MoDOT Research Peer Exchange

April 11-12, 2011

Executive Summary

The Missouri Department of Transportation hosted a peer exchange on April 11-12, 2011 in Jefferson City, Missouri. Participants included representatives from four state DOTs, The National Academies, USDOT-RITA, FHWA, and both public and private research organizations. Discussion was structured around sharing best practices and experiences in the areas of identifying research ideas and implementing research.

This report outlines the conversation's highlights and opportunities identified for MoDOT surrounding two topics 1) identifying research needs and 2) implementing research throughout the department.

MoDOT's research program is shaped and supported by the department's Tangible Results and Values, as displayed in Appendix D. Mara Campbell shared a recent public information campaign entitled, "It's Personal", where MoDOT works to make transportation "personal" to the average citizen, as well as a video of MoDOT's Innovation Challenge held in March 2011. The group was asked on the final day what strengths and opportunities they identified in the discussions during the peer exchange. MoDOT resolved to take action on specific items identified that may assist the research program.

MoDOT Strengths (as reported by the invited peer exchange participants):	MoDOT Opportunities (as reported by the invited peer exchange participants):
• Organizationally placed well, reports to CEO • Committed to making a difference throughout the agency • Wonderful staff • Receptive to new ideas and concepts • Focused on ensuring the research program adds value to the DOT, playing a key role in addressing issues the agency faces • Technically experienced • Tracker provides focus, and is used as a key management tool • Able to understand research impact areas – getting the most bang for the buck	• Get the sense that this group has worked to establish good relationships with its research partners, the universities, MRI Global – there is an opportunity to continue to develop those relationships and share MoDOT's needs with its partners. • Consider allocating flexible funding for shorter term, rapid response projects. • Develop an on-call contract or explore ways to streamline contracting process so quick, short term projects can be carried out quickly.

Participants

State DOT participants –
- Ned Parrish, Research Manager – Idaho DOT
- Sandra Larson, Research & Technology Bureau Director – Iowa DOT
- Moy Biswas, State Research & Analysis Engineer – North Carolina DOT
- Jennifer Fitch, Research Engineer – Vermont Agency of Transportation

Research Partner participants –
- Doug Harwood, Program Director– MRIGlobal
- John Myers, Associate Professor of Civil and Architectural Engineering– Missouri S&T – Rolla
- Chris Hedges, Senior Program Officer – The National Academies – Washington, DC
- Erik Loehr, Director of Research – University of Missouri – Columbia

Federal Partner participants –
- Dawn Perkins, Transportation Engineer – FHWA Missouri Division
- Matthew Klein, Transportation Specialist – US DOT RITA

MoDOT participants –
- Mara Campbell, Organizational Results Director – MoDOT Organizational Results
- Bill Stone, Organizational Performance Administrator – MoDOT Organizational Results
- Jen Harper, Organizational Performance Engineer – MoDOT Organizational Results
- Rebecca Geyer, Organizational Performance Specialist – MoDOT Organizational Results

Opening Remarks Speakers –
- Kevin Ward, Division Administrator – FHWA Missouri Division Office
- Dave Nichols, Chief Engineer – MoDOT

Pictured left to right:
(Back Row) Sandra Larson, Doug Harwood, Chris Hedges, Ned Parrish, Matt Klein, John Myers, Bill Stone.
(Front Row) Moy Biswas, Jennifer Fitch, Mara Campbell, Jen Harper, Rebecca Geyer, Dawn Perkins.

Key Observations and Best Practices Discussed for Identifying Research Needs	Key Observations and Best Practices Discussed for Implementing Research
• Use a Focus Group approach • Continue Innovation Challenge • Build Relationships – researchers, DOT and stakeholders • Provide feedback on project statements • Use regional approach to leverage research funds • Open scope of work and plan to allow for research flexibility	• Build relationships with University and DOT personnel • Involve all levels of the DOT with research • Gain buy-in from DOT staff and stakeholders early, and verify importance at all stages, but most importantly early on • Know your DOT champions, at all levels and specific subject areas • Track implementation of research • Determine appropriate research product format to assist in implementation, RFP deliverable should achieve that. • Begin with the end in mind • Category 2 fund use possibilities • Use the value of research projects to gain staff interest

Planned Actions – Visiting Team

State DOT participants

Ned Parrish, Idaho DOT
- Develop a research opportunities workshop. Instead of doing one big thing, start small and pick one area. Could start with either bridge or maintenance. I will also take home ways to build relationships. I will get out more and develop those relationships – spending a day with the Bridge Engineer and learn more about that.
- "Innovations challenge" is something I'd like to investigate implementing in Idaho.
- Do more to assist staff with development of problem statements.
- Consider use of focus groups like in Iowa to talk about needs.
- Mini-subject specific research opportunities workshops.
- When putting out RFP – focus on defining problem clearly and specify objectives – leave flexibility to potential researchers to suggest approach to accomplishing the work.
- Better communication of research needs to research community.
- Consider budgeting some dollars specifically for implementation.
- Investigate experimental features program as mechanism to facilitate implementation of new materials, technologies, processes.
- Implementation starts with research ideas that address real/important problems.
- Need to involve the people who will benefit from the research throughout the process.
- Need to spend time building/strengthening relationships with customers.

- Every day need to think about what we can do for customers:
  - What info can we share with them?
  - How can we better understand their needs?
- Focus groups
- Work to "grow staff" (non-research staff from within Idaho DOT) to take the lead or oversee research projects.
  - Investigate a tentative source of funding that could be used to encourage implementation.

Sandra Larson, Iowa DOT
- I have 6 pages of notes, mostly taking back a renewed passion for what we do.
- Look at implementing maintenance equipment innovations competition, like MoDOT.
- Consider a regional pooled fund for Region 3 – to fund common problems.
- Continue with Focus Groups – research idea generating model.
- Focus on the strengths of our research program & what is working best.
- How do we spur passion for research with non-interested persons? Don't focus on them; they may become interested if they see results from others.
- Find out more about Category 2, implementing research in construction.
- Include information on successful implementation of research & quantification of the value of specific research projects in our annual report.
- Meet with maintenance managers & assistant district engineers to gather SPR research ideas.

Moy Biswas, North Carolina DOT
- A formal documentation on possible quantification of implementation possibly in a database. Look at implementation of research done elsewhere. See where we can use others' research. Effort is in individual research projects, but not looking at the big picture. Need to do things from a higher level – talk to top senior management and talk about the big picture research we need to be doing.
- Iowa's periodic Focus Group Mtgs. (strategic research planning), strategic planning involving the DOT, industry and university.
- Idaho mentioned Utah had an internal Trailblazer award.
- Newsletter of services and research products.
- Produce results of high level and broad impact to the department.-transformative process.
- Look at implementation of research done elsewhere-such as NCHRP final reports.

Jennifer Fitch, Vermont Agency of Transportation
- Focus on what the product deliverable should be (it could be a specification/product/and/or report). Doesn't necessarily have to be a formal report.
- Expand focus groups to include more dialog between agency members, university reps, and contractors (AGC).
- Define areas of research needs for the department.
- Provide formal feedback regarding unfunded research ideas (this includes a letter).
- Distribute electronic communications regarding newly funded research projects.
- Require an action plan for implementation by the TAC members and principle investigator.
- Develop a procedure to track implementation.
- Define project objective clearly and allow technical experts freedom to refine scope of work

Research Partner participants

Doug Harwood, MRIGlobal
- Documenting the implementation of research, is there some way to create a database to capture this. Getting people talking to one another. Another thing we didn't really talk about, everything we talk about in research is really short-term stuff. Given the budget and needs, it's not usually given more thought. Transformative research may be something to consider. How can (at least on some scale) MoDOT could work along that line, perhaps in little pieces along the way. The first thing to determine is the thing that needs to be fixed by a long term vision.
- DOT personnel are usually best source of research needs. Although in a few cases researchers may have ideas that DOT staff did not know were possible. DOT staff who originate research needs are usually practitioners and may not be in the best position to identify research methods, scope, cost, etc.
- Create videos if the project is a "winner".
- Need to develop metrics to document implementation-a major challenge because no one is really doing this.
- Implementation documentation-get people talking to one another (focus groups) – perhaps need a database for this.
- Long-term vision-Research needs to bring this to the organization-transformative research takes time but can change how things are done.

John Myers, Missouri S&T
- The relationships, build more personal relationships, have the faculty interact more regularly with the DOT. Foster a better understanding of MoDOT needs, perhaps an exchange program. Lastly, develop contractor relationships.
- To foster a better understanding of DOT issues could a program be initiated where faculty spend 1-2 weeks in the summer at DOT? (May-Aug) University personnel could mirror staff in a particular area (maintenance, design, testing, etc.) Then prepare a summary report "from their eyes." Since university personnel do not often understand MoDOT issues, this may foster improved understanding.
- Foster communication between contractor and university to help foster faster, cheaper, safer, etc. (AGC).
- Economic impact in project assessment/selection.
- Methods to improve regional DOT collaboration to stretch research dollars.
- Sharing Best Practices/understanding unmet needs low cost solutions.
- Effective communication of results.
- Integrate implementation within project (front-end).
- Identify champions to foster implementation.
- Involve contractor in process.
- Only a few key individuals need to be in the "know" to implement a technology.
- Experimental features under category 2 will pay to replace if system or component prematurely fails.
- Get all MoDOT personnel to embrace new innovations at all levels.
- Quantify the value of the research.
- Universities must be more proactive to engage MoDOT engineers.
- Focus on the individuals that will champion research.
- Category 2 fund use. Look into other research funding sources.

- Have division engineers look at top 2 research products.
- How MoDOT markets and undertakes research.
- Be area specific in research where expertise exists.
- Get internal MoDOT personnel involved in research (have them visit research institution).
- Awards program internal to MoDOT folks (see above). Could be for group effort or individual.
- Could bring in vendors/customers to recognize MoDOT Staff.
- Larger scale high profile studies with multiple regional DOTs.

Chris Hedges, The National Academies
- I will take home the idea that there is a need to develop a structured way to measure implementation.
- Encourage problem statement submitters to concentrate on the problem, not the research plan needed to solve it.
- Deliver a presentation on how to submit problem statements during TRB state visits.
- Look for other ways to facilitate collaboration on developing NCHRP problem statements (eg. Focus groups, workshops, etc)
    - Should be AASHTO-led.
- Assign a sub-set of the panel to lead implementation efforts.

Erik Loehr, University of Missouri – Columbia
- Keep your conviction and keep "fighting the fight" as it is important to continue momentum developed from recent successes.
- Focus groups are good idea.
- Useful to separate different aspects of research endeavor (with a feedback loop in at least the first two or maybe even three steps):
    - problem identification
    - establishing plan/scope/budget:
    - evaluating proposals
    - contract/award,
- Need:
    - conviction & persistence (about value of research),
    - Open-mind & buy-in from leadership at outset,
    - Appropriate metrics & deliverables to facilitate implementation.

Federal Partner participants

Dawn Perkins, FHWA Missouri Division Office
- Category 2 funding and building relationships.
- Assist those with ideas by helping with paperwork & problem statement.
- Iowa uses focus groups.
- Need partnering with DOTs & research teams.
- NCHRP is moving toward the champion providing a grand problem statement then relying on the researchers to create the work plan & scope:
    1. Define problem and outcome
    2. Workplan includes scope, schedule & budget
    3. Research performed
- Post unfunded projects on website so the ideas are available to everyone.

- Give feedback if not selected or implemented (communication is huge key).
- Possible job shadowing of academia with workers & vice versa (for submittal & research).
- Write spec or special provision include this as a deliverable (also promote demo projects).
- Must have buy-in/ownership!
- Must give estimated savings instead of no benefits defined.
- Investment strategy in research portfolio, include some long term plus current issues.
- Implement something like Innovations Challenge for research/experimental.
- Recognition based awards, like Innovations Challenge (money not necessary)

Matt Klein, USDOT – RITA
- Tracking measurable implementation is key to understanding what value are we getting from our research.
- Building personal relationships is essential to gathering information and understanding research needs.
- Recognizing collaborative designing between granting/contracting organization and researcher of plan and scope of research and/or granting latitude on plan and scope to researcher when writing proposal as a best practice.
- Exploring the "Category 2" program (experimental features program) as resource for states to insure against implementation risk.
- Measuring implementation is likely more important than simply recognizing implementation.
- Look at how others track implementation of projects at all levels to apply lessons learned to RITA programs.
- Importance of focus groups (for example, a scaled down TAG at MoDOT) to gather research ideas and assess research capacities.
- Importance (for MoDOT and others) to consider and ensure buy-in for implementation from responsible persons from the beginning of a research project.

Planned Actions – MoDOT Research Team (Mara, Bill, Jen & Rebecca)
- Foster better and more strategic relationships. Go to the construction and materials management meeting and have 15 minutes on the agenda. Take a little time to talk about the things that are impacted by research. Build those relationships with those that we've hit home runs with. Let the other ones go.
- Look at the top two research projects and present results to senior management.
- Look for ways to implement a quick 80-hour short term contract with university for in-house projects.
- Look at how we market our research, including in-progress
- Consider conducting focus groups like Iowa does – even at the county level
    - Research Opportunities Workshop
    - Iowa LTAP group would be at focus group gathering
    - Pre-proposals generated from this should be approximately 5 pages.
- Unfunded research needs-posted
- Informal avenues of communication are best-MRI
- Bring university and AGC together
- TRB – Poster sessions work well, able to ask specific questions.
- MRI – gets info of research to AASHTO committees
    - Similar to TAC within DOT
- Hwy research board – quarterly report

- o Within year and after certain period of time
- Iowa TAC signs off on implementation plan
- Connecticut tries to track the value of research
- Pick four or five key focus areas and build those relationships. Can really make a difference in those areas. If we have folks that are very interested in research, build and foster those relationships now as they may be the next division engineers.
- Shift focus of Rebecca's team from actively seeking research ideas from the business side to supporting the division in pursuing new program dollar opportunities (Exploratory Advanced Research and Highways for Life).

Top items to encourage MoDOT to do – Visiting Team

- Matt (USDOT-RITA) – consider implementation at the beginning of the projects, ensure buy in from the Technical Advisory Group, and gather information through external focus groups.
- Doug (MRIGlobal)– division heads not that interested in research. Finding ways to either work on that or work around that seems to be a key challenge for MoDOT and I hope you're successful in it.
- Chris (The National Academies)– need to constantly evaluate what our job descriptions are and sometimes you get easy ideas. We shouldn't shy away from areas that pull us out of our expertise. We need to expand our horizons a little bit.
- Jennifer (Vermont) –Become energetic and your customers will build from that and you will continue to work well together.
- Moy (North Carolina) – I appreciate that MoDOT and universities have identified that there is a problem. In private sector, if a partner is in the office all day and not generating business, the business is not successful. I am not in my office the first two hours of the day or the last hour of the day because I'm out beating the bushes. I make a point of getting in touch with folks we've not done business. The staff should be able to take care of the low hanging fruit.
- Sandra (Iowa) – Iowa's not very far away. I come to Columbia often, and am only a phone call away. Anything we can do to help. I think you are honing in on a vision and it is one thing we all strive for in finding ways we can contribute. I keep a list of folks I can go to for innovative ideas, and Missouri has been on that list.
- John (Missouri S&T) – bottom line, try to be more effective in communicating MoDOT's needs. We want to work to provide end products that are helpful (other than a final report). Work with the stakeholders, it was great working with University of Missouri-Columbia. I've seen a shift to partnering more with UMC, we're one system and we should. We want to address MoDOT's needs and have all of the universities know what MoDOT's needs up front.
- Ned (Idaho) – echo Sandra's remarks – you should be proud of what you have accomplished in the past 5 years. Hit home runs in the areas where you need it and the passion will come.
- Dawn (FHWA-Missouri Division) – the MoDOT team is all about innovation and it's good to see that you have that chemistry and spark and are working to promote the spark in other people. Focus on those that are pushing for research. I really like the discussion regarding "know what you want for the outcome" prior to starting the research project (i.e. spec, special provision, demo project, etc.).
- Erik (University of Missouri-Columbia)– take a little bit of pride in what you've accomplished and look to the future. We'd like to be an extension of staff and help wherever we can. It's been fun and informative.

Appendix A – Resources

"It's Personal" presentation and informational web page: http://www.modot.org/itspersonal/index.htm

MoDOT's Innovations Challenge 2011 YouTube video:
http://www.youtube.com/watch?v=RyByg99eQ0U&feature=channel_video_title

Organizational Results' Innovation Library: http://www.modot.mo.gov/services/OR/byDate.htm

Appendix B

Missouri Department of Transportation
Research Peer Exchange Agenda
Gathering Ideas and putting them into Practice
April 11-12, 2011

April 11, 2011

8:00-8:05	**Opening Remarks – Mara Campbell**
	Welcome & Introductions
8:05-8:15	**Opening Remarks – Dave Nichols – Chief Engineer-MoDOT**
8:15-8:25	**Opening Remarks – Kevin Ward – Division Administrator – FHWA Missouri Division**
8:25-8:45	**Overview of Peer Exchange and Presentation of "It's Personal"– Mara Campbell**
8:45-10:30	**Roundtable discussion with Peer Exchange participants – sharing how participating organizations identify research ideas**
10:30-10:45	**Break**
10:45-12:00	**Continuation of Peer Exchange roundtable discussion with participants**
12:00-1:00	**Lunch**
1:00-2:00	**Roundtable discussion with Peer Exchange participants – sharing how participating organizations implement and document research**
2:45-3:00	**Break**
3:00-3:30	**Continuation of Peer Exchange roundtable discussion with participants**
3:30-4:00	**Recap of Day**
	State Perspective of Day's proceedings
6pm	**Dinner at Sapphires in Downtown Jefferson City**

Missouri Department of Transportation
Research Peer Exchange Agenda
Gathering Ideas and putting them into Practice
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April 12, 2011

8:00-8:15	**Opening Remarks – Mara Campbell**
	Welcome, Brief recap of previous day, Goals for today
8:15-10:00	**Roundtable discussion of takeaways from Peer Exchange**
10:00-10:15	**Break**
10:15-11:00	**Discussion of issues Organizations are facing in developing and conducting research**
11:00-12:00	**Development of Executive Summary**
	Timeline for completion of Final Peer Exchange Report
12:00-1:00	**Lunch**
1:00-1:30	**Final wrap-up of Peer Exchange**
	Participants perspective of Peer Exchange
	Next Steps
1:30-2:00	**Reimbursement procedures – Donna Linnenbrink - MoDOT**

Appendix C – Roster

Last Name	First Name	Title/Unit	Agency/Organization	Street	City	State	Zip	E-mail	Phone
Biswas	Moy	Research & Development Unit	North Carolina Department of Transportation	1549 Mail Service Center	Raleigh	NC	27699-1549	biswas@ncdot.gov	919.508.1790
Fitch	Jennifer		Vermont Agency of Transportation	186 Industrial Lane Road	Barre	VT	5641	Jennifer.Fitch@state.vt.us	802.828.2553
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Loehr, Ph.D., PE	J. Erik	Civil & Environmental Engineering	University of Missouri-Columbia	E2509 Lafferre Hall	Columbia	MO	65211	eloehr@missouri.edu	573.882.6380
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Geyer	Rebecca	Organizational Performance Specialist	MoDOT	830 MoDOT Drive	Jefferson City	MO	65109	Rebecca.Geyer@modot.mo.gov	573.751.1114
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Nichols	Dave	Chief Engineer	MoDOT	105 W. Capitol	Jefferson City	MO	65101		
Stone	Bill	Organizational Performance Administrator	MoDOT	833 MoDot Drive	Jefferson City	MO	65109	William.Stone@modot.mo.gov	573.526.4328
Wieberg	Carol	Recorder	MoDOT	2217 St. Mary's Blvd.	Jefferson City	MO	65109	Carol.Wieberg@modot.mo.gov	573.526.0993

Appendix D

MoDOT Tangible Results:

- Uninterrupted Traffic Flow
- Smooth and Unrestricted Roads and Bridges
- Safe Transportation System
- Roadway Visibility
- Outstanding Customer Service
- Partner With Others to Deliver Transportation Services
- Advance Economic Development
- Innovative Transportation Solutions
- Fast Projects That Are of Great Value
- Environmentally and Socially Responsible
- Efficient Movement of Goods
- Easily Accessible Modal Choices
- Customer Involvement in Transportation Decision-Making
- Accommodating Roadsides
- Best Value for Every Dollar Spent
- Advocate for Transportation Issues
- Proactive Transportation Information

MoDOT Value Statements:

MoDOT…

- supports and develops employees because we believe they are the key to our success.
- is flexible because we believe one size does not fit all.
- honors our commitments because we believe in integrity.
- encourages risk and accepts failure because we believe in getting better.
- is responsive and courteous because we believe in delighting our customers.
- empowers employees because we trust them to make timely and innovative decisions.
- does not compromise safety because we believe in the well-being of employees and customers.
- provides the best value for every dollar spent because we're taxpayers too.
- values diversity and inclusiveness because we believe in the power of our differences.
- is one team because we all share the same mission and teamwork produces the best results.
- fosters an enjoyable and productive workplace because we care about each other and our mission.
- is open and honest because we must be trustworthy.
- listens and seeks to understand because we value everyone's opinion.
- treats everyone with respect because we value their dignity.
- seeks out and welcomes any idea that increases our options because we don't have all the answers.
- always strives to do our job better, faster, and cheaper because we want to meet more of Missouri's needs.