



Missouri Department of Transportation

July 2007

Organizational Results Fiscal Year 2007 in Review

Introduction

Fiscal year 2007 was another year of significant accomplishments. Organizational Results staff continued to deliver projects that directly impact the performance of MoDOT. Our group of professionals from business and engineering backgrounds has become a vital source for department managers to access the latest information, tools and resources to close performance gaps. Through partnerships with public and private sectors, Organizational Results delivers best practices and innovative solutions designed to deliver a world-class transportation experience.

This year-end review is intended to bring you up to date on OR's accomplishments for this past fiscal year.

Respectfully submitted,

A handwritten signature in black ink that reads "Mara Campbell". The signature is written in a cursive, flowing style.

Mara Campbell
Organizational Results Director

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Organizational Support

- ✓ Completed performance incentive pilot and rolled out statewide implementation
- ✓ Launched Solutions at Work, statewide best practices system
- ✓ Designed Tool and Equipment Challenge as an off-shoot of the best practice system
- ✓ Expanded performance measurement reports to districts and divisions
- ✓ Facilitated the annual strategic advance meeting
- ✓ Coordinated the Missouri Quality Award application
- ✓ Hosted a partnering meeting to speed up final project payments
- ✓ Hosted AASHTO's national quality conference in St. Louis



Partnering for Innovative Efficiencies Meeting Kickoff

Research



Peer Exchange Brainstorming Session

- ✓ Initiated Web-based request for proposal process for contract research
- ✓ Hosted the first transportation research forum bringing together research experts from public and private sectors for daylong discussions on a research focus area
- ✓ Hosted a formal peer exchange
- ✓ Coordinated an internal research prioritization process involving 30 department managers
- ✓ Initiated Performance Advisory Teams to expand research input from all areas of the department

Innovative Solutions

- ✓ Awarded Local Transportation Assistance Program to the University of Missouri-Rolla
- ✓ Improved internal and external OR web sites
- ✓ Streamlined new product evaluation process
- ✓ Published quarterly Fast Forward newsletters
- ✓ Partnered with the Missouri State Library to house the Missouri Transportation Library
- ✓ Established a service using a professional document researcher to conduct literature searches and industry summaries for department staff

Status of Products, by Groups.			
Group:	Product's Name:	List:	CR = Organizational Needs List
	Product Use or Description:	CET = Customer Products List	PAL = Full-Approval List
	SSBuz: Approved, Not Approved or other	ECI = Cashworthy End-Terminat.	QL = Qualified List
		ECI = Erosion Control List	QL = Qualified List
Asphalt			
Asphalt Equipment			
	Asphalt Zapper-4802		OR
	Magnum-Powered Reclamation/Milling Attachment.		
	5/29/2003 Declined - MoDOT declines to evaluate, do not use, contact NPEC.		
	2/20/2003 Evaluating - In relevant section, use not approved, contact NPEC.		
	2/19/2003 Proposed - By full form, use not approved, contact NPEC.		
	Cold In-place Recycling with Kocac Construction		OR
	A process where hot asphalt is injected with cold water during mixing.		
	3/20/2003 Declined - MoDOT declines to evaluate, do not use, contact NPEC.		
	2/23/2003 Evaluating - In relevant section, use not approved, contact NPEC.		
	2/21/2003 Proposed - By full form, use not approved, contact NPEC.		
Bituminous: Liquid Anti-Strip Agent			
	AD Here LA-3		PAL
	Liquid Anti-Strip Additives		
	4/16/2007 Not Approved - Can not be used by or for MoDOT, contact NPEC.		
	11/14/2006 Evaluating - In relevant section, use not approved, contact NPEC.		
	11/13/2006 Proposed - By full form, use not approved, contact NPEC.		
	Ecochem		PAL
	Neutral Organic Color Neutralizer:		
	6/1/2004 Declined - MoDOT declines to evaluate, do not use, contact NPEC.		
	2/21/2004 Evaluating - In relevant section, use not approved, contact NPEC.		
	2/20/2004 Proposed - By full form, use not approved, contact NPEC.		
	HFM		PAL
	Liquid Anti-Strip Additives		
	11/30/2004 Approved - Use as appropriate, see PAL or QL for more info.		
	10/19/2004 Evaluating - In relevant section, use not approved, contact NPEC.		
	10/18/2004 Proposed - By full form, use not approved, contact NPEC.		
	PaveRight 880		PAL
	Liquid Anti-Strip Additives		
	5/25/2006 Approved - Use as appropriate, see PAL or QL for more info.		
	4/11/2006 Evaluating - In relevant section, use not approved, contact NPEC.		
	4/10/2006 Proposed - By full form, use not approved, contact NPEC.		
	Asphalt Additive		

New Product Online Database



MoDOT Test Truck on Rough Pavement

Innovative Solutions (cont'd.)

- ✓ Published the following Staff Summaries:
 - Public Perception of Wetlands and Their Possible Impact on Property Values
 - Practical Design Case Study
 - Non-Traditional Transportation Funding
 - Metropolitan Mobility and Congestion
 - Highway-Railroad Crossing Safety
 - Median Guard Cable Performance in Relation to Median Slope
 - Pavement Smoothness and Fuel Efficiency
 - Container-on-Barge Feasibility
 - Container- on-Barge Service for Missouri Waterways

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Completed Research Projects

Slope Stabilization Using Recycled Plastic Pins, Phase III

The objective of this project was to produce a user's guide for field application of recycled plastic pins for slope stabilization projects. The manual has been distributed to the appropriate MoDOT work areas.

Image Analysis of Hardened Concrete

This project was a national pooled fund study in which Missouri was the lead state. The findings indicated an automated process can reliably replace hand counting air-void bubbles in concrete. The report included software development and hardware configurations to implement the automated process. MoDOT has begun to use this process.



Field readings of stabilized slope

Pavement Smoothness and Fuel Efficiency: An Analysis of the Economic Dimensions of the Missouri Smooth Roads Initiative

The objective of this in-house project was to validate previous research on the correlation of pavement smoothness and increased fuel efficiency for Missouri specific conditions. The results showed a 53 percent improvement in road smoothness, as part of the Smooth Roads Initiative, resulted in a 2.46 percent improvement in miles per gallon for large trucks. This information has been shared through department communication with Missouri legislators and the general public.



Karst Field Review

Assessment of Karst Activity at Construction Sites Using the Electrical Resistivity Method

This project was focused on two specific construction sites in Greene and Jefferson counties in close proximity to active sinkholes. Application of this technology at these sites demonstrated that electrical resistivity profiling could be successfully used to image the subsurface in karst terrain. This tool will be used as similar projects are identified.

Investigation of Cause of Cracked Stringer on the Blanchette Bridge

This investigation sought to find the cause of cracked stringers on the approach spans of the Blanchette Bridge in the St. Louis area. The results of the study indicated the stringer cracking occurred at details that had very high stress concentration factors due to open shim butt joints with fillet welds crossing the joint. Preventive measures have been implemented within the appropriate MoDOT divisions.

Southview Bridge Rehabilitation, Design and Construction

This project was undertaken to evaluate the use of post-tensioned fiber reinforced polymer for bridge-deck construction. The results showed how FRP, in the form of GFRP as passive and CFRP bars as active internal reinforcement, could be a feasible solution replacing the steel reinforcement of concrete slab bridges. Long-term results from this location will determine additional applications.



Blanchette Bridge over the Missouri River

Assessing MoDOT's Efforts to Provide the Right Transportation Solution

This project developed and deployed a survey tool to 12,000 Missourians to determine customer perceptions of recently completed transportation projects. Projects were evenly distributed throughout the state and varied in size. The survey provided project specific, regional and statewide results showing most Missourians are satisfied with MoDOT's efforts in providing the



Concrete sealer being applied to test deck

right transportation solution. The survey analysis has been shared with the appropriate MoDOT managers.

Bridge Deck Concrete Sealers

This in-house project analyzed a number of potential bridge deck sealers and the approach used by other states. The results showed linseed oil is still the best overall approach for small cracks on new bridge decks. The study did identify one new product for sealing larger cracks. The results will be incorporated into department specifications.

Post Construction Business Location Analysis, Highway 67 Relocation Project

This project studied business location patterns associated with the construction of a highway relocation project near Poplar Bluff. Five years of business data showed the city’s business district has remained stable and not moved toward the relocated highway interchange. However, a subsequent site visit did show some new business and real estate growth toward the new route. This information has been shared with department transportation planners.

Six-Mile Corridor Economic Impact Study, I-44 and I-70 Corridor Summaries

MoDOT teamed with the Missouri Department of Economic Development to study the economic impact of the state’s two major interstate systems. The results showed that more than one out of every three people working in Missouri works within three miles of Interstates 70 and 44 and annual commerce for these two roads adds more than \$130 billion to Missouri’s gross state product. This information has been shared through department communication with Missouri legislators and the general public.

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Business location map along Interstates

Customer Satisfaction: Fiscal Year 2007 Survey of Missouri Adults

This project is an annual update of a statewide telephone survey on customer satisfaction. Statistically valid samples of Missouri adults showed a 4 percent increase in overall satisfaction to 79 percent. This information has been shared with all department employees.

Review and Critique of MoDOT's State Revenue Forecasting Model

The objective of this project was to compare Missouri's state revenue forecasting model with national best practices. The results provided MoDOT with recommended changes to its current process. These recommendations have been implemented by MoDOT's resource management staff.

Viability and Durability of Shotcrete for Repairing Bridges

This in-house study evaluated shotcrete for making overhead and vertical repairs on bridge structures. Manual methods with rapid set mortar are effective, but time consuming. Field and laboratory testing showed Shotcrete to be a viable option for these types of bridge repairs if contractors follow specifications and some best practices. This information will be incorporated into MoDOT specifications.

Active Contract Research

Development of Hand-Held Thermographic Inspection Technologies

The goal of this study is to provide state highway agency maintenance and inspection personnel with an effective, nondestructive tool for detecting and monitoring structural concrete deterioration without disrupting traffic flow. A guideline and written practice for utilizing thermal cameras for the inspection and monitoring of concrete structures will allow for the widespread implementation of this new technology to enhance bridge inspection capability and improve maintenance operations. The implementation of this technology will improve the safety of the traveling public by reducing the possibility of the loose concrete falling into traffic lanes, and improve maintenance operations by providing engineers with a tool to better evaluate the boundaries of deteriorated areas on bridge decks. The results will also improve the efficiency of the highway infrastructure by reducing the number of lane closures required to evaluate deteriorating concrete structures.

Contract/Grant Number: TPF-5(152)

Total Dollars: \$245,000

Analysis of MoDOT Communication and Outreach Effectiveness

The study will review the efficiency and effectiveness of MoDOT's communication strategies and procedures as well as provide areas where opportunities to improve exist. The analysis will include an independent assessment of MoDOT's customer groups (and potential customer groups) and an analysis of MoDOT approaches to servicing each customer group.

Contract/Grant Number: RI07-009

Total Dollars: \$43,750

Study of Roadside Vegetation Establishment on Critical Areas

Lack of permanent vegetation along Route 60 in Carter County has left large areas of the right-of-way unprotected from soil erosion. There is erosion occurring on large areas of slopes that range from slight to severe. The sediment from this erosion is leaving deposits in the drainage systems and moving off site to areas that are within the national scenic river watershed of the Current River, which is listed as an outstanding national water resource. MoDOT is studying optimal vegetation and procedures for establishing vegetation on these roadsides where planting has been a challenge.

Contract/Grant Number: RI07-016

Total Dollars: \$25,000

Benefit/Cost of MoDOT's Total Striping and Delineation System

MoDOT has recently completed the Smooth Road Initiative (SRI) to improve delineation on approximately 2,200 miles of roadway, including freeways and major highways. The objectives of the research are to evaluate the safety effectiveness of the improvements (including specific combinations of improvement types), to use the safety evaluation results together with improvement cost data to perform a benefit-cost evaluation, and to assess public perception or satisfaction with the improved delineation.

Contract/Grant Number: RI06-043

Total Dollars: \$50,000

Investigating Tractor Trailer-Passenger Vehicle Interactions

With the growing numbers of vehicle miles traveled (VMT) in the commercial trucking industry, there is concern regarding the safety impact of this increase. This issue has raised much debate about how MoDOT regulates large trucks on its roadways. In terms of lane restrictions, states have different ways of handling truck-car interactions on highways. The study should provide MoDOT with sufficient information to either better defend its current policies regarding truck speeds and lane usage or consider modifications to these policies to improve safety and benefit the traveling public. Furthermore, an analysis of crash causation will benefit safety efforts in engineering, enforcement, and education to prevent future severe crashes involving large trucks.

Contract/Grant Number: RI07-006

Total Dollars: \$25,000

Comparison of Automated Vehicle Status and Location Systems

The objective of this project is to compare Fleet Point and International's vehicle monitoring systems that use global positioning systems, cell phone service, Internet, and data collection boxes and sensors to report vehicle status and location information.

Contract/Grant Number: RI07-045

Total Dollars: RFP not completed

Before and After Surveys of 2007 Pick-up Truck Campaign

To assess the impact of a media campaign and law enforcement effort related to safety in pickup trucks, a pre and post survey will be conducted. The survey questionnaire will assess the knowledge, attitudes, and behavior of Missourians ages 18-34 who have driven a pickup in the 30 days prior to the survey. A phone survey questionnaire will be similar to the one used last year to assess another pickup truck safety campaign for annual comparisons.

Contract/Grant Number: RI07-008

Total Dollars: \$35,000

Arc Spray Galvanic Anode for Bridge Substructures

This project describes how Aluminum-Zinc-Indium (AL-Zn-In) Arc sprayed anode was applied on three bridge substructures on I-44, St. Louis City & St. Louis County. An Aluminum, Zinc, Indium Arc Sprayed Galvanic Anode (CORRSPAY) cathodic protection system will be applied over concrete repairs to the superstructure and substructure of three bridges. This will be the first use of this technology by MoDOT. This is a preventive maintenance contract, which was to repair the concrete and then seal the areas with epoxy coatings. This product will replace the epoxy coating at some locations to provide a more active way of preventing continued corrosion of the rebar and protect the new concrete patches from coming out. It will be directly compared to the epoxy coating to determine the better repair.

Contract/Grant Number: RI05-044

Total Dollars: \$25,000

In-house Research

Active Projects

- RI 06-020 Investigation of Failures of Epoxy Polymer Overlays in Missouri
- RI 06-021 Evaluation of Soil Nail Launcher Slide Repair, Rte. 24 Monroe County
- RI 06-022 Field Evaluation of Concrete Pavements for Aggregate Specifications
- RI 07-016 Critical Area Roadside Vegetation Establishment
- RI 07-027 Update the Port Study Needs
- RI 07-028 Fleet Optimization Study

Pooled Fund Research & NCHRP

- SPR-3(017) Midwest States Pooled Fund Crash Test Program
- SPR-3(078) Wind-induced Vibration in Cable Stay Bridges
- TPF-5(021) North Central Superpave Center
- TPF-5(048) Accelerated Testing Facility
- TPF-5(066) Material and Construction Optimization for Prevention of Premature Pavement Distress in PCCP
- TPF-5(124) Accelerated Performance Testing on the 2006 NCAT Pavement Test Track
- TPF-5(092) Test and Evaluation of Material, Equipment and Methods for Winter Highway Maintenance
- TPF-5(111) Development of Standards for Geotechnical Management Systems
- TPF-5(112) Midwest States Pooled Fund Pavement Preservation Partnership

Pooled Fund Research & NCHRP (cont'd.)

TPF-5(131)	Underwater Inspection of Bridge Substructures Using Underwater Imaging Technologies
TPF-5(155)	Impact of New Seismic Design Provisions on Bridges in Mid-America
TPF-5(156)	Mississippi Valley Freight Coalition Pooled Fund
TPF-5(165)	Development of Design Guide for Thin and Ultra-Thin Concrete Overlays of Existing Asphalt Pavements

Budget Summary

	<u>Budget Amount</u>	<u>Expenditures</u>	<u>Percent Expended</u>
Administration	\$625,318	\$774,875	123.9%
Research	2,211,435	1,735,458	78.5%
Development	42,956	6,795	15.8%
Technology Transfer	<u>225,000</u>	<u>41,679</u>	<u>18.5%</u>
Total	\$3,104,709	\$2,558,807	82.4%

During FY 2007, Organizational Results Division realized a 17.6 percent budget surplus. This is an increase of 9.4 percent over FY 2006. Contract time extensions were granted on several projects resulting in lower than expected expenditures in research for the year. Due to staffing decreases, in-house project budgets for development were not fully expended. However, all SPR funding is obligated to existing research contracts and was included in the FY 2008 SPR budget.

Contract Expenditures for Fiscal Year 2007

Project #	Project Title	Contractor	Status	Obligated	Expended	FY08
RI 98-007D	Slope Stabilization Using Recycled Plastic Pins - Phase III	UMC	Complete	\$0	\$14,009	--
RI 98-026D	Library Systems Development at the RDT Division of MoDOT	UMC	Active	\$60,800	\$51,963	\$6,786
RI 02-022	Validation of FRP Composite Technology Through Field Testing	UMR	Active	\$150,300	\$44,283	\$300,676
RI 02-023	Adaptive Traffic Signal System	UMR	Complete	\$8,900	\$8,747	--
RI 03-007	Precast Concrete Panels in New Highway Construction	UMC	Complete	\$120,500	\$120,502	--
RI 03-056	Missouri Airport Investment Study	UMR	Complete	\$121,500	\$44,721	--
RI 04-002	AASHTO ME Pavement Design Guide Implementation in MO	ARA (ERES)	Active	\$123,900	\$24,154	\$160,100
RI 05-021	MTI Work Plan & Budget	MTI	Active	\$125,000	\$148,551	\$150,000
RI 05-023	Analysis of Seismic Instrumentation of Cape Girardeau Bridge	UMR	Complete	\$37,600	\$37,660	--
RI 05-036	Structural Assessment of the I-70 Blanchette Bridge	UMR	Complete	\$49,200	\$47,123	--

Contract Expenditures for Fiscal Year 2007(cont'd.)

Project #	Project Title	Contractor	Status	Obligated	Expended	FY08
RI 05-048	Using Best Practices to Model Economic and Non-Economic Benefits of Transportation Research in Missouri	UMC/UMR	Active	\$0	\$21,080	\$35,000
RI 05-053	Passenger Rail and Freight Capacity Analysis	UMC	Complete	\$99,200	\$109,127	--
RI 05-054	Public Opinion Survey on Primary Seat Belt & Motorcycle Helmet Law	UMR	Complete	\$0	\$3,360	--
RI 05-057	Route Relocations and Bypassed Communities Study of Impact on Economic Development	DED	Complete	\$0	\$17,000	--
RI 06-001	Resilient Moduli of Typical MO Soils and Unbound Granular Base Materials	UMR	Active	\$94,800	\$69,936	\$23,406
RI 06-007	Evaluation of Experimental Traffic Sign / Signal Photo Enforced	UMKC	Active	\$20,000	\$1,180	\$20,000
RI 06-010B	Engineering for Non-Engineering	UMC	Complete	\$0	5,960	--
RI 06-011B	Assessment of the Dynamic Merge System	UMR/UMC	Complete	\$35,000	\$34,995	--

Contract Expenditures for Fiscal Year 2007(cont'd.)

Project #	Project Title	Contractor	Status	Obligated	Expended	FY08
RI 06-017	Determination of Missouri Aggregate Specific Gravities	UMR	Complete	\$5,000	\$4,943	--
RI 06-019	Tracker Measures for FY 2007	UMR	Complete	\$0	\$161,884	--
RI 06-024	Assessment of MoDOT's Revenue Forecasting Method	HDR	Complete	\$25,000	\$68,487	--
RI 06-025	Right Transportation Solution Survey	UMC	Complete	\$0	\$45,000	--
RI 06-026	Evaluation of Flashing Yellow Arrow	UMKC	Active	\$0	\$7,008	\$18,000
RI 06-042	Economic Impact Analysis of Design-Build vs Design-Bid-Build	REMI	Complete	\$0	\$66,000	--
RI 06-045	Best Practices for Bio-Diesel Programs	MRI	Active	\$0	\$3,644	\$40,000
RI 06-046	2+1 Simulation Project	FHWA	Complete	\$0	\$40,000	--
RI 07-005	Amphibian Conservation in Mitigation Wetlands	UMC	Active	\$0	\$4,939	\$22,250
RI 07-006	Tractor Trailer Passenger Vehicle Interactions	UMC	Active	\$0	\$3,096	\$15,000
RI 07-008	Pick-Up Truck Surveys	UMC	Active	\$0	\$6,948	\$28,000
RI 07-034	Transportation Research Forum	UMR	Complete	\$0	\$5,530	--



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