

**MoDOT**

Research, Development and Technology

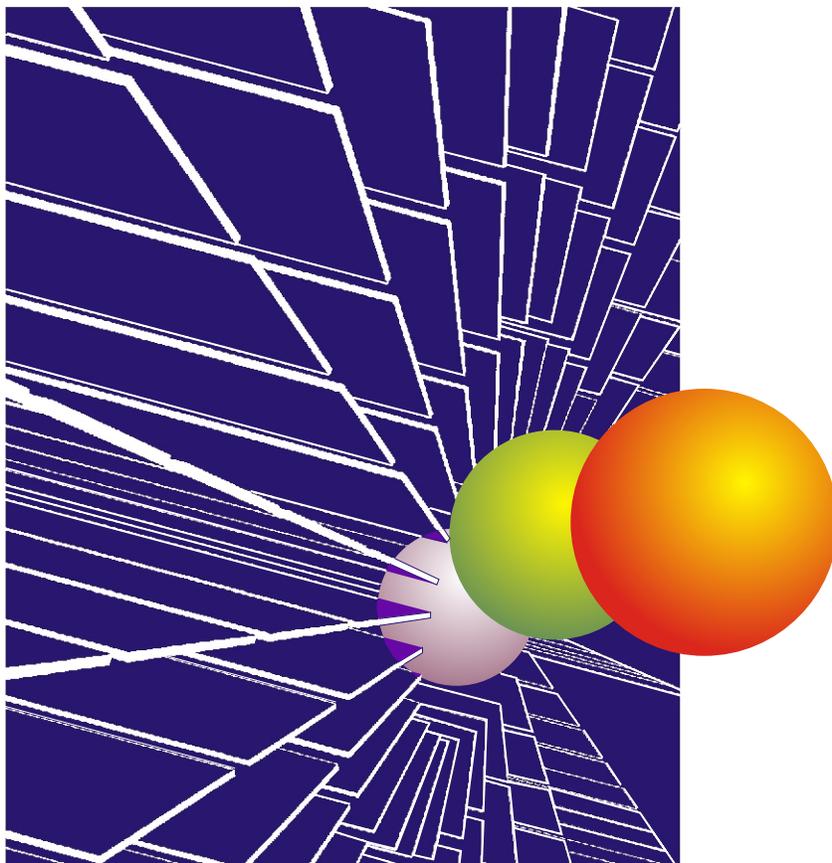
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RDT 02-08

# Missouri Department of Transportation RDT Peer Exchange Final Report

Conducted at:

MoDOT Central Laboratory  
1617 Missouri Boulevard  
Jefferson City, MO 65102  
April 29th - May 2nd, 2002



June, 2002

**Research Management Peer Exchange  
Hosted by the  
Missouri Department of Transportation  
Research, Development & Technology  
April 29 – May 2, 2002  
RDT 02-008**

**Introduction**

The Missouri Department of Transportation hosted a Peer Exchange of its research program April 29 - May 2, 2002. Members of the Peer Exchange Team were:

- Richard L. McReynolds, Kansas Department of Transportation, Team Leader
- Peter Clogston, FHWA, Missouri Division
- David Lippert, Illinois Department of Transportation
- Moy Biswas, North Carolina Department of Transportation
- Leanna Depue, Central Missouri State University
- Bill Schonberg, University of Missouri, Rolla
- Roger Port, FHWA, Tennessee Division (retired)
- Richard Pain, Transportation Research Board
- Ray Purvis, Missouri Department of Transportation

**RDT Staff Member Participants:**

The following staff members participated throughout the peer exchange:

Don Davidson, RDT Director/Development  
Mike Shea, RDT Director/Technology Transfer  
Tim Chojnacki, RDT Director/Research  
Keith McGowan, Technical Support Engineer  
Patty Lemongelli, Research and Development Engineer  
John Wenzlick, Research and Development Engineer  
Tom Anna, Research and Development Engineer  
John Donahue, Research and Development Engineer  
Dan Smith, Research and Development Engineer  
Ernie Perry, Research and Development Specialist  
Donna Ridenhour, Senior Administrative Secretary

The peer exchange began with a free discussion format, and provided the exchange team an opportunity to listen to concerns, success stories, technical accomplishments and suggestions from the RDT Staff, MoDOT Staff and University Staff. The following MoDOT and University Staff participated in the opening session for the peer exchange:

## **MoDOT Staff**

Kevin Keith, Chief Engineer  
Ken Fryer, State Project Operations Engineer  
Roger Schwartze, District Engineer – Jefferson City  
Richard Walter, District Engineer – Joplin  
Shyam Gupta, State Bridge Engineer  
Kyle Kittrell, Transportation Planning Director

## **University Staff**

Sam Kiger, University of Missouri-Columbia

### **The expressed objectives of the peer exchange were to:**

- Verify and/or improve research-related processes
- Increase effectiveness of research, development and technology transfer efforts to best serve MODOT strategic goals and objectives
- Benchmark performance

### **Several common themes emerged from the discussions:**

- Expand communications to improve effectiveness and knowledge of the research process
- Importance of policy research
- Importance of implementation and measurement processes
- Enhance customer service and delivery strategies to meet diverse customer needs
- Efficiency and “the need for speed” to meet MoDOT needs

### **The exchange team noted several significant strengths at the Department of Transportation:**

- Policy research initiated during last 2-3 years to meet senior management needs
- MoDOT participates in research at state, regional, and national levels
- Technical Advisory Groups (TAG) are working well in terms of generating research ideas, communicating with faculty and identifying emerging research areas
- MoDOT RDT staff has knowledge, diversity, and enthusiasm
- Missouri Transportation Research and Education Center (MOTREC) model is effective at identifying research needs
- Desire to improve research process to meet customer needs including those of senior management
- Marketing is used effectively by RDT

- RDT's location in Central Lab supports effective in-house research and new product evaluations
- RDT's commitment to improving library and use web-based delivery systems
- Demonstrated interest of senior management in research program
- Research capabilities of State Universities
- RDT recognizes the importance of implementation of research; additional efforts to improve processes are underway
- Support of multiple research endeavors (in-house, contract, new products, technology transfer, local technical assistance program, library, etc.)
- Effective support of FHWA Division Office

**The exchange team also noted several areas of opportunities for RDT**

- Support of Agency business plan and State Transportation Improvement Program (STIP) can be expanded
- Identify and use district contact persons for facilitating applicable research
- Consider including Implementation in the functional unit title
- Increase staff to be commensurate with available research funding (dedicated SPR Funds) and broader MoDOT research mandates
- Use MOTREC solicitation process annually
- Involve additional universities in the research process
- Improve research reports to better meet customer needs and facilitate implementation of results
- Engage senior management in annual research briefing
- Use best practices and best research results from other sources
- Increase involvement of Functional Unit Leaders in the research process to improve implementation success rate
- Use project level committees including primary customers
- Provide orientation for project technical contact/liaison, principal investigators, and TAG members
- Develop a culture of prestige for project technical contact/liaison
- Senior management support of web-based delivery systems including virtual libraries
- Review current TAG procedures and representation to ensure that the full spectrum of MoDOT activities is addressed
- Take advantage of marketing resources to better communicate RDT success stories

**Richard L. McReynolds, Kansas Department of Transportation**

**Observations**

MoDOT has a dedicated research staff and excellent research facilities. The interest of top senior staff in the research process is commendable as is the policy research being accomplished. MoDOT has a broad-based program that covers most of the agency needs. Improvement of the library and emphasis on creating an improved web presence should

pay future dividends. Thanks for providing me the opportunity to participate in your peer exchange.

### **Planned Actions**

- Share information regarding MO library initiatives and WI peer exchange information with Technology Transfer Engineer and his staff.
- Contact RAC listserv regarding our library scanning activities to hopefully reduce duplication of effort if others are scanning similar materials.
- Evaluate using MO and IL methods (brainstorming at meeting of users and faculty) of research project selection in addition to our annual research idea solicitation. Evaluate inclusion into our planned Research Needs Day.
- Evaluate increasing staff participation on Area Panels, and using standard forms for project evaluation to document pre-proposal reviews.
- Evaluate using quarterly reporting form in electronic format and distribution as NC and IL do.
- Check out IL web based New Products List for ideas on our planned Internet List.
- Confirm Dr. Gene Russell, KSU and Mike Crow, KDOT (project monitor) are aware of PA use and evaluation of centerline rumble strips.
- Evaluate improving our annual report format to better utilize color and pictures as MO and others do.
- Advise KDOT staff of the work Ernie Perry is doing and contact information.
- In addition to a camera ready copy, request a word processing file and Adobe pdf file on CD with final version of each report (NC).

### **David Lippert, Illinois Department of Transportation**

#### **Observations**

- Policy research headed by Ernie Perry is addressing unique research needs of MoDOT and can serve as a model for expansion or export to other states.
- Technical Advisory Groups (TAG's) is an interesting method to generate research focus topics in specific areas.
- Several research issues are similar for both IDOT and MoDOT – a research activity exchange on technical projects would be very productive for both states.
- One page glossary summary helps with marketing of completed research.

#### **Planned Actions**

- Would like to explore an informal exchange of technical topics that each state is researching and exchange ideas and common issues.
- Will discuss issue of “need for speed/efficiency” with IDOT staff.
- Will be checking into several technical items brought up in discussions.
- National Work Zone Clearing House in Texas
- KDOT's efforts in Erosion Control Training that Colorado was a resource for.

- IDOT needs to explore the use of one page summary “glossy” for raising bar on research marketing efforts.

### **Moy Biswas, North Carolina Department of Transportation**

#### **Observations**

MoDOT RDT provides services in multiple functional areas including Management of Contract Research, In-house Research, New Products Evaluation, LTAP, and Information Services (Library).

MoDOT RDT has initiated research and investigation in the areas the environment and policy. It is expected that environmental requirements will become increasingly critical for program delivery and also to meet environmental streamlining and stewardship needs. Environmental concerns will include natural systems as well as human systems. Consequently, more environmental studies should be anticipated, and staff expansion should be planned in this area.

#### **Planned Actions**

- I would like to adapt the idea of MOTREC in some form to improve dialog amongst research customers and stakeholders.
- MoDOT research staff has developed an EXCEL based system for tracking research project progress, completion, and distribution of final reports. I would like to adopt such a system, and perhaps add an implementation component.
- I liked the idea of developing implementable report that would be short and would include action items. The report should be produced as soon possible, and be usable as easily as possible.
- I would explore the idea of expediency in conduct of research, and in implementation of research products.
- I would explore the idea of synthesizing research completed elsewhere and try to implement the same in North Carolina.
- I liked the process of documentation of MoDOT Peer Exchange (Brain Storming format) and plan to incorporate it in my Peer Exchange.

### **Leanna Depue, Missouri Safety Center, Central Missouri State University**

#### **Observations**

MoDOT’s RDT staff was very open and eager to learn about other states research processes and procedures. They asked excellent questions and were earnestly seeking new opportunities to enhance their current research program

#### **Planned Actions**

Key action items I plan to undertake include:

- Share information I gained about the MoDOT RDT Program with selected Center and University personnel.
- Further investigate ways the Missouri Safety Center and Central Missouri State University can expand their involvement with the RDT Program
- Investigate a process to develop a database to track our research activities.

### **Roger Port, Tennessee Division, Federal Highway Administration (Retired)**

#### **Observations**

The Missouri RDT Program has made many improvements since the last peer exchange. Examples include the following:

- MOTREC implementation has progressed and is well received
- Research staff capabilities have been broadened and enhanced to address policy planning and environmental issues
- Research management processes have improved

The staff shows enthusiasm and interest in doing good work.

#### **Planned Actions**

The following will be shared with the TN DOT and FHWA TN Division Office:

- MoDOT's study of pavement rehabilitation and management strategies including rehabilitation treatment selection.
- MoDOT's consideration of much more expenditures on system preservation and less system expansion as a high payoff strategy. That there is belief from TRB that preventive maintenance can have 6:1 benefit-cost payoff.
- Centerline rumble strips used in Pennsylvania seem successful.
- U of Missouri Bridge Rating Van is a success.
- KDOT's training course and manual on practical erosion control is successful.
- Work on electronic library at Kansas and MoDOT's virtual library interest.
- MoDOT's census data use of planning, social impacts and environmental justice and the "How To" manual under development.
- MoDOT's interest in knowing and considering best practices of other states for use in Missouri. Encourage scanning trips where appropriate.
- IDOT's warranty projects for bridges and pavements.

### **Bill Schonberg, University of Missouri-Rolla**

#### **Observations**

#### **Marketing Issues**

- RDT needs to market better what it does to upper management/functional unit leaders/district engineers

- Need a graphic artist to increase marketability of publications, organization reports, etc. Skill set includes: Editing, Graphics, Writing, Web Skills

### **Implementation Issues**

- IDEA: Write in a requirement into each contract or grant that an implementation plan must be included in each final report.
- Once a project is completed and a product identified, who will train district/division engineer during the implementation phase?
- It is difficult to get Divisions to work with RDT to get implementation because it means extra work for the Divisions
- Contributions of MoDOT in the implementation of research results often obscured because implementations occur down on the Division level by Division personnel
- How to communicate news, information, etc. to districts/divisions in a form and at a frequency that would be most beneficial to districts/divisions
- Need to survey district/division personnel to find out in what form would they like to receive their information.
- Each district/division needs a POC whose main function would be to serve as the recipient and disseminator of tech transfer information.
- IDEA: Implement a Project Steering Committee consisting of TAG members as well as the person who will be responsible for implementing the results of the project
- Committee members take some ownership of the project.
- Will facilitate implementation of project results
- Committee should provide “intellectual leadership” and not be burdened with administrative responsibilities
- Maybe Project Steering Committee should oversee actual implementation?
- Individuals signing off on the implementation plan need to be the end-users of the product (or at least close to the end-users).
- Cost of implementation → can be substantial depending on the type of research
- IDEA: Create the position of Implementation Engineer (see IDOT)
- Works with research project PI on the front end to develop implementation plan and on the tail end to make sure implementation plan is doable.
- Once project results are implemented, how do we know that they have made a difference? Is there a payoff, and if so, how much? Was the project worth the investment?
- Cost of evaluation → can also be substantial!
- Consistency issue → we do not formally evaluate the performance of roadway projects that cost \$100M so why should we evaluate research projects that cost \$50K?

### **Research Process Issues**

- Do MoDOT TAG’s cover the full spectrum of agency needs/activities?
- Need membership from multi-modal groups

- IDEA: Perhaps RDT needs to implement a “Super-TAG” that meets maybe twice a year for a very short period of time (one hour or less) to review/approve/decline TAG recommendations
- Membership to include upper management plus individual TAG chairs
- How can other universities/organizations get involved in the research process?
- Can be a problem in non-traditional areas
- Need to avoid fishing expeditions
- Maybe MoDOT needs to visit non-research institutions that may have something to offer from time-to-time and explain how MoDOT does business and how it can be approached?

### **Research Reporting Issues**

- Are milestones more appropriate rather than interim reports?
- Should interim reports go to the entire TAG in addition to the project supervisor?
- IDEA: Simple 1- or 2-page report highlighting progress since last report, any problems encountered, and plans for upcoming reporting period
- Progress reports can be given at a TAG meeting
- If a faculty member is not a TAG member, this brings him/her into the fold
- Gets buy-in to the project from other TAG members
- IDEA: Final reports need to be converted to or supplemented by either a training manual or a guideline to be followed
- Research project reports written by PhD researchers, but are being read by BS graduates
- IDEA: Include a 4-page executive summary with understandable/implementable action item (e.g., “Here is what you can implement from this report.”)

### **Project Management Issues**

- Do project supervisors understand their role in managing the project? Probably not.
- IDEA: Duties need to be described either (1) in the letter notifying an employee of selection as a project supervisor/manager or (2) at a meeting in between RDT rep and newly selected project manager.
- RDT engineers need to be brought into the culture of project supervision
- It is a privilege to be asked to do this

### **Staff Development Issues**

- ASCE Resolution 465 will change education needs and opportunities
- Currently no incentive to get an advanced degree
- Salary adjustment for advanced degree or licensure?
- KDOT, IDOT yes; MoDOT no
- Professional development hours for licensure maintenance coming in 2003

### **University-based Center of Excellence**

- This would be one way of maximizing a university’s potential

- This would also be a way of having a regionally/nationally visible activity/function

### **FHWA Issues**

- FHWA Resource Centers often staffed by young engineers that are not as knowledgeable as hoped
- Can new RC employees be required to rotate through the DOT's in the RC's region upon appointment?

### **In-house Projects**

- Should be managed the same as external projects
- Avoids quality misperceptions

## **Richard Pain, Transportation Research Board**

### **Observations**

RDT staff's belief in research and desire to improve the research process program is of immeasurable value.

The TAG process appears to be in place and working successfully. I believe the TAG's could be further used to enhance research management. Specifically, a subset of TAG members could serve on a panel to oversee each research project. Thus, two or three TAG members would serve on project panel A, a different two or three on project panel B and so on. Project panels would be supplemented with primary customer and users as needed. These panels would write or review the project work statement/RFP, assist in evaluating proposals and overseeing the project throughout its life, including additional development and final implementation. An important function of the primary customer/end user would be to prepare an implementation plan for the project towards the end of the research project. Then when the project is complete, i.e. the final report is submitted, next steps and actions are ready to present to management for review and approval. The benefit is early buy-in of customers and users in the research and in implementation of the results. This leads to more efficient and quicker implementation.

RDT staff expressed the need and interest in using research findings and best practices from other sources, i.e. other states, municipalities or countries, as appropriate. The TRIS and Research in Progress (RIP) databases are designed to aid the transportation field in identifying such findings and practices. However, these databases are only as good as the information therein. I strongly encourage MoDOT to continue submitting timely information to TRIS and RIP. As the new TRIS and RIP software become operational late this summer hopefully MoDOT will use and find both data bases of greater value in locating desired information.

Traditionally state DOT research focused on "hard" side engineering research. MoDOT has broadened that scope to include policy research. It appears to me that shifting from a perspective of hard and soft side research to one of "what are the research needs within

MoDOT” complements the broadened research department scope. With that change in perception RDT will be able to better communicate and serve all areas within MoDOT.

As the research scope broadens within RDT there likely will be need for a wider range of research expertise. This suggests that additional universities within the state that bring currently untapped expertise to MoDOT could be included in the research process.

For more effective management of larger research projects there may be some value in requiring more detailed specification of technical milestones, anticipated areas of needed cooperation, planned communications with project panel/TAG, and implementation potential and possibilities in proposals or project work plans.

### **Action List**

NCHRP and other TRB research reports are prepared and published in a traditional research report format. From the discussions during this exchange it became clear that many TRB research reports could be presented in alternate, more useful formats.

### **Pete Clogston, FHWA – Missouri Division**

#### **Observations**

MoDOT has a strong, vibrant, well-managed RDT program, yet is actively striving to further improve where significant opportunities exist. RDT is fortunate to have a very talented staff and significant resources. Missouri is also fortunate to have two State Universities with strong engineering programs and excellent research capabilities. The resources at Central Missouri State University offer potential opportunities for additional safety related research.

This peer exchange has been an excellent forum for sharing of best practices and I think that all involved have benefited. Improved implementation of research results is always going to be a goal for research and was one of the most important themes that ran throughout this exchange.

#### **Planned Actions**

- Evaluate potential opportunities to use available FY 2002 FHWA Missouri Division discretionary technology transfer funds to support a MoDOT scanning trip to states that are having exceptional success with issues that are of high priority and concern in Missouri. During this peer exchange, MoDOT management raised unsatisfactory performance of pavement striping as a major concern and this is an example and potential immediate opportunity for the focus of such a scanning trip.
- Continue to encourage and advocate improvements in the administration of the Pooled Fund Program on the national level.

- Encourage and facilitate the participation of appropriate Missouri Division Office personnel on research project technical committees.
- On bridge related research projects, in particular, promote and encourage the active involvement of the Bridge Division Technical Liaison identified for the project. The Technical Liaison should be project champion and can help ensure that the project stays focused on the identified needs and results in a report that is written for the practicing engineers who will be applying any implementable recommendations.
- Be available to assist RDT with the implementation of any changes that result from this peer exchange.

**Ray L. Purvis, Missouri Department of Transportation**

**Observations**

Peer Exchanges are an investment of time and effort that has the potential for a high rate of return. This peer exchange will prove to be very valuable for RDT and MoDOT. Team members were chosen based on known strengths and values that they would bring to this peer exchange and proved a good mix of transportation minds to meet the objectives. The team stayed focused on the objectives and the planned agenda and has identified strengths and opportunities for us to review and build on for a more effective RDT unit. These efforts would not have proven successful without the strong support of Chief Engineer, Kevin Keith and active participation by invited department and RDT staff.

**Planned Actions**

- RDT will capture comments from the closeout session with senior management and complete the Peer Exchange with a final report. The final report will be shared with FHWA in accordance with the Peer Exchange guidelines.
- I intend to set a day aside within the next two weeks to review this Peer Exchange Report with the RDT Management Team with the objective of identifying short, immediate and long-term goals for the business units and individual staff members from the materials presented and topics discussed.
- RDT will establish a follow-up meeting with senior management after the RDT Management meeting and again in six months to determine progress and accountability for the Peer Exchange. An additional follow-up by the RDT management team will be scheduled for one year from now. We will include Division FHWA representation in these meetings.

**CLOSE OUT SESSION**

The peer exchange concluded with individual presentations from members of the team. A question and answer session followed by members of the MoDOT staff.

The following MoDOT Staff participated in the close out session for the peer exchange:

**MoDOT Staff**

Kevin Keith, Chief Engineer  
Don Hillis, Director of Operations  
Ken Fryer, State Project Operations Engineer  
Roger Schwartze, District Engineer – Jefferson City  
Richard Walter, District Engineer – Joplin  
Shyam Gupta, State Bridge Engineer  
Kyle Kittrell, Transportation Planning Director  
Mara Campbell, Strategic Planning and Policy Manager

## ADDENDUM

### KEY POINTS FROM MODOT SENIOR MANAGEMENT

Kevin Keith, Chief Engineer –

- Policy Level Research
  - TAGs include all functional areas (include Multimodal) legislative liaisons
- Identify the customers of policy research
- Implementation of results (Internal & External)
- Top Down vs. Bottom Up
- Driving the research culture through the department
- Educate the customers (7 Keys)
- (Need for Speed) Efficiency
- Cut the timeline for research
- Learn from others/don't reinvent
  - (Rehabilitation & Preventative Maintenance)
  - (Best Practices)
- Striping (see at night and in rain)
  - (CL Rumble strips) (Penn DOT)
- Spend wisely for effective rehabilitation
- Turn around worsening system condition
- University research used effectively/Resources/Relationship
  - (Maximize university capabilities)
- Enough staff or too much
  - (How are we using our resources?)
- Capturing others research results
- TT Scan for Best Practices
- Like to see less sure research that has value
- Walt Disney World Fairies Model

### STAFF DISCUSSION

**Ken Fryer, State Project Operations Engineer**

- New Product Review Process
  - Are there gaps in the process?
  - Review existing process and amend as required

**Action Item:** RDT to meet with Functional Unit Leaders and District Engineers.

### **Roger Schwartze, District Engineer, Jefferson City**

- Best Practices on Pavement Marking
- NCHRP 350 approved sign stands – (Dean Sicking-University of Nebraska)
- Part Marking Color (yellow vs. white) Rich Cunard – TRB (202-334-2963)
- How to get contractors in and out faster (strategies, work zones, closures, bypasses, etc.)
- Milestones for Contract Research
- Use Highway Engineer's Conference to showcase technologies

### **Implementation – General**

- Update master agreement on implementation plan and training
- Have end user (champion) follow research from conception to completion
- Customer truly wants the results from the project
- Expand on the tech brief (Virginia)
- What about implementation?
- Implementation Engineer – IDOT
- NCHRP Report – Spec writing and training
- Research Report Guideline – Manual

### **Richard Walter, District Engineer – Joplin**

- FWD on (approach slabs)
- Better implementation on FWD
- Traffic flow through work zones (Wyoming)
  - Night work issues
- Preventive Maintenance
- Mined areas construction
  - Work zone Clearinghouse (TTI)

### **Kyle Kittrell, Transportation Planning Director**

- Maintenance Dollar/Cost Effective

### **Shyam Gupta, State Bridge Engineer**

- Simplify Research Reports (National Issue)
- End User Friendly
- Implementable Report – Understandable Action Items

## **DOCUMENTS SHARED WITH MoDOT**

Research Outreach 2002 – Illinois Department of Transportation; January 2002

Research, Development and Technology Transfer Procedures Manual – Kansas Department of Transportation; November 2000

Research Annual Report – Kansas Department of Transportation; Year 2000

Work Program & Cost Estimate – Kansas Department of Transportation; Year 2002

## **DOCUMENTS SHARED WITH PEER EXCHANGE TEAM**

RDT Functional Unit Manual – Missouri Department of Transportation; May 2002

RDT 2001 Summary Report – Missouri Department of Transportation; Sept 2001

RDT Contract Research Report – Missouri Department of Transportation; Nov 2001