4,243,604**	96%	$ 156,396	$ 2,001,473	47%	Totals do not include 300K income from MI and reflects savings from 81K Travel, 40K communications, 75K HMA performance testing, 49K poor pavements contract
		* NRRA Associate funding not included in this budget					
Construction Partnership Donations (not income for NRRA)	$ 3,298,621						MnDOT and MODOT Construction funding used not NRRA

	Senario	Funding	Projects NRRA can Fund
Related to 2020 Call for Innovation	**No additional Income**	$ 156,396	1.5
	Michigan pays year 4 and 5	$ 456,396	4.5
	MnDOT Labor and Associate Funds Used - Discuss with MnDOT	$ 600,000	6.0

Project Charge	General Outcome / Deliverable	Vendors	Funding Budget	SPR Pooled Funding			Partnerships		Agency Self Funds	
				Budget	Spent	Spent %	Budget	Spent	Spent	Who
TPF15341A	MNDOT Labor - (Website, Monthly Newsletter, Written Documents/Marketing)	MnDOT	125,000	125,000	125,000	100%				
	Costs will be accounted in TPF15341D - not in summary at the bottom of sheet		MnDOT TPF15341D will cover (Adjust)							
TPF15341	Agency travel / meals / meeting room costs (assume no more travel in 2020)	MNDOT PO	33,108	33,108	33,108	100%				
	Communication (Written, Newsletter, video, Website) - MnDOT will not charge	TBD	-	-	0					
TPF15341	Tack Coats	2016 State of Practice (SRF)	95,626	95,626	87,617	92%	These are the top two topics from each team established in 2016			
	Longitudinal Joint Construction Performance									
	Design and Performance of Concrete Unbonded Overlays									
	Repair of Joint Associated Distress Pavements									
	Larger Subbase Materials - Done by Iowa State									
	Subgrade Design for New and Reconstructed									
	Surface Characteristics of Diamond Ground PCC Surfaces									
	Pavement preservation approaches for lightly surfaced roadways									
	Partial Depth Repairs of Concrete									
	E-Ticketing									
TPF15341B	Tech transfer write-ups (MnDOT Labor) - Topics Below	MnDOT	18,036	18,036	18,036.13	100%				
TPF15341	HMA – Asphalt Mixture Rejuvenator Synthesis	2019 State of Practice (WSB)	92,302	92,302	91,250	99%	These are the top two topics from each team established in 2019			
	PM - NRRA Spray on Rejuvenator Synthesis									
	PM - Concrete Pavement Restoration (CPR) for Bonded Concrete Overlays of Asphalt (BCOA)									
	PM - Service Life Enhancement of Substrates Overlaid with Thin Overlays (UTWBC, Chip Seals & Microsurfacing) for each state									
TPF15341	2017 MnROAD Constrruction Sensor Purchases	MnDOT PO	184,672	159,130	184,672	100%				
	2018 CCP Missouri Sensor Purchases - broken off the 60K avalible			25,542						
TPF15341C	Inspection (MnDOT) - MnDOT approved operating funds for any additonal costs over the initial budget - MnDOT fund from Dec 17 budget report	MnDOT	50,400	50,400	50,400	100%				
	Costs will be accounted in TPF15341D - not in summary at the bottom of sheet		MnDOT TPF15341D will cover (Adjust)							
TPF15341D	MnROAD Staff - Construction, Sensors and Performance Monitoring	MnDOT	825,318	279,318	640,973	85%			40,940	MnDOT
	MnDOT approved operating funds for any additonal costs - 120K approved by EC - MnDOT fund from Dec 17 budget report									
	Approved $120K extra funding for monitoring 2018			120,000						
	Approved $200K extra funding for monitoring 2019			200,000						
	Approved $200K extra funding for monitoring 2020			200,000						
	Missouri Sensor Labor Costs for 2018 installs - CCP - broken off the 60K avalible			26,000						
	Accounting line item - cover overcharges to A and C (shows as double because of neg ballances above) - MnDOT funding for operations of NRRA			Adjust Cost	63,512					
TPF15341	PCC Sampling/Testing	AET Consultant	61,514	20,000	61,514	100%				
	Additional Funding Approved (low initial estimate)			41,514						
	HMA Performance Testing (75K original Estimate - will not use in Phase-I)	TBD	-	-	0	0%				
	Partial Depth Repairs Construction (not in construction contract)	Diamond Surfacing	78,662	40,000	78,662	100%				
	Additional Funding Approved			38,662						
	Compacted Concrete Pavement Construction (not in construction) - $50K original	Missouri DOT								
	Missouri CCP Construction, Testing, Monitoring Contract (Missouri Hired)	Hired University	125,000			NA			125,000	MoDOT
	Diamond Grinding Construction (not in construction contract) - $50K	**Not Done**								
TPF15341	HMA Overlay and Rehab of Concrete and Methods of Enhancing Compaction	UNH	169,970	169,970	82,592	49%				
	Cold Central Plant Recycling	AET Consultant	99,997	99,997	49,015	49%				
	Fiber Reinforced Concrete Pavements	UMD	149,999	149,999	44,048	29%				
	Long Term Effects of Diamond Grinding - $75k	**Not Done**								
	Conctete Early Opening Strength to Traffic	UofPitt	149,999			NA	149,999	19,166		
	Optimizing the Concrete Mix Components for Contractors	Iowa State	147,627	147,627	65,063	44%				
	Compacted Concrete Pavements for Local Streets - $80K - Did do in Missouri	**Not Done**								
	Recycled Aggregates in Aggregate Base and Larger Subbase Materials	Iowa State	225,000	225,000	77,233	34%				
	Maintaining Poor Pavements	SRF	28,725	28,725	28,725	100%				
	Partial Depth Repair	Braun Inertec	72,295	72,295	30,826	43%				
TPF15341	HMA – Asphalt Mix Rejuvenator Test Sections (added 50K in April 2020)	University of New Hampshire	150,000	150,000		0%				
	PM - Spray on Rejuvenator Test Sections (added 50K in Aprl 2020)	RFP coming out	150,000	150,000		0%				
	ICT - Levels 3-4 Intelligent Compaction Measurement Values (ICMV) for Soils Subgrade/Aggregate Subbase Compaction	Transtec Group	162,024	162,024		0%				
	ICT - Support Importing, Viewing and Analysis of Dielectric Constant Data in Veta	Transtec Group	45,000	45,000		0%				
	ICT - HD and VHD Seismic Approaches for Roadway Evaluation	Park Consulting	299,886	299,886	93,087	31%				
	Geo - Mechanistic Load Restriction Decision Platform for Pavement Systems Prone to Moisture Variations	University of New Hampshire	90,231	90,231	31,057	34%				
	Geo - Environmental Impacts on the Performance of Pavement Foundation Layers	Michigan State	35,000	35,000	3,000	9%				
	Geo - Permeability of Base Aggregate and Sand		30,000	30,000		0%				
	Geo - Improve material inputs into mechanistic design properties for reclaimed HMA Roadways		30,000	30,000	3,000	10%				
	PCC - Construction Report for Jointless FRC Roundabout in Minnesota	Iowa State	49,999	49,999	30,076	60%				
	PCC - Incorporate Joint Faulting Model Into BCOA-ME	Contracting Uof Pittsburg	25,000	25,000		0%				
	PCC - Engineered Dowel and Tie Bars combined with LTPP SPS-2 Determination of Causes for Cracking Over Dowel Bars	ERES Consulting	101,083	101,083	9,839	10%				
TPF15341	Blending of Higher Strength Aggregates with Recycled Concrete and Marginal Aggregates to Improve Concrete Properties	Contracting - UofSt Thomas	32,332	32,332		0%				
	Performance of Concrete Overlays over Full Depth Reclamation (FDR)	Contracting - ARM	34,265	34,265		0%				
	Bio-material Maintenance Treatments	Contracting - Iowa State	50,000	50,000		0%				
	Innovative Practical Approach To Assessing Bitumen Compatibility As A Means Of Material Specification	Contracting - Cargill	204,119	204,119		0%				
	Cold Asphalt Recycling Technologies using Rejuvenating Asphalt Emulsion: Impact; Implementation; Specification	Contracting - UNH	141,442	141,442		0%				
	Support Contract for T1.3.1 (SRF) Repair of Joint Associated Distress Pavements	Contracting - Iowa State	5,000	4,972		0%				
	Call for Innovation - Project 1 - $100K	Summer 2020	-	-						
	Call for Innovation - Project 2 - $100K	Summer 2020	-	-						
	Call for Innovation - Project 3 - $100K	Summer 2020	-	-						
	Call for Innovation - Project 4 - $100K	Summer 2020	-	-						
MnDOT	2017 MnDOT Funding of **~36 - 500' equivalent test cells**	C.S. McCrossan	3,132,681						3,132,681	MnDOT
MODOT	2018 Missouri CCP Construction Costs	Missour Best	150,000						150,000	MoDOT
		Totals =	**7,651,312**	**4,093,604**	**1,982,307**	**48.4%**	**149,999**	**19,166**	**3,298,621**	
				(B)	(D)	(D)/(B)	Research Partnerships		Agency Partnerships	

Attachment C – NRRA Project Listing

Team	NRRA Project (Title might be abrevated)	Contractor	Status	2017	2018	2019	2020	2021	2022
Flex	Developing Best Practices for Rehabilitation of Concrete with Hot Mix Asphalt (HMA) Overlays	University of NH	60%		2017 Research				
Flex	Cold Central Plant Recycling (CCPR)	AET Consulting	80%	2017 Research					
Flex	Longitudinal Joint Construction Performance	MnDOT	100%	Synthesis					
Flex	Tack Coats	MnDOT	100%	Synthesis					
Flex	Mix Rejuvenator Synthesis (Phase I)	WSB Consulting	100%			Synthesis			
Flex	Cold Asphalt Recycling Technologies using Rejuvenating Asphalt Emulsion	Cargill	0%				2019 Call for Innovation		
Flex	Innovative Practical Approach to Assessing Bitumen Compatibility as a Means of Material Specification	University of NH	0%				2019 Call for Innovation		
Flex	Mix Rejuvenator Test Sections (Phase II)	University of NH	4%				2019 Call for Innovation		
GeoTech	Improve Material Inputs into ME Design Properties for Reclaimed HMA & Concrete Aggregates	Michigan State	35%			2019 Research			
GeoTech	Environmental Impacts on the Performance of Pavement Foundation Layers - Phase I	Michigan State	40%			2019 Research			
GeoTech	Subgrade Design for New and Reconstructed	SRF Consulting	Phase-II	Synathesis					
GeoTech	Permeability of Base Aggregate and Sand	University of WI	40%			2019 Research			
GeoTech	Mechanistic Load Restriction Decision Platform for Pavement Systems Prone to Moisture Variations	University of NH	60%			2019 Research			
GeoTech	Determining Pavement Design Criteria for Recycled Aggregate Base and Large Stone Subbase	Michigan State	90%	2017 Research					
GeoTech	Large-Aggregate Granular Materials (3-6+ inch) Used as Bases or Sub-bases	Michigan State	100%	Synthesis					
ICT	Support Importing, Viewing and Analysis of Dielectric Constant Data in Veta	Transtec Group	1%			2019 Research			
ICT	Seismic Approach to Quality Management of HMA	Park Seismic, LLC	6%				2019 Research		
ICT	Evaluation of Levels 3-4 Intelligent Compaction Measurement Values (ICMV)	Transtec Group	10%			2019 Research			
ICT	Validation of Electronic Truck Delivery Ticketing of HMA Material	SRF Consulting	100%	Synathesis					
PM	Pavement preservation approaches for lightly surfaced roadways	SRF Consulting	100%	Synathesis					
PM	Effective Long Lasting Partial Depth Joint Repairs for Challenging Conditions	Braun Intertec	80%		2017 Research				
PM	Service Life Enhancement of Substrates Overlaid with Thin Overlays	WSB Consulting	100%			Synathesis			
PM	Concrete Pavement Restoration (CPR) for Bonded Concrete Overlays of Asphalt	WSB Consulting	100%			Synathesis			
PM	Surface Characteristics of Diamond Ground PCC Surfaces	SRF Consulting	100%	Synathesis					
PM	Spray on Rejuvenator Synthesis	WSB Consulting	100%			Synathesis			
PM	Maintaining Poor Pavements	SRF Consulting	100%		2017 Research				
PM	Bio-Materials Maintenance Treatments	Iowa State	Contracting				2019 CFI Research		
PM	Spray on Rejuvenator Test Sections	RFP out April 2020	RFP				2019 Research		
Rigid	Repair of Joint Associated Distress Pavements	SRF Consulting	2%	Synathesis					
Rigid	Solutions to Mitigate Dowel/Tie-Bar Propagated Cracking	ARA, Inc.	8%				2019 Research		
Rigid	Compacted Concrete for Local Streets	Missouri University	30%		2018 Research / Missouri Lead				
Rigid	Construction Report for Jointless FRC Roundabout in Minnesota	Iowa State	35%			2019 Research			
Rigid	Reduced Cementitious Material in Optimized Concrete Mixture	Iowa State	80%		2019 Research				
Rigid	Performance Benefits of Fiber-Reinforced Thin Concrete Pavement and Overlays	University of UMD	80%		2019 Research				
Rigid	Evaluation of Long-Term Impacts of Early Opening of Concrete Pavements	University of Pitts	80%		2019 Research				
Rigid	Design and Performance of Unbonded PCC Overlays	SRF Consulting	95%	Synathesis					
Rigid	Performance of Concrete Overlays over Full Depth Reclamation (FDR)	ARM of Minnesota	0%				2019 CFI Research		
Rigid	Incorporation of Joint Faulting Model into BCOA-ME	University of Pitts	Contracting				2019 Research		
Rigid	Effect of Low and Moderate Recycled Concrete Aggregate Replacement Levels on PCC Properties	St Thomas	Contracting				2019 CFI Research		