TRANSPORTATION RESEARCH SYNTHESIS

Strategic Plans for Transportation Research Programs: A Survey of State and National Practice

The purpose of this TRS is to serve as a synthesis of pertinent completed research to be used for further study and evaluation by MnDOT. This TRS does not represent the conclusions of either CTC & Associates or MnDOT.

Introduction

MnDOT is embarking on a strategic planning effort for research across the agency and is interested in knowing more about the effective elements of other state and national transportation research program strategic plans. Of particular interest are steps taken to measure the effectiveness of meeting strategic program goals.

To gather information for this effort, MnDOT distributed an email survey to members of the AASHTO Research Advisory Committee asking research directors to share research strategic plans, if available, or provide a status on their agency's research strategic planning efforts.

Summary

Twenty-two state or district departments of transportation (DOTs) responded to the survey. Half of the respondents provided a plan or indicated that a plan was in process; the other half of the respondents reported that they have no plan or have suspended update of an existing research strategic plan. The table below summarizes survey responses.

Strategic Plans for Transportation Research Programs Survey Responses		
Response	**Number of Responses**	**State/District**
Research strategic plan or other document provided (details provided later in this report)	7	California, District of Columbia, Louisiana, Missouri, New Jersey, Ohio, Wisconsin
Plan in process	4	*Georgia*. A business plan is pending.
		Kentucky. A plan will be developed over the next 12 months.
		Nevada. The agency is creating its first-ever research strategic plan; the consultant's work is expected to be completed by October.
		New Mexico. The agency waited for completion of its state DOT strategic plan; planning will begin soon on the research strategic plan.
No research strategic plan	11	Idaho, Illinois, Indiana (see below), Iowa, Kansas (see below), Maryland, Montana, New Hampshire, South Carolina, Utah, West Virginia *Indiana*. The agency stopped updating its research strategic plan about six years ago. An October 2013 peer exchange report (see http://research.transportation.org/_layouts/AASHTORAC/FileDownLoad.aspx?Rid=66) sets the agency's objectives. See Appendix B for Indiana DOT's research and development goals for 2014. *Kansas*. The respondent provided Kansas DOT's 2008 Research, Development and Technology Transfer Procedures Manual (see Appendix C).

Survey responses, with contact information, are provided separately in Appendix A.

In this report, we examine the plan documents provided by seven agencies: California, District of Columbia, Louisiana, Missouri, New Jersey, Ohio and Wisconsin. In addition, we also review research strategic plans developed by the following national agencies and organizations:
- AASHTO Standing Committee on Research (SCOR)
- Federal Highway Administration (FHWA) Infrastructure Research and Technology
- Transportation Research Board (TRB)

Plan Analysis

Of the 10 plans or documents reviewed for this report, seven focus on improving the products, services, processes and impact of a research program. Of these, three agencies—District of Columbia, Louisiana and New Jersey—include performance measures, with only one agency plan—Louisiana's—specifying numeric targets to quantify program success in meeting stated objectives. The three remaining plans examined for this report focus on identifying research needs and developing a roadmap to meet those needs (California and FHWA) and the programs or services needed for effective execution of a research agenda (Ohio).

Plan Scope
Developing a research strategic plan is clearly not a one-size-fits-all proposition. The documents we reviewed for this report range widely in complexity and scope. On one end of the spectrum, the District of Columbia has prepared a document that examines the factors and efforts contributing to plan development before laying out the goals, objectives, strategies and action items that comprise the plan. Similarly, TRB's plan describes the activities that contributed heavily to development of the plan, and in its strategic research plan, Caltrans describes the workshops that provided input for the strategic research questions (SRQs) identified in the plan. At the other end of the spectrum are briefer documents developed by Louisiana and Missouri that focus solely on goals, objectives and strategies.

Research strategic plans typically begin at a high level, with a brief vision or mission statement, and gain in specificity with each succeeding level of the plan. Arising from the vision or mission are goals, with strategies associated with the goals designed to achieve the vision or mission. While some plans align strategies with a specific goal, others present strategies more generally, tying them to the overarching mission or vision. In some plans, action items are associated with each strategy to describe the activities that should be undertaken to pursue the strategies. Action items can be tracked using qualitative or quantitative performance measures.

Plan Differences and Similarities
Just as missions or visions differ by agency, so too do the goals identified to achieve those missions. Factors such as current and future challenges, available funding, staffing, availability and adoption of technology, and relationships with internal and external stakeholders that are specific to each agency lay the groundwork for plans that differ from one another in varying degrees.

Even with these differences, we identified common themes and practices in the processes used to develop the plans and the plans themselves. Below is a summary of common practices identified in the plans, with a reference to the agency plans reflecting those practices. We also include below those practices that were not found to be common among the plans but could be significant in their impact.

Factors affecting development of the plan
- Align the research strategic plan with the strategic plan of the agency (California, FHWA, Louisiana; New Mexico will begin its research strategic plan only after its agency plan is complete)
- Identify factors that affect the research direction of the agency (California, District of Columbia, FHWA, TRB)
- Conduct a strengths, weaknesses, opportunities and threats (SWOT) analysis (District of Columbia, Missouri, TRB)

Guiding the research agenda
- Align research goals with the overarching agency mission (California, District of Columbia, FHWA, Louisiana, Ohio)
- Identify focus areas to guide selection of research projects (California, District of Columbia, Louisiana, Ohio, TRB)

Roles in developing the plan

- Led by research division (District of Columbia, Missouri, New Jersey)
- Launched with executive direction (Louisiana)
- Encourage stakeholder involvement in plan development (District of Columbia, Missouri, New Jersey, TRB)
- Consider focus groups, surveys and other forms of outreach to gather feedback to inform plan development (California, District of Columbia, Missouri, New Jersey, TRB)

Plan structure

- Assess the performance of the research program (District of Columbia, Louisiana, Missouri, New Jersey, SCOR, TRB, Wisconsin)
- Develop a roadmap to guide investments (FHWA)
- Identify strategic research questions (California)
- Establish performance measures (District of Columbia, Louisiana, Missouri, New Jersey)
- Establish targets for the performance measures (Louisiana)

Goals and Strategies for Process Improvement

Seven of the 10 research strategic plans examined for this report focus on process improvement. As we examined these plans, we classified goals and strategies into the following 12 categories to permit cross-referencing of plans across agencies and aid in identifying possible consensus among the plans in the research program goals they include and the strategies identified to achieve them.

- Customer service
- Data management
- Fiscal issues
- Human resources
- Implementation
- Managing research
- Marketing
- Partnerships
- Process improvement
- Products and services
- Technology
- Training

Note: The categorization described above is subjective. The tables summarizing the plans that appear later in this document are not intended to be representative of an entire plan but rather provide highlights that permit a limited and targeted comparison of plans.

Goals, strategies or action items related to marketing appeared in all seven process improvement plans, and this type of goal, along with partnerships and process improvement, appeared more frequently in the plans than did other goal types. The table below summarizes the categorization of goals, strategies or action items across plans.

Summary of Plan Goals, Strategies and Selected Action Items by Category

Category	Number of Goals, Strategies or Actions by Agency/Organization							
	District of Columbia	Louisiana	Missouri	New Jersey	SCOR	TRB	Wisconsin	Total
Marketing	1	1	2	1	1	1	3	**10**
Partnerships	1	0	2	3	1	2	1	**10**
Process improvement	0	3	0	4	1	1	1	**10**
Managing research	2	0	0	2	3	1	1	**9**
Implementation	1	1	1	2	1	1	0	**7**
Customer service	1	2	0	2	0	1	0	**6**
Fiscal issues	0	2	1	1	0	1	1	**6**
Human resources	0	3	0	1	0	1	1	**6**
Training	0	3	0	0	0	1	0	**4**
Technology	0	0	1	0	0	2	0	**3**
Data management	1	0	0	0	0	0	0	**1**
Products and services	0	0	1	0	0	0	0	**1**
Total	**7**	**15**	**8**	**16**	**7**	**12**	**8**	**73**

Performance Measures
Some plans employ a limited number of performance measures (New Jersey, for example) while others include a great many measures in various categories (see the District of Columbia's plan). Below we summarize performance measures for the four agencies identifying such measures (District of Columbia, Louisiana, Missouri and New Jersey).

Customer satisfaction
- Customer satisfaction surveys for research projects published and technical assistance project results delivered (Louisiana) and Customer/Research Bureau Satisfaction Indices based on annual customer/stakeholder surveys (New Jersey)

Data management
- Content, quality and quantity of data in the data center (District of Columbia)
- Number of divisions/branches using research framework to identify and share data (District of Columbia)
- Number of presentations, projects and initiatives related to research involvement in data activities (District of Columbia)

Fiscal issues
- Cost savings associated with reduced data duplication (District of Columbia)
- Cost, time or other savings (District of Columbia, New Jersey)
- Expending funds on time and on budget (Louisiana, New Jersey)
- Funding from sources other than traditional funders (Louisiana, New Jersey)
- Maintaining cost per participant (Louisiana)

Human resources
- Percentage increase of professional development opportunities (Louisiana)
- Percentage of individual development plans developed (Louisiana)
- Percentage of staff compliance with safety requirements (Louisiana)
- Percentage/ratio of staff completing required training (Louisiana)

Implementation
- Amount of funding for implementation (District of Columbia)
- Evaluation of program based on results that are implementable, implemented and not implementable (New Jersey)
- Number of National Cooperative Highway Research Program (NCHRP) and other external research program results implemented (District of Columbia)
- Number of research results and best practices implemented (District of Columbia)
- Percentage of completed research projects providing recommendation for implementation of results endorsed by project review committee (Louisiana)

Library services
- Library utilization, literature search assistance, best practice scans completed, and in-person and electronic requests (District of Columbia)
- Number of library items circulated (Missouri)

Managing research
- Final reports and other publications delivered on schedule (Louisiana)
- Number and type of research collaborations with internal and external partners (District of Columbia)
- Number of projects completed on time (Missouri)
- Number of research needs statements submitted (District of Columbia)
- Number of research projects completed (Missouri)
- Percentage of divisions/branches participating in problem statement submission, project panel participation, evaluations and research results implementation (District of Columbia)
- Percentage of proficiency tests conducted by agency labs (Louisiana)
- Problem statements submitted to national research programs (District of Columbia)
- Projects completed on time and within budget (District of Columbia, New Jersey)
- Timely completion of editing (Louisiana)

Marketing
- Marketing technical information and research results (Louisiana)
- Number of presentations given and publications based on program deliverables (District of Columbia)
- Number of presentations to or meetings with external partners/presentations to agency units (District of Columbia)

Training

- Internal and external participation in training courses maintained (Louisiana)
- Number of course offerings maintained (Louisiana)
- Number of Local Technical Assistance Program (LTAP) classes and attendees (Missouri)
- Number of new training courses developed (Louisiana)
- Number of revised technical training courses (Louisiana)
- Training external partners (New Jersey)

Performance Targets

Only Louisiana sets specific targets to gauge success in meeting program goals. Louisiana's program sets a series of objectives for each goal, with measureable outcomes that allow the agency to specify both a target percentage for meeting the goal and a percentage at which the goal will have been exceeded. Louisiana Transportation Research Center (LTRC), a division under Louisiana Department of Transportation and Development's Office of Engineering, has established goals for two sections—Research, and Technology Transfer and Training. The agency's goal documents specify inputs, outputs and a description of the efficiency gained by meeting or exceeding the target.

Using an executive-level framework and some staff input, objectives for the two LTRC sections were developed by section heads with the intent of improving operations and efficiencies at LTRC. Over time, new objectives have been added and existing objectives have been modified or eliminated if an objective failed to measure what was intended. A relatively new voluntary program, Pay for Performance, encourages staff and management to meet goals by providing bonus pay ($500 or $1,000) to sections of the agency exceeding targets by a specified amount.

Detailed Findings

The research strategic plans highlighted in this report fall into four categories based on their focus:
- Setting a research agenda
- Research program execution
- Research program process improvement (performance measures)
- Research program process improvement (no performance measures)

Setting a Research Agenda

In this section we highlight research strategic plans from the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) that focus on establishing an agency's research agenda. Research priorities are central to these plans, with discussions of process improvement playing a lesser role.

Federal Highway Administration

Strategic Plan, 2011 FHWA Infrastructure Research and Technology, Federal Highway Administration, April 2012.
http://www.fhwa.dot.gov/publications/research/infrastructure/12043/12043.pdf

Plan Background
The Federal Highway Administration's (FHWA's) strategic direction in this plan is based on two other documents:
- FHWA Strategic Plan (see https://www.fhwa.dot.gov/policy/fhplan.htm)
- USDOT Strategic Plan FY 2010–FY 2015: Transportation for a New Generation (see http://www.uab.edu/utc/PDF%20Files/Dot_strategic_plan_2010-15.pdf for a draft version of this plan)

Page 2 of the Infrastructure Research and Technology plan describes how the plan will be used:

> The plan will provide a comprehensive focus and direction across organizational boundaries and assist in prioritizing program initiatives, allocating resources, and improving the processes relative to how FHWA staff work together to achieve FHWA's mission in the future. The strategic plan and roadmap will recognize the inter-relationships and interdependencies among the different infrastructure disciplines and provide a framework for collaboration across disciplines and with other FHWA programs.

Principles, Objectives and Strategies
The strategic plan and roadmap will guide investments of FHWA resources (human, financial and capital); inform other internal and external programs; and drive input to the agencywide strategic planning processes. Some of the guiding principles for developing the strategic plan include:
- The FHWA research and technology process, from research through implementation, is systematic and begins with the end in mind.
- Stakeholders are engaged throughout the process.
- The process is grounded in the FHWA mission and goals, and guided by multiyear plans.
- The performance of initiatives will be measured and evaluated.
- Programs and projects will be effectively communicated to partners to foster transparency and a collaborative approach.

FHWA Infrastructure Research and Technology objectives include:

- Reduce the number of fatalities attributable to infrastructure design characteristics and work zones.
- Improve the safety and security of highway infrastructure.
- Improve the management of infrastructure assets and advance the implementation of a performance-based program for the National Highway System.
- Improve the ability of transportation agencies to deliver projects that meet expectations for timeliness, quality and cost.
- Reduce user delay attributable to infrastructure system performance, maintenance, rehabilitation and construction.
- Improve highway condition and performance through increased use of design, materials, construction and maintenance innovations.

Page 9 of the strategic plan describes the differences between strategies and initiatives:

> Infrastructure program strategies describe and define the work required to achieve objectives and outcomes and, ultimately, the FHWA and USDOT strategic goals. Carrying out a strategy is intended to achieve an end result or goal. Infrastructure program initiatives are efforts to advance one or more strategies. They may involve collaboration among staff within one office or several offices. Initiatives typically have shorter timeframes and/or scales than strategies. Individual offices will advance an initiative through the activities in their unit plans.

The strategies that will be used to achieve these objectives are presented on page 15 of the strategic plan. While the plan indicates that FHWA will "[a]ssess impact of initiatives and actions and measure results," specific performance measures do not appear in the plan.

California

The Caltrans Strategic Research Plan, Caltrans Division of Research and Innovation, California Department of Transportation, 2008/2009.
http://www.dot.ca.gov/research/strategic_plan/docs/strategic_research_plan_8-18-09.pdf

Plan Background
Caltrans' strategic research plan is based on the agency's strategic plan, which focuses on five goals: safety, mobility, delivery, stewardship and service. The strategic research plan is used to help propose and select research and to assess the alignment of Caltrans' research portfolio with the agency's strategic direction.

Using workshops to encourage departmentwide input into the strategic research plan, Caltrans brought together research stakeholders for each goal to brainstorm research questions for each strategic plan objective, refine questions to identify higher-level research questions, and rank the questions. The workshops resulted in 38 strategic research questions (SRQs) organized in five groups that track to the five goals identified in the agency's strategic plan:

- Safety
- Mobility
- Goods movement
- Climate change
- Infrastructure

Strategic Research Questions

The 38 SRQs were allocated among three categories: priority (9), best practice (15) and low priority (14). The nine priority SRQs were design and construction, proactive safety, data, integrated corridor management, travel demand modeling (TDM) real time, TDM system elements, goods movement, climate change and transportation infrastructure. The complete list of SRQs grouped by strategic plan goal is available in Appendix C, which begins on page 31 of the plan.

To assess how existing research relates to the SRQs, Caltrans:

- Mapped the existing research agenda to the SRQs to facilitate a gap analysis
- Examined how funds have been allocated across priority, best practice and low priority SRQs

The plan includes profiles of the nine priority SRQs. Each research question is followed by background information and additional questions that surfaced during the workshops. The profiles conclude with a sampling of research projects underway to address the SRQ being profiled.

Related Resource

Strategic Research Questions: Progress Report, RDSC Meeting, Caltrans, June 22, 2010.
http://www.dot.ca.gov/research/strategic_plan/docs/srq_progress_report.pdf
This progress report prepared as a presentation to the Caltrans Research & Deployment Steering Committee summarizes Caltrans' strategic research plan, noting that in each research focus area, the agency is "trying to refine high-level research questions to guide future research." The presentation's summary notes that this effort has:

- Focused attention on key questions and priorities
- Increased communication and collaboration across programs and with University Transportation Centers
- Helped to classify and understand research being done by Caltrans and other agencies
- Identified projects that apply to more than one strategic area

Research Program Execution

Unlike the plans highlighted in the previous section, the Ohio DOT (ODOT) plan discussed below does not include a detailed research agenda. Instead, it identifies three strategic research focus areas that will guide how the majority of program funds are expended. The plan then describes the programs that will be used to meet the agency's research needs.

Ohio

Strategic Research Plan for 2014-2016, Ohio Department of Transportation, May 20, 2014.
http://www.dot.state.oh.us/Divisions/Planning/SPR/Research/Strategic%20Research%20Plan/STRATEGIC%20PLAN%202014-2016v2.pdf

Strategic Research Plan for 2012-2014, Ohio Department of Transportation, undated.
http://www.dot.state.oh.us/Divisions/Planning/SPR/Research/Strategic%20Research%20Plan/STRATEGIC%20%200PLAN%20202012-2014.pdf

Plan Background

The current strategic research plan is an update of the 2012-2104 plan that identified four research focus areas:

- Transportation asset management
- Organizational transformation
- Transportation safety
- Customer connections

As the discussion below indicates, the 2014-2106 plan reflects removal of one of the focus areas identified in the 2012-2014 plan and the renaming of another.

Goals and Strategies

The current plan outlines the three focus areas of ODOT's transportation research, development and technology transfer (RD&T^2) program:

- Transportation infrastructure preservation and enhancement
- Organizational transformation
- Transportation safety

The RD&T^2 program's primary goal is to provide decision makers with the information and tools they need to meet the evolving transportation needs of Ohioans and the traveling public. Secondary goals include maximizing research investments; taking advantage of new technologies; and producing practical research results with strong implementation potential.

The plan identifies keys to effective research program execution:

- Identifying emerging areas of interest with potential for great impact that are aligned with the department's mission
- Creating an open, collaborative environment that fosters creative solutions and accountability
- Engaging in partnerships with universities, consultants and other disciplines
- Designing subprograms to help meet research program goals

Program Execution

The following programs are described as key elements of ODOT's plan for effective research program execution:

- ***Strategic research projects.*** Ideas submitted by ODOT staff that relate to one or more of the three strategic research areas are developed into requests for proposals (RFPs) that, once approved by executive leadership, are posted on the Research website.

- ***ODOT in-house research.*** This program funds studies in the field, lab or from the office and encourages engagement from any ODOT office with research needs and project ideas that support the strategic research plan.

- ***Research on call.*** Developed to respond to the need for high-impact research conducted on a smaller scale than traditional research projects, this program speeds up delivery of research results to the implementation phase.

- ***ODOT's Partnered Research Exploration Program.*** This program encourages researchers to propose unsolicited projects to address research needs that have not been identified by ODOT.

- ***Student studies.*** Small research studies that are limited in scope are adapted to an academic investigation that can be conducted by a college student under the guidance of a professor in the form of a student study. These projects are often proposed by university professors during an annual solicitation.

- ***Ohio's Research Initiative for Locals.*** This collaborative effort provides research support for local agencies to address problems specific to the local roadway system.

Research Program Process Improvement (Performance Measures)

While all of the plans reviewed thus far have included at least a brief discussion of process improvement—for example, encouraging outreach—the plans highlighted in this section of the report focus exclusively on process improvement. All three plans—from District of Columbia, Louisiana and New Jersey—include performance measures to help the agency assess its success in meeting goals and objectives, but only Louisiana's plan includes specific targets for each measure.

District of Columbia

Strategic Plan 2013-2017: Building a Premier Urban Research Program, Research, Development, & Technology Transfer Program, District Department of Transportation, District of Columbia, September 23, 2013. https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGMuZ292fGRkb3QtcmVzZWFyY2gtcHJvZ3JhbXxneDo3ZjQyZWFjMzgyN2I4Mjk1

Plan Background
Two primary outcomes of District Department of Transportation's (DDOT's) strategic planning process are:
- A definition of the agency's needs for research, both in terms of the types of research activities and the subject areas
- A description of how the program can better deliver its services

The critical agency needs identified below will inform the research project selection process beginning in fiscal year 2014:

- Stormwater management and low-impact development
- Innovative financing and project delivery methods, including pricing approaches
- Asset management
- Technology: intelligent transportation systems and information technology
- Performance measures and performance management

- Business processes and management
- Parking management and operations
- Safety
- Transportation system management and operations
- Innovative contracting models
- Data warehousing and analysis
- Sustainability

Development of the plan benefited from:
- Examination of a 2008 FHWA program audit.
- A June 2013 peer exchange with other research program managers that addressed the plan and its objectives.
- Outreach meetings with 35 of the 50 DDOT branches. These meetings reintroduced the Research Program and its offerings and generated discussion about the issues and research needs of each branch.
- A survey of DDOT staff about their experiences with and what they would like from the research program.

- A review of strategic plans written for other states' research programs and for national research programs and groups.
- A strengths, weaknesses, opportunities and threats (SWOT) analysis to understand where and how the program should grow (see page 18 of the plan for details of the analysis).

Goals and Strategies
The table below summarizes the agency's goals and strategies for accomplishing those goals. Specific action items for each strategy, divided into near-term (one to two years) and mid-term (three to five years) actions, begin on page 28 of the plan.

District Department of Transportation Strategic Plan Goals and Strategies		
Goal	**Category**	**Strategy**
Enhance the research value proposition	Managing research	Produce quality and relevant research through improved identification, programming and management of projects
	Implementation	Improve project implementation
Propel the agency's data-driven culture	Data management	Increase availability of timely and quality data
		Integrate disparate data collection efforts
Partner for success	Partnerships	Build on existing university relationships and foster new connections
		Strengthen connections to federal agencies and their research efforts
		Better utilize cooperative research programs
Enhance the visibility of the research program	Marketing	Communicate the program's activities, services and research more broadly
	Customer service	Focus on customer service, especially providing information to customers
	Managing research	Integrate research programmatically into DDOT's work

Performance Measures
The DDOT plan includes performance measures to track program progress. Measurement will occur at least annually; fiscal year 2013 will be used as a baseline. The table below summarizes the performance measures. Note that specific targets have not been identified; cost and other savings will be identified in Years 3 through 5 of the plan.

District Department of Transportation Strategic Performance Measures	
Goal	**Performance Measure**
Enhance the research value proposition	• Number of research results and best practices implemented • Percentage of projects completed on time and within budget • Number of research needs statements submitted • Amount of funding for implementation activities • Years 3-5: Benefits to DDOT, including cost or other savings, process effectiveness and knowledge transfer improvements
Propel the agency's data-driven culture	• Number of presentations, projects and initiatives related to research program involvement in data activities • Content, quality and quantity of data in the DDOT data center • Years 3-5: Number of divisions/branches using framework developed to identify and share data • Years 3-5: Cost savings associated with reduced data duplication
Partner for success	• Problem statements submitted to national research programs • Number of NCHRP and other external research program results implemented at DDOT • Years 1-2: Number of presentations to or meetings with prospective external partners • Years 3-5: Number and type of research collaborations with internal and external partners
Enhance the visibility of the research program	• Number of presentations to DDOT units • Percentage of DDOT divisions/branches participating in problem statement submission, project panel participation, evaluations and research results implementation • Library utilization, including information pushed, literature search assistance, best practice scans completed, and in-person and electronic requests • Number of presentations given and publications based on program deliverables

Louisiana

Research (Section 19), Fiscal Year 14-15, Louisiana Transportation Research Center, Louisiana Department of Transportation and Development, undated.
See Appendix D.

Note: Harold "Skip" Paul, director of Louisiana Transportation Research Center (harold.paul@la.gov, 225-767-9101), provided background information about his agency's research strategic plans.

Plan Background
Louisiana Department of Transportation and Development (LADOTD) has maintained an agencywide five-year strategic plan since at least 1986, with little change in the executive-level goals over the years. In 2005-2006, each of the five offices reporting to the agency executive's office (the LADOTD secretary) were required to establish office-level strategies and objectives based on the goals in the executive five-year strategic plan. Each office could also add goals. Within each office, the divisions and sections established their own goals using the framework of the executive strategic plan.

Louisiana Transportation Research Center (LTRC), a division under LADOTD's Office of Engineering, is composed of two sections—Research, and Technology Transfer and Training. Using the executive-level framework and some staff input, objectives for the two LTRC sections were developed by section heads with the intent of improving operations and efficiencies at LTRC. The objectives include measurable outcomes that permit the use of performance measures with associated targets. Paul noted that over time, new objectives have been added and existing objectives have been modified or eliminated if an objective failed to measure what was intended. Agencies just beginning the process of goal setting and measurement should expect a trial-and-error process that requires modification to ensure that the exercise produces useful results.

Each LTRC section produces quarterly reports that show progress in meeting section goals. These quarterly assessments are also used for employee midyear planning sessions. An annual assessment is provided for overall agency reporting.

While LTRC has not attempted to identify quantifiable cost or time savings results for its research program, Paul notes that LTRC has made marked improvement in objectives such as publishing final reports on time and in the budget/spending objectives. The opportunity for sections to earn additional pay through the Pay for Performance program (see the *Note* below) has elevated interest in working together to meet and exceed goals.

Goals and Performance Measures
Using a series of objectives for each goal that specify both a target percentage for meeting the goal and a percentage at which the goal will have been exceeded, LTRC's goal document specifies inputs, outputs and a description of the efficiency gained by meeting or exceeding the target.

Note: Three years ago, LADOTD initiated a voluntary Pay for Performance (PfP) program that provides bonus pay ($500 or $1,000) for sections exceeding targets by a specified amount. The Research section chose to participate and set "exceed" targets. The goals, objectives and targets were approved by the agency's human resources office. After a one-year trial to determine the effectiveness of the measures and targets, any necessary revisions to the objectives or targets were made before the program began regular operation in Year 2. The PfP results are also incorporated into each employee's annual personnel evaluation.

The table below provides highlights of the Research section's goals and the measurements used to assess progress in meeting those goals. See Appendix D for details on the established targets.

Louisiana Department of Transportation and Development Goals for the Research Section		
Goal	**Category**	**Performance Measure**
Continuously improve the performance of the Office of Engineering	Marketing	Marketing of technical information and research results
	Process improvement	Proficiency tests completed
Deliver cost-effective products, projects and services in a timely manner	Process improvement	Percentage of final reports delivered on schedule
Improve customer service and public confidence	Customer service	Average rating on customer satisfaction surveys for research projects published and technical assistance project results delivered
Effectively develop and manage our human resources	Training	Percentage of employees completing required training for leadership and individual development
		Percentage of employees completing required safety training
Effectively manage the financial resources available to the Office of Engineering	Fiscal issues	Percentage of projects expending funds as specified by estimated budget
	Implementation	Percentage of completed research projects that include implementation recommendations

Goals for Technology Transfer and Training (Section 33), FY 14-15, Louisiana Transportation Research Center, Louisiana Department of Transportation and Development, May 22, 2014.
See Appendix E.

Goals and Performance Measures
Using a series of objectives for each goal that specify a target for meeting the goal, LTRC specifies inputs, outputs and a description of the efficiency gained by meeting the target to determine how well the technology transfer and training activities of the section are meeting its goals.

Note: The Technology Transfer and Training section chose not to participate in LADOTD's PfP program and did not set "exceed" targets.

The table below provides highlights of the goals and measurements used to assess the progress of the Technology Transfer and Training section in meeting its goals. See Appendix E for further details.

Louisiana Department of Transportation and Development Goals for the Technology Transfer and Training Section

Goal	Category	Performance Measure
Continuously improve the performance of the Technology Transfer and Training section	Training	Revise existing training courses and develop new ones
Deliver cost-effective products, projects and services in a timely manner	Process improvement	Assess average rating for course content to ensure quality
		Maintain participation levels and course offerings
Improve customer service and public confidence	Customer service	Ensure timeliness in getting publications to press
	Human resources	Increase professional development opportunities
Effectively develop and manage our human resources	Human resources	Determine the number of individual development plans developed
	Training	Number of employees completing required training
Efficiently manage the financial resources of the Technology Transfer and Training section	Fiscal issues	Maintain private sector funding and cost per participant; manage allocated budget
Enhance the safety and well-being of our citizens, visitors and staff	Human resources	Determine the number of employees reading monthly safety document

New Jersey

Strategic Plan 2005-2008: Turning Problems into Solutions, Bureau of Research, New Jersey Department of Transportation, June 4, 2005.
http://www.state.nj.us/transportation/refdata/research/pdf/Research%20Strategic%20Plan%20.pdf

2005 Strategic Directions: Turning Problems into Solutions, Bureau of Research, New Jersey Department of Transportation, undated.
http://www.state.nj.us/transportation/refdata/research/pdf/Research Strategic Plan Brochure.pdf

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Note: The New Jersey DOT Bureau of Research is updating its research strategic plan.

Plan Background
This plan, which covers the period 2005 through 2008, was developed by New Jersey DOT's Bureau of Research as an update to the strategic planning process that began in 2000. The 2005 plan, developed with input from survey results and focus group meetings with research stakeholder groups, identified two strategic goals:

- Enhancing customer service
- Strengthening the capacity of the Bureau of Research

Strategies, Actions and Performance Measures
The plan includes strategies and actions for both goals. Performance measures, but not targets, are also specified for both goals. The tables below provide selected highlights from the plan.

New Jersey DOT Bureau of Research Goal 1: Enhancing Customer Service		
Strategy	**Category**	**Selected Actions**
Continuously solicit customer and organizational feedback	Partnerships	Involve customers and organization unit managers in project decision-making
Negotiate each project problem with the appropriate division management	Customer service	Assist organizational units with solicitation of their research needs
Attend appropriate scoping meetings	Customer service	
Significantly increase the number of projects that are successfully implemented	Implementation	Increase weight given to evaluating implementation plans in project proposals
		Build implementation ideas or requirements into research contracts
		Develop implementation guidelines
		Require research project managers to develop work plans for implementation
		Target up to 20% of the bureau's budget for implementation expenses
Conduct continuous improvement forums with university research partners	Process improvement	Improve project completion on-time delivery
	Implementation	Produce more tangible research projects that can be reasonably implemented
	Process improvement	Improve the quality of final research reports
Simplify ease of access to information	Process improvement	
Develop a "differential research projects" process	Managing research	*Pipeline 1.* Full research project of one year or more with university partner or performed in-house. *Pipeline 2.* Rapid research, pilot implementation or demonstration project less than one year with university partner or performed in-house. *Pipeline 3.* Survey, literature search or research consulting services effort.
Ensure timely delivery of quarterly reports, technical memorandums and draft final reports	Process improvement	Limit time extensions and require customer's approval for any extension

Performance measures for Goal 1:

- Customer Satisfaction Index based on an annual customer survey of Pipelines 1, 2 and 3 research activities
- Customer sign-off based on percentage of the program in three categories: implementable, implemented and not implementable
- Percentage of projects delivered on time and on budget
- Cost and time savings for the department

Note that these goals do not include targets or thresholds.

New Jersey DOT Bureau of Research Goal 2: Strengthening the Capacity of the Bureau of Research		
Strategy	**Category**	**Selected Actions**
Hire and retain excellent staff	Human resources	Develop a bureau succession plan (hiring and mentoring)
		Change the department paradigm to hire before someone leaves
		Explore staff cost-sharing mechanisms with other organizations
Investigate alternative sources of funding	Fiscal issues	Diversify funding sources
		Explore cost sharing for research projects with non-DOT organizations
		Explore matching funds from operational units for implementation efforts
Explore a partnership structure with the New Technology and Products Group	Partnerships	Produce a joint annual report that highlights the program and products of both organizations
Demonstrate the bureau's value to the department	Marketing	Develop a bureau marketing plan
		Update department staff on research through tech briefs, quarterly meetings, "brown bag" lunches and articles in the *Transporter*
Expand the bureau's partnerships with outside organizations	Partnerships	Engage industry and consultant organizations in implementation and training efforts
Explore the development of a New Jersey Transportation Institute	Managing research	Document the pros and cons of this type of research organization for the state of New Jersey

Performance measures for Goal 2:

- Percentage of the program funds from sources other than traditional funders
- Research Bureau Satisfaction Index based on annual interviews with customers, university research partners and FHWA
- Percentage of training and implementation efforts that involved industry and consultant organizations

Note that these goals do not include targets or thresholds.

Research Program Process Improvement (No Performance Measures)

Highlighted in this section are plans from two state transportation agencies and two national organizations that focus on process improvement but do not include performance measures.

State agencies: National organizations:

- Missouri   • AASHTO Standing Committee on Research (SCOR)
- Wisconsin   • Transportation Research Board (TRB)

Missouri

MoDOT Research Vision, Research Division, Missouri Department of Transportation, June 19, 2014. See Appendix F.

Note: Jennifer Harper, Missouri DOT research engineer (jennifer.harper@modot.mo.gov, 573-526-3636), provided background information about the MoDOT Research Vision.

Plan Background
This June 2014 document updates a previous, high-level vision that the Missouri Department of Transportation (MoDOT) developed using focus groups and surveys. A recently completed SWOT analysis identified elements that contributed to the development of the revised research vision. Previous partnering surveys were reviewed as Research Division staff prepared to update the vision; however, new surveys were not issued, and input for the updated vision was limited to Research Division staff and the division's contract librarian.

The head of the Research Division requested an update to the vision, and Research staff took the lead to develop it. The recently adopted vision provides a greater focus on goals and needs. While performance measures and targets have not yet been considered for inclusion in the research vision, the Research Division has established other performance measures (see Performance Measures below). To date, the Research Division's efforts to quantify benefits such as cost savings or safety improvements have been on a project-by-project basis and not at the program level.

MoDOT's advice to other agencies developing a research vision is to ensure that the goals and strategies are established with enough specificity that they provide adequate direction for the research program. The research vision should be a usable document, not simply a report on a shelf.

Goals and Strategies
The MoDOT Research Vision does not provide benchmarks or targets. Instead, strategies are provided to meet each goal. Highlights from the vision document are summarized in the table below.

Missouri Department of Transportation Research Vision Goals and Strategies		
Goal	**Category**	**Strategy**
On time/on budget	Fiscal issues	Track project progress and estimates vs. expenditures
Build relationships	Marketing	Use publications to highlight implementation opportunities
	Partnerships	Develop formal process to solicit research ideas/areas of concerns; engage with universities
Research innovations and implementable research	Implementation	Define research needs and implementation plans; pilot project to quantify implementation results; define implementation benefits to department
New product process	Products and services	Reorganize new product effort; evaluate new products
Knowledge management	Marketing	Increase visibility and accessibility of MoDOT publications
	Technology	Identify digitization opportunities
	Partnerships	Leverage expertise of regional and national knowledge networks

Performance Measures

MoDOT maintains a robust performance measure system with its *Tracker*, a tool that measures the agency's performance in delivering products and services to its customers (see http://www.modot.org/about/Tracker.htm). Research-related measures, not connected to the MoDOT Research Vision, were included in *Tracker* until January 2013; after this date, a significant number of measures were removed from *Tracker* publications. The Research Division maintains the following performance measures in its divisional *Tracker:*

- Number of library items circulated
- Number of LTAP classes and attendees
- Number of research projects completed
- Percentage of active and completed research projects on time

Related Resources

Research Division *Tracker* measures:

Number of LTAP Classes and Attendees, Research Division, Missouri Department of Transportation, Second Quarter 2014. **See Appendix G.**

Number of Library Items Circulated, Research Division, Missouri Department of Transportation, Fourth Quarter 2014. **See Appendix H.**

Number of Research Projects Completed, Research Division, Missouri Department of Transportation, June 2014. **See Appendix I.**

Percent of Active and Completed Research Projects on Time, Research Division, Missouri Department of Transportation, June 2014. **See Appendix J.**

Wisconsin

2011-2015 Strategic Plan, Wisconsin Highway Research Program, October 25, 2010.
http://wisdotresearch.wi.gov/wp-content/uploads/WHRP-strategic-plan-2010-10-25.pdf

Emphasis Areas and Actions
The Wisconsin Highway Research Program (WHRP) was established in 1998 by Wisconsin DOT in collaboration with the University of Wisconsin–Madison to discover better ways to design, build and reconstruct the state's highways. The table below summarizes the three emphasis areas of WHRP's strategic plan and the actions taken in support of those emphasis areas.

Wisconsin Highway Research Program Strategic Plan Emphasis Areas		
Emphasis Area	**Category**	**Action**
Maintaining the value and relativity of the program	Partnerships	Maintain strong ties to academia, industry and public agencies
	Marketing	Proactively share information with local agencies
		Share information and promote use of research ideas
	Fiscal issues	Effectively utilize federal and state research funds
Ensuring the validity and applicability of the research	Managing research	Conduct meaningful research in core topical areas and consider research in other key areas
	Marketing	Enhance technology transfer efforts and create new outreach opportunities
Enhancing the management and conduct of the projects	Process improvement	Monitor performance of projects and researchers, track outcomes and document impacts of research
	Human resources	Facilitate involvement of staff, managers and partners in projects
	Marketing	Ensure completed research reaches partners and stakeholders

AASHTO Standing Committee on Research

Strategic Plan, AASHTO Standing Committee on Research, AASHTO Research Advisory Committee, March 27, 2013.
http://research.transportation.org/Documents/SCOR%20Docs/AASHTO-SCORStrategicPlan_3-27-13.doc

Plan Background
From the SCOR website:

> In 1997, AASHTO encouraged all of its standing committees to consider developing a mechanism for self-evaluation. In March 1998, SCOR initiated work to develop a Strategic Plan. Since then, SCOR's Strategic Plan has been reviewed and updated regularly.

> The current version of the Plan was revised following SCOR's March 2013 meeting and lays out SCOR's vision, mission, objectives and strategies (or specific action items).

Strategies and Actions
The table below presents highlights of SCOR's current strategic plan.

AASHTO Standing Committee on Research Strategic Plan Strategies and Actions		
Strategy	**Category**	**Action**
Champion, optimize and enhance the quality and value of research and innovation to AASHTO, the transportation community and the public	Marketing	Communicate value of research; advocate for research
	Implementation	Facilitate implementation of research results
Partner with the USDOT and other stakeholders from academia, the private sector and other organizations to create and sustain strategic national transportation research programs	Managing research	Define and maintain framework for strategic transportation research
	Partnerships	Coordinate aspects of individual state DOT research agendas, as appropriate
Lead research planning and programming	Managing research	Identify and prioritize immediate and long-term research needs; coordinate with other transportation research agendas
Ensure the development and application of successful research of the National Cooperative Highway Research Program (NCHRP)	Managing research	Formulate the annual NCHRP program; improve awareness and deployment of NCHRP research results; improve management practices
Continuously review and improve Committee functions and activities	Process improvement	Continuously review strategies; report on SCOR activities

Transportation Research Board

Strategic Plan, Transportation Research Board, June 2014.
http://onlinepubs.trb.org/onlinepubs/general/trb_strategic_plan.pdf

Plan Background
This plan will guide the agency's activities for the next five years. An action plan for the strategic plan will be developed during the second half of 2014 and first half of 2015. The following are cited as contributing to development of the plan:

- Information and input generated during the development of *Critical Issues in Transportation*, published in late 2013 (see http://onlinepubs.trb.org/Onlinepubs/general/criticalissues13.pdf)
- Recommendations generated by the National Research Council (NRC) Governing Board's Triennial Review of TRB in 2013
- A survey of TRB leaders conducted in December 2013
- Focus groups held in conjunction with the TRB Annual Meeting in January 2014
- Meetings and interviews conducted during 2013 and 2014 with TRB Executive Committee members, oversight and steering committees for major TRB programs, and key stakeholders and affiliates

Goals, Strategies and Action Items
TRB's goals:

1. Anticipate transportation challenges and provide leadership in promoting and conducting research and policy analysis to help meet those challenges.
2. Conduct and promote knowledge creation and dissemination, especially on innovative practices and technologies in the transportation sector.
3. Provide timely and informed advice on transportation and transportation-related issues to decision makers and others who are responsible for multimodal transportation systems.
4. Act as an effective and impartial forum for the exchange of knowledge and information, including transportation and its relationship with social, economic, environmental and other issues.
5. Promote collaboration on transportation research, education and technology transfer at international, national, regional, state and local levels; across public and private sectors; and with transportation providers, customers and other stakeholders.
6. Contribute to the professional development of individuals currently working in transportation and to the education and enhanced diversity of the pool of individuals who will work in the field in the future.
7. Conduct and promote communications efforts to enhance the awareness of transportation research and its contributions to innovation and progress in transportation.
8. Contribute to the public's understanding of transportation and its significance to society.

The table below presents the strategies and highlights some of the action items that will aid TRB in meeting its goals. Each strategy addresses multiple goals. A complete list of action items begins on page 13 of the plan (page 14 of the PDF). A footnote in the plan provides this qualification:

The action items listed are new or will be receiving increased emphasis from TRB as part of this plan. The myriad activities that TRB carries out on an ongoing basis are not all listed in this section but are summarized in other parts of this plan.

TRB Strategic Plan Strategies and Action Items

Strategy	Category	Action
Identify and address emerging and critical transportation issues in a more strategic and proactive manner	Managing research	In collaboration with other units, designate one or more "hot topics" and implement action plans to address each topic
Involve a broader cross section of stakeholders and constituencies in TRB programs and activities	Partnerships	• Review TRB's Sponsor and Affiliate programs • Bring together constituencies that depend on one another but do not frequently interact • Increase involvement of state DOT CEOs and other agency leaders • Facilitate involvement of nontraditional stakeholders • Reach out to other U.S. and international organizations • Involve other units of the NRC in TRB programs and activities
Conduct strategic reviews of the portfolio of TRB legacy programs and products, and introduce new activities, to meet the critical needs in today's marketplace	Process improvement	• Review programs managed by TRB and identify opportunities for enhancements and streamlining • Survey attendees of the 2015 TRB Annual Meeting to identify opportunities associated with the new meeting venue • Evaluate TRB legacy publications and *Transportation Research Record* • Review processes and timelines for paper submissions, peer reviews and publication
	Training	Implement a training program for transportation research program managers
Apply more systematic approaches for identifying and tracking the impacts of TRB's research programs	Customer service	Conduct periodic stakeholder surveys
	Partnerships	Expand efforts such as the Research Pays Off series, the Key Research Achievements database, the AASHTO RAC annual "Sweet 16" and the Airport Cooperative Research Program Impacts on Practice
	Implementation	• Augment programs that solicit specific information on the impacts of TRB's research activities • Ask that committees receiving funding report on the benefits from previous funded projects • Communicate the impacts of TRB research programs

TRB Strategic Plan Strategies and Action Items

Strategy	Category	Action
Strengthen the long-term financial stability of TRB by augmenting traditional federal or federally derived sources of funding	Fiscal issues	• Pursue funding from a broader range of sources • Offer more private-sector funding opportunities in conjunction with the TRB Annual Meeting and other conferences • Seek direct funding from agencies for Cooperative Research Programs activities • Offer pooled-funding arrangements to support TRB activities such as conferences and policy studies • Develop and implement capital budgeting processes for selected larger, multiyear investments
Develop and implement coordinated approaches to communicate information on TRB activities and products that address emerging and critical issues	Marketing	• Develop and implement a marketing plan for each TRB policy study report • Coordinate roles and messages across TRB communications outlets • Produce easy-to-understand communications that provide overviews of TRB and its programs and activities
	Technology	• Address increasing reliance on electronic communications and social media over printed publications • Enhance TRB's capacity to deliver webinars
Provide TRB staff with the knowledge, resources and tools necessary to meet and exceed the expectations of TRB stakeholders and customers	Technology	• Work with NRC on software and information infrastructure • Implement software applications for volunteer engagement management, paper review and Annual Meeting planning
	Human resources	Develop and employ succession plans for senior leadership positions

Appendix A: Survey Results

Members of the AASHTO Research Advisory Committee received an email on July 16, 2014, asking for their assistance by providing an electronic copy of their current research strategic plans. Listed below are the results of that inquiry with contact information for the survey respondent or research director receiving the email request.

California

Research Director: Coco Briseno, Division Chief, Research, Innovation and System Information, Caltrans, coco.briseno@dot.ca.gov, 916-654-8877.

Caltrans provided the following plan:

> **The Caltrans Strategic Research Plan**, Caltrans Division of Research and Innovation, California Department of Transportation, 2008/2009.
> http://www.dot.ca.gov/research/strategic_plan/docs/strategic_research_plan_8-18-09.pdf

District of Columbia

Research Director: Soumya Dey, Director of Research and Technology Transfer, District of Columbia Department of Transportation, soumya.dey@dc.gov, 202-731-5014.

District of Columbia DOT provided the following plan:

> **Strategic Plan 2013-2017: Building a Premier Urban Research Program**, Research, Development, & Technology Transfer Program, District Department of Transportation, District of Columbia, September 23, 2013.
> https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGMuZ292fGRkb3QtcmVzZWFyY2gtcHJvZ3JhbXxxneDo3ZjQyZWFjMzgyN2I4Mjk1

Georgia

Research Director: David Jared, Chief, Research & Development, Georgia Department of Transportation, djared@dot.ga.gov, 404-608-4799.

Ours is still pending (a business plan, that is).

Idaho

Research Director: Ned Parrish, Research Program Manager, Idaho Transportation Department, ned.parrish@itd.idaho.gov, 208-334-8296.

No plan provided.

Illinois

Research Director: Amy M. Schutzbach, Engineer of Physical Research, Illinois Department of Transportation, amy.schutzbach@illinois.gov, 217-782-2631.

We do not have a strategic plan but would be *very* interested in what you receive from the responding states.

Indiana

Research Director: Tommy E. Nantung, Manager, Research & Development Division, Indiana Department of Transportation, tnantung@indot.in.gov, 765-463-1521, ext. 248.

INDOT stopped doing its research strategic plan about 6 years ago. Right now the Peer Exchange report is what basically sets up our objectives. [The October 2013 peer exchange report is available here: http://research.transportation.org/_layouts/AASHTORAC/FileDownLoad.aspx?Rid=66. See Appendix B for INDOT's research and development goals for 2014.]

Iowa

Research Director: Peggi Knight, Director, Research and Technology, Performance and Technology Division, Iowa Department of Transportation, peggi.knight@dot.iowa.gov, 515-239-1530.

No plan provided.

Kansas

Research Director: Rick Kreider, Jr., Chief, Bureau of Research, Kansas Department of Transportation, richard.kreider@ksdot.org, 785-296-1195.

The survey respondent provided Kansas DOT's 2008 Research, Development and Technology Transfer Procedures Manual (see Appendix C).

Kentucky

Research Director: Jason J. Siwula, Innovation Engineer, Kentucky Transportation Cabinet, jason.siwula@ky.gov, 502-782-5537.

KYTC doesn't have a plan, but we plan to develop one over the next 12 months. I am very interested in the results of your survey.

Louisiana

Survey Respondent: Harold "Skip" Paul, Director, Louisiana Transportation Research Center, harold.paul@la.gov, 225-767-9101.

The survey respondent provided the following documents:

Research (Section 19), Fiscal Year 14-15, Louisiana Transportation Research Center, Louisiana Department of Transportation and Development, undated.
See Appendix D.

Goals for Technology Transfer and Training (Section 33), FY 14-15, Louisiana Transportation Research Center, Louisiana Department of Transportation and Development, May 22, 2014.
See Appendix E.

Maryland

Research Director: Allison R. Hardt, Chief of Research, Maryland State Highway Administration, ahardt@sha.state.md.us, 410-545-2916.

No plan provided.

Missouri

Survey Respondent: Jennifer Harper, Research Engineer, Missouri Department of Transportation, jennifer.harper@modot.mo.gov, 573-526-3636.

We just finished up working on this a month or so ago. Attached is our "Vision." We also did a SWOT analysis and then identified pieces out of that to focus our vision. Let me know if you have any questions. [See Appendix F.]

Montana

Research Director: Sue Sillick, Research Manager, Montana Department of Transportation, ssillick@mt.gov, 406-444-7693.

We don't have a research strategic plan or even a departmental strategic plan, but I'd love to see the responses you get.

Nevada

Survey Respondent: Ken Chambers, Research Chief, Nevada Department of Transportation, kchambers@dot.state.nv.us, 775-888-7220.

Nevada is in the process of creating its first-ever Strategic Research Plan. We expect to have the consultant work done by October. The project manager is our Research Coordinator: Mr. Manju Kumar. His phone number is 775-888-7803.

New Hampshire

Research Director: Glenn E. Roberts, Chief of Research, Bureau of Materials and Research, New Hampshire Department of Transportation, groberts@dot.state.nh.us, 603-271-1659.

No plan provided.

New Jersey

Survey Respondent: Stefanie Potapa, Project Engineer Research, New Jersey Department of Transportation, stefanie.potapa@dot.state.nj.us, 609-530-2861.

Please find our NJDOT Research Bureau Strategic Plan for 2005-2008 here: http://www.state.nj.us/transportation/refdata/research/pdf/Research%20Strategic%20Plan%20.pdf

and our Strategic Plan 2005-2008 Brochure here: http://www.state.nj.us/transportation/refdata/research/pdf/Research Strategic Plan Brochure.pdf.

This is our latest version and although we are updating it, it has not been finalized at this juncture. If you have any questions, feel free to contact me.

New Mexico

Research Director: Scott M. McClure, Chief, Research Bureau, New Mexico Department of Transportation, scott.mcclure@state.nm.us, 505-841-9155.

We do not currently have a strategic research plan. We had proposed doing one about 2 years ago and were halted until our overall DOT state strategic plan was completed. We will commence planning our SRP soon.

Ohio

Research Director: Cynthia Gerst, Research Program Manager, Statewide Planning & Research, Ohio Department of Transportation, cynthia.gerst@dot.state.oh.us, 641-644-8135.

The survey respondent provided Ohio DOT's strategic research plan for 2012-2104:

> **Strategic Research Plan for 2012-2014**, Ohio Department of Transportation, undated. http://www.dot.state.oh.us/Divisions/Planning/SPR/Research/Strategic%20Research%20Plan/STRATEGIC%2020PLAN%20202012-2014.pdf

South Carolina

Research Director: Michael R. Sanders, Research Engineer, Research & Materials Lab, South Carolina Department of Transportation, sandersmr@scdot.org, 803-737-6692.

No plan provided.

Utah

Research Director: Cameron Kergaye, Research Director, Utah Department of Transportation, ckergaye@utah.gov, 801-965-2576.

No plan provided.

West Virginia

Research Director: Donald L. "Donny" Williams, Director of Research and Special Studies, West Virginia Department of Transportation, donald.l.williams@wv.gov, 304-677-4000.

No plan provided.

Wisconsin

Research Director: Daniel Yeh, Chief, Research & Creative Communications, Wisconsin Department of Transportation, daniel.yeh@dot.wi.gov, 608-267-6977.

The survey respondent provided a strategic plan for the Wisconsin Highway Research Program, which was established in 1998 by Wisconsin DOT in collaboration with the University of Wisconsin–Madison to discover better ways to design, build and reconstruct the state's highways.

> **2011-2015 Strategic Plan**, Wisconsin Highway Research Program, October 25, 2010. http://wisdotresearch.wi.gov/wp-content/uploads/WHRP-strategic-plan-2010-10-25.pdf

INDOT Research & Development Goals for 2014
(Listed goals are new R&D goals or emphasis areas goals and are not intended to be comprehensive of all R&D business activities)
11-5-13

Goal Area: Pavements and Materials –Pavements, Materials & Construction Research Section

- Improve FWD testing efficiency by conglomerating district testing requests through interaction with the Pavement Design Training, submit the FWD results one month before the RFC date and one week after the FWD testing (after the core tables are received), quantify the cost savings from the FWD program.

  - Complete the remaining 2 courses of pavement training for INDOT pavement engineers by April 2014.

- Plan and execute Pavement Condition Survey Program for INDOT as follows:

  - Pavement investigation requests as soon as the license plate of the van is issued

  - Pavement evaluation with smoothness testing by February 28, 2014

  - Pavement management system testing by April 30, 2014. Comparison between the INDOT System and the Pathway System will be accomplished during testing after this date.

- Conduct forensic pavement and materials investigation for the INDOT Committees/Groups/Districts/Divisions/Offices; transmit results two weeks before the meeting date.

Goal Area: Roadway Safety & Mobility - Transportation Systems Research Section/ Specialized Testing & Facilities Support Section

- Sustain 95% or more of INDOT roadways above a friction number of 20 and a 90% or more above 25.

  - Collect, analyze and distribute friction inventory data needed to plan for preservation projects by August 31, 2014 (More than 6000 lane miles).

    - ➢ Distribute low friction numbers identified through inventory testing to districts within two weeks of testing.

  - Collect, analyze and distribute friction data for materials management and pavement preservation special projects and other forensic investigations by November 30, 2014. (More than 100 projects, more than 1500 lane miles).

o   Friction testing program will include 1160 bridges on the INDOT system in 2014 (Interstate bridges and those longer than 100ft).

o   Incorporate revised friction inventory routes for the Interstate system into the 2014 Friction Testing Program. Review/revise remaining friction inventory routes by December 2014 (Steve/Harry).

o   Monitor warranty preservation projects, other warranty projects project level and forensic investigation requests employing smoothness IRI project level testing and FHWA PROVAL software. Data is to be used for modeling for and upgrading existing models (average is 15 per year).

o   Coordinate with Materials Management in the implementation of the new Smoothness Specification.

Goal Area: Ground Penetrating Radar (GPR) Testing - Transportation Systems Research Section

- Minimize the amount of testing that requires traffic control and replace it with highway speed testing equipment such as void detection, pavement thickness evaluation and underground storage tanks. (At least 20 GPR requests can be served). Report results within three weeks of the request.

Goal Area: Nondestructive Bridge Deck Testing - Transportation Systems Research Section

- Continue NDT testing program for bridge decks employing equipment such as the ground penetrating radar (GPR), Infrared Thermography and Impact Response (IR) in bridge decks evaluations, as well as forensic investigations, with a capacity to respond to at least 20 requests from central office and District. Report results within three weeks of the testing.

- Establish performance measures for these NDT results for future use in driving decision for bridge maintenance, preservation and/or rehabilitation. Determine costs and cost-effectiveness of NDT of bridge deck testing. (This will be tied with the upcoming SPR 3818 study)

Goal Area: Development of FY 2015 Research Needs & Work Program – Research & Development Div.

- Review PEX opportunities with JTRP Office, establish timelines/owners, and implement by deadlines.

- JTRP Managing Director identify additional program goals by January 31, 2014

- Complete RNS identification via DC/Focus Groups by May 8, 2014.

Goal Area: SHRP 2 Implementation Efforts - Transportation Systems Research Section

- Scoping SHRP 2 products to identify

  o Those INDOT has already implemented and/or has better practices than those recommended to be implemented.

  o Those ready for implementation without additional verification.

  o Those ready for implementation with additional verification.

  o Those planned for implementation with competitive funding from SHRP 2.

- Communicate to affected INDOT staff products in each category within a week of the announcement of the product.

- Coordinate with affected INDOT Staff (and Ted Pollack) the implementation of category 2 including RFP if SHRP 2 offers competitive funding.

- Coordinate with affected INDOT Staff (and Ted Pollack) planning for the verification of category 3 including RFP if SHRP 2 offers competitive funding.

- Coordinate with affected INDOT Staff in planning and RFP for competing for the funds offered by SHRP 2 for the pilot in-field verification of category 4.

- Foster Implementation, Innovation to ensure the highest ROR of INDOT Investment in the Program.

Goal Area: Marketing & Communications of R&D Program – Research & Development Div.

- Fulfill R&D portion of M&C Plan for Year 2.

Goal Area: SPR Part II R&D Program Budget Improvements – Office Manager

- Once Work Program is approved by FHWA, assign DES # within 1 week. Request FEMS # within 1 week of project approval letter date.

- Monthly update and posting (end of month) of SPR Part II Research & Development Fund Database. Integrate SPR Part II databases into one file.

- Review current SPR Part II business practices regarding PFS, TRB, NCHRP, etc. and provide review to Karen Hicks by June, 2014.

Goal Area: Building & Grounds/Safety - Specialized Testing & Facilities Support

- Develop prioritized list of R&D building needs (capital/O&M projects) with estimated costs and transmit to Fleet & Facilities Manager by March 31, 2014.

- M-5 System online by June 30, 2014.

- Minimum of 6 Safety Training meetings in 2014, which includes all mandatory training courses.

Kansas
Department of Transportation

Research, Development
and
Technology Transfer

Procedures Manual

May 1995
Revised November 2000
Revised December 2008

KANSAS DEPARTMENT OF TRANSPORTATION

Research, Development and Technology

Transfer Procedures Manual

Prepared by

Engineer of Research

Bureau of Materials and Research

Research Unit

in cooperation with

U. S. Department of Transportation

Federal Highway Administration

May 1995
Revised November 2000
Revised December 2008

Table of Contents

FOREWARD

This manual describes the organization of and procedures for conducting research, development and technology transfer (RD&T) activities performed or sponsored by the Kansas Department of Transportation (KDOT). These procedures are followed for all Federal and State funded RD&T projects conducted by KDOT or any party appointed by KDOT to conduct RD&T projects.

This manual describes all aspects of research administration, addresses responsibilities of groups and individuals with RD&T related assignments and explains in detail the steps to be taken from identification of research needs through reporting and implementation of results.

The purpose of the manual is to organize and document all currently used RD&T procedures in one source document. The manual will serve as a resource for management and staff and is designed to document the KDOT RD&T management process to meet the requirements of the Federal Highway Administration as defined in 23 CFR, Part 420. Related KDOT documents and forms such as the KDOT Standard Operating Manual (SOM) are included as attachments in an appendix to the manual. Other RD&T related documents and manuals such as the American Association of State Highway and Transportation Officials (AASHTO) Research Advisory Committee (RAC) Handbook that are referenced in the manual are available from the Engineer of Research or on the internet.

Questions concerning interpretation of the contents of this manual should be directed to the Engineer of Research at the following:

> Kansas Department of Transportation
> 2300 SW Van Buren St.
> Topeka, KS 66611-1195
>
> (785)291-3841
> (785)296-2526 FAX

1.0 PURPOSE, GOALS AND POLICIES

1.1 Background

Research, one of the principal missions of the first national highway program in the United States is, in fact, the oldest continuous federal highway activity. The Federal Highway Act of 1921 authorized the first sustained fiscal support for highway research. Support for highway research was reaffirmed in the Federal-Aid Highway Act of 1962, which mandated funds for planning and research purposes only. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 required that a minimum of 25% of the State Planning and Research (SPR) funds shall be expended on research, development and technology transfer activities. This requirement was continued in the Transportation Equity Act for the 21st Century (TEA-21) of 1998 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) which was signed on August 10, 2005.

1.2 Purpose

The purpose of the manual is to organize and document all currently used RD&T procedures in one source document. The manual will serve as a resource for management and staff and is designed to document the KDOT RD&T management process to meet the requirements of the Federal Highway Administration as defined in 23 CFR, Part 420. One goal of this effort is to improve the effectiveness of research. By identifying the various functions of KDOT's research unit and giving procedural information about research operations, this manual will produce a general model of a research management system. The programs, projects and products generated by the research unit, using the management system, are provided for the benefit of KDOT, its employees and other transportation agencies and users. To promote the effectiveness of the research process and program, several key objectives are followed in the manual:

- Determining the usefulness and implementation potential of the research,

- Inclusion of short term research results in a long term program,

- Assessing research using project and program accomplishments,

- Improving research through the coordination of several disciplines, and

- Determining the continuation potential of a research project based on a periodic review of its progress.

1.3 Authority

The authority for the state transportation research function is found in K.S.A. 75-5007. The responsibilities for Bureau of Materials and Research are stated in Responsibility and Authority Statement, Kansas Department of Transportation. The authority for a state research organization to use federal funds is found in 23 U.S.C. 505. The authority for the state to administer the SPR funds in their program is found in 23 CFR 420, Subpart B.

1.4 Definitions

These definitions are as defined in 23 CFR 420B, Section 420.203:

<u>Research</u> means a systematic controlled inquiry involving analytical and experimental activities which primarily seek to increase the understanding of underlying phenomena. Research can be basic or applied. <u>Basic research</u> means the study of phenomena whose specific application has not been identified; the primary purpose of this kind of research is to increase knowledge. <u>Applied research</u> means the study of phenomena relating to a specific known need in connection with the functional characteristics of a system; the primary purpose of this kind of research is to answer a question or solve a problem.

<u>Development</u> means the translation of basic or applied research results into prototype materials, devices, techniques, or procedures for the practical solution of a specific problem in transportation.

<u>Technology transfer</u> means those activities that lead to the adoption of a new technique or product by users and involves dissemination, demonstration, training, and other activities that lead to eventual innovation.

Most of the research sponsored and conducted by KDOT is applied research done to find solutions to specific problems or to develop/implement new products and procedures. Much of the in-house research is related to evaluation of experimental features, development of procedures, specifications and tests to implement new technology and review of field related problems to find solutions or improvements.

1.5 Research Policy

The Department has a strong commitment to support research, development and technology transfer activities (RD&T) in the Bureau of Materials and Research. While the focal points of RD&T activities are in the Research Unit of the Bureau and the Kansas Transportation Research and New-Developments (K-TRAN) Program operated in conjunction with KU and KSU, the Department advocates an interest and involvement in these activities by all KDOT staff members. Activities such as submitting research ideas, implementing research results, providing or monitoring test sections, and administering a K-TRAN or other research projects are all important RD&T functions and examples of the involvement and commitment desired from staff.

Management support of RD&T activities will be provided through advocacy, funding and a willingness to promote implementation of research findings.

1.6 Mission of the Research Unit

The mission of the Research Unit is:

- To support and encourage innovation throughout the Department by promoting research, development and implementation (RD&T) activities.

- To evaluate problems as they arise during standard construction and maintenance field operations and provide timely responses.

- To serve as an information resource for agency management.

While in-house RD&T activities of the Research Unit are primarily focused on highway construction and maintenance materials, products and procedures, the Unit supports all functional areas through general administration of the K-TRAN Research Program and providing technical information to management.

A goal of the Unit is to be service oriented and provide timely responses to the wide array of questions and requests received.

1.7 Seven Keys to Building a Robust Research Program

KDOT is committed to a robust research program, one that is a vital part of the organization. The NCHRP Synthesis of Practice 280, describes the seven keys to a robust research program:

1. Found It on Trust
2. Market Boldly
3. Root It in Economics
4. Make Deals Unabashedly
5. Insist on Accountability
6. Embrace Policy Research
7. Empower the Staff

1.8 Strategic Goals

The "Benefit to Cost Ratio of K-TRAN projects" output measure is formally reported in the **K-TRAN Status Report.** This report is presented to the Research Program Council at their meeting each spring and fall.

1.9 Organizational Structure

The general KDOT organizational structure is shown in Figure 1. Responsibility for the RD&T function is given to the Bureau of Materials and Research in the Division of Operations. The Research Unit of the Bureau performs or coordinates essentially all of the RD&T functions of the agency as related to the use of Federal funds. The Research Unit organization is shown in

Figure 2. Other Bureaus are authorized to perform RD&T activities using state funds upon approval by the Deputy Secretary for Engineering and State Transportation Engineer and the Bureau Chief.

ORGANIZATIONAL CHART
KANSAS DEPARTMENT OF TRANSPORTATION
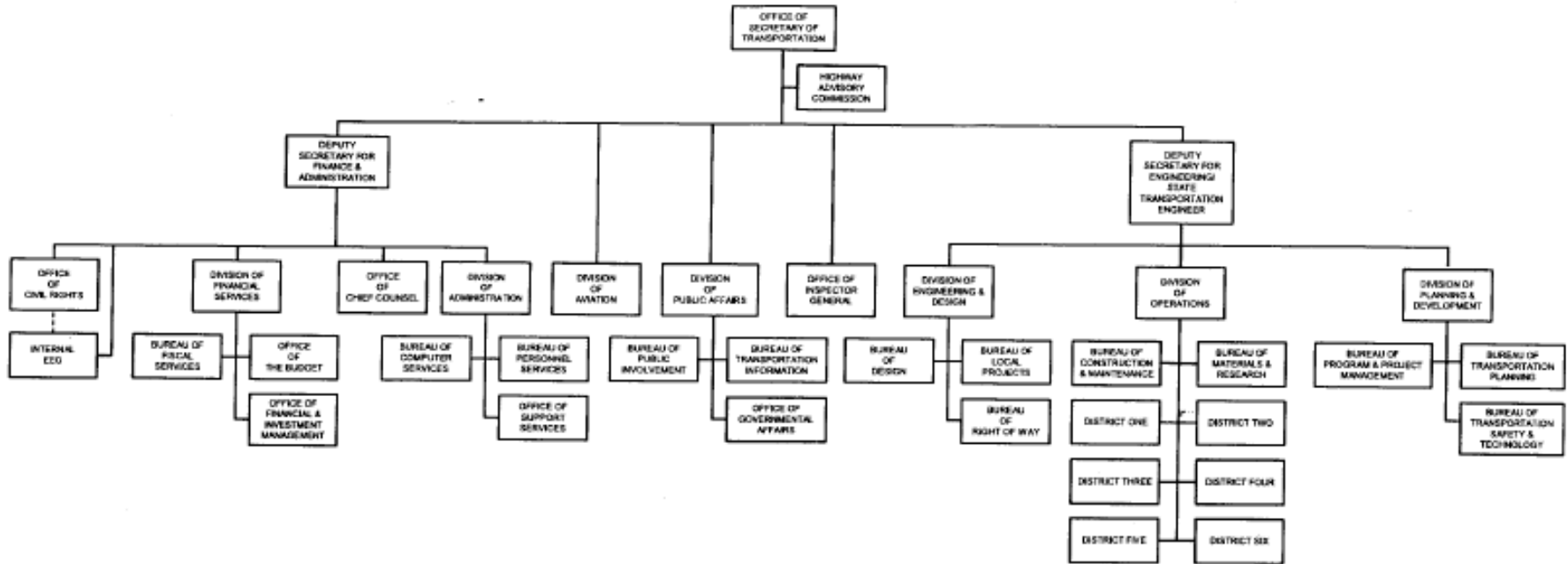
Figure 1.

BUREAU OF
MATERIALS & RESEARCH
RESEARCH UNIT

```
                    ENG OF RES
                      DICK
                   McREYNOLDS
                    09-70-700
                         |
                         |-------ADM ASST
                         |        BRENNA
                         |       HASTINGS
                         |       09-70-702
                         |
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ASPHALT	CONCRETE	RESEARCH DEV.	PAVEMENT SURF.	TECH. TRANSFER	GEOLOGY	ADVANCED TECH
ASPHALT RES ENG VACANT POSITION 09-71-710	CON RES ENG RODNEY MONTNEY 09-72-720	RES DEV ENG DAVE MEGGERS 09-73-730	PAV SUR ENG BILL PARCELLS 09-74-740	TECH TRANSF ENG SUSAN BARKER 09-75-750	RES GEOL RANDY BILLINGER 09-76-760	ADV TECH RES ENG CLIFF HOBSON 09-77-771
ENG TECH SP CHUCK ESPINOZA 09-71-711	RES STAFF ENG JENNIFER DISTLEHORST 09-72-723	RES ENG SPEC VICTORIA FELKER 09-73-733	ENG TECH SR MICHAEL FEIDEN 09-74-741	LIBRARIAN I MARIE MANTHE 09-75-751	EA II RALPH POLLOCK 09-76-763	ELECTRNCS TECH SR VACANT POSITION 09-77-772
ET SR LINDA BOSAK 09-71-712	ENG TECH SR JOHN MAH 09-72-721	ENG TECH SR JIM BERNICA 09-73-731	ENG TECH MICHAEL KABRIEL 09-74-742	PROG CON I BECKY WELSH 09-75-752	ENG TECH MATT STADLER 09-76-762	
ENG TECH MICHAEL GUERRERO 09-71-714	ENG TECH ASSOC TRAVIS HIRT 09-72-722	ENG TECH JESSICA ESPINOZA 09-73-732		PUBL WRITER I TOM ALLEN 09-75-753		

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JANUARY 29,2009

Figure 2.

2.0 RD&T INTERACTION

2.1 Customer Support Development

2.1.1 Purpose

In section 1.0, Purpose, the programs, projects and products of research were stated to be for the benefit of the Agency, its employees and other transportation agencies and users. Attaining this objective requires the support of our customers. Customer support can best be achieved by involving them in the process of developing the program and participating in the research process. Participation throughout the process allows their needs and interests to be considered.

2.1.2 Process

2.1.2.A. Outreach Partners

Research partners come from the ranks of the agency, universities, companies affiliated with transportation (trucking firms, suppliers, contractors, etc.), consultants, local governments, other state departments of transportation, national and regional associations, FHWA and the public. The partners involved and their level of involvement will be different throughout the process.

2.1.2.B. Methods of Inclusion

B.1 Public/Private Meetings

Public and private session meetings with the various research partners, industries, university transportation centers, suppliers, contractors, transit authorities and local governments allow the different institutions to give their input on specific issues, while coming to understand their effect on other institutions. Examples include making arrangements for supplier presentations to staff, ACPA and KAPA field tours, industry members on research and technology implementation committees, etc. Meetings are typically held for the purposes of implementation and technology transfer rather than identification of new research topics.

B.2 Committees

Industry partners may be represented on specific committees, as defined in section 2.2, Research Committees Structure. A committee serves as the most formal of the interactive techniques and provides non-agency institutions the opportunity to affect policy as a voting member.

B.3 Institutional Discussions

Public/private meetings with individual companies and institutions are held regularly. For example, specific material suppliers and/or contractors usually through their associations meet regularly to exchange ideas. Implementation of new technologies affecting the industry is discussed through these forums. Meetings with universities and University Transportation

Centers are held to discuss their programs. Meetings and involvement in regional and national organizations such as the Transportation Research Board (TRB) and American Association of Transportation Officials (AASHTO) committees is encouraged as a means to share information and experiences.

B.4 Seminars, Conferences, Workshops

Agency sponsored seminars, conferences and workshops are used to introduce and discuss broader issues with researchers, users and other experts in a specific field. These meetings offer presentations and discussions directed to advance understanding of issues and promote research efforts for the Agency. Staff members serve on advisory and planning committees related to jointly organized meetings and conferences.

B.5 Requests for Research

Research ideas are solicited annually each summer from KDOT staff members and institution/industry partners. Section 3.1, Solicitation of Research Ideas, defines the process.

2.1.2.C. Procedures

C.1 Committees Activities

Committees and their activities are defined in section 2.2, Research Committees Structure. The procedures to be followed for the committees are also described in that section. The committees perform several functions, namely, assist in the development of the strategic plan, prioritize projects, monitor the progress of projects or discuss the formation of the research work program with Agency management.

C.2 Feedback

All participants in the annual research idea solicitation process will be given feedback on the results. The program development process will result in a research work program that will be sent to all participants and agencies that submitted research ideas and research project statements.

2.1.3 Product

The success of a research program hinges on our ability to develop strong and lasting interactive relationships with all the beneficiaries of research. Continuing communications with outreach partners will assist the Agency with program development, consensus building, implementation assistance, technical input and the strengthening of partnerships.

2.2 KDOT Research Committees

KDOT supports RD&T activities and advocates interest and involvement in these activities by all KDOT staff members. Research committees are organized for specific purposes as described in SOM 1.5.2 but basically the members prioritize research needs, promote needed research and to assist with technology implementation.   Responsibilities and relationships of the research committees are described in following sections.

2.2.1 Committee Membership and Organization

2.2.1A Research Organization

The KDOT research committee organizational structure is shown in Figure 3. KDOT uses a three tier organizational structure for research oversight. The duties of each committee are described in 2.2.2 Committee responsibilities. Current committee members and contact information is available on the KDOT web site. Members of each committee are shown in Table 1.
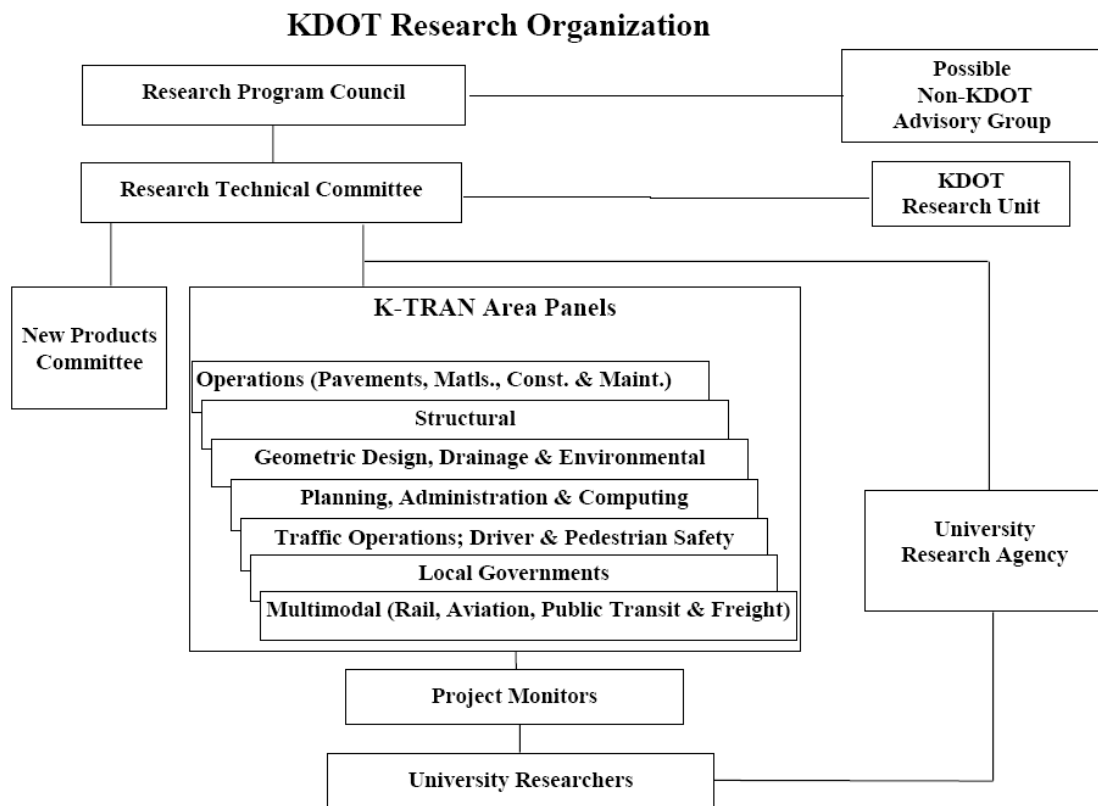

KDOT Research Organization

- Research Program Council
- Possible Non-KDOT Advisory Group
- Research Technical Committee
- KDOT Research Unit
- New Products Committee
- K-TRAN Area Panels
  - Operations (Pavements, Matls., Const. & Maint.)
  - Structural
  - Geometric Design, Drainage & Environmental
  - Planning, Administration & Computing
  - Traffic Operations; Driver & Pedestrian Safety
  - Local Governments
  - Multimodal (Rail, Aviation, Public Transit & Freight)
- University Research Agency
- Project Monitors
- University Researchers

Figure 3.

Research Committees

Research Program Council

Secretary of Transportation, Chair
Deputy Secretary for Engineering and State Transportation Engineer, Vice Chair
Dean, School of Engineering, KU
Dean, College of Engineering, KSU
Three Private Sector Member
FHWA Division Administrator, ex officio
Engineer of Research, Secretary, ex officio

Research Technical Committee

At-Large Members:
Engineer of Research, Chair
Technology Transfer Engineer, Secretary
Chief, Bureau of Construction and Maintenance
Chief, Bureau of Computer Services

Area Panel Leaders:
1. Operations (Pavements, Materials, Construction & Maintenance)-Chief, Bureau of Materials and Research, Vice-Chair
2. Structural- Engineering Manager-State Bridge Office
3. Geometric Design, Drainage & Environmental-Engineering Manager, State Road Office
4. Planning, Administration & Computing-Chief, Bureau of Transportation Planning
5. Traffic Operations; Driver & Pedestrian Safety-Chief, Bureau of Transportation Safety and Technology
6. Local Governments-Chief, Bureau of Local Projects
7. Multimodal (Rail, Aviation, Public Transit & Freight)-State Multimodal Planner

University Designees: Two each from the University of Kansas and the Kansas State University
FHWA Representative: Planning Team Leader

K-TRAN Area Panel Members

The Area Panel Leader is the Chair of their panel. One or more representatives from the FHWA, KU and KSU are appointed to serve on each panel. Each agency appoints their member or members to the Area Panels.

<div align="center">

Table 1 (cont.)

</div>

Research Committees (cont.)

New Products Committee

Technology Transfer Engineer, Chair
Assistant Chief of Materials and Research, Vice Chair
Assistant Chief of Construction & Maintenance
Chief, Bureau of Design
Assistant Chief of Local Projects
Engineer of Tests
Assistant Chief of Transportation Safety and Technology
FHWA Planning Team Leader (ex- officio)

Table 1

2.2.2 Committee Responsibilities

2.2.2.A Research Program Council Responsibilities

The Research Program Council sets policy and approves the annual K-TRAN Program from a prioritized candidate list of research project statements developed by the Research Technical Committee. This is completed by the first of April each year for the following fiscal year so that the contracts can be completed by deadlines.

2.2.2.B Research Technical Committee Responsibilities

The responsibilities of the Research Technical Committee are as follows:

- To develop knowledge of the needs for research and development in transportation, both at KDOT and throughout the State, and to promote the submission of research project statements.

- To annually solicit research ideas from KDOT staff, university faculty, other agencies, groups or individuals.

- To annually solicit research project statements from university faculty and assign them to Area Panels for detailed evaluation.

- To prioritize research project statements approved by the Area Panels into a recommended K-TRAN program for submittal to the Research Program Council.

2.2.2.C K-TRAN Area Panel Responsibilities

The responsibilities of the Area Panels are as follows:

- To develop knowledge of research and development needs in transportation both at KDOT and throughout the State, in the Area Panel specialty area.

- To promote submission of research project statements to K-TRAN by interacting with university faculty and KDOT staff. This will include identifying researchers and determining budgets for research projects.

- To review and prioritize research project statements assigned by the Research Technical Committee.

- To assign a KDOT staff person as project monitor for research assigned to the Area Panel. The person assigned will be responsible for executing the research project agreements with the University, monitoring research progress, and reviewing draft research reports. The person assigned should be familiar with the topic being researched and will be a member of the Area Panel for the duration of the research project.

2.2.2.D New Products Committee Responsibilities

The responsibilities of the New Products Committee are as follows:

- The committee will determine whether new products, procedures, and technologies satisfy the criteria for acceptance using standard evaluation criteria

- Individual members will evaluate or assign evaluation of products, procedures, etc. in their respective area of expertise and make a recommendation for consideration of the full committee

- Individual members will draft specifications for review by the Assistant Chief, Materials and Research, submit a policy statement, new product announcement, and prepare a plan for implementation of high payoff items as judged by the full committee.

More details are included in SOM 1.14.2 (See Attachment G) on the procedures and forms used by the New Products Committee. Products reviewed by the committee are those different than those currently described in the specifications. New products approved by the committee can be found on the intranet. Products approved for use under the standard specifications and special provisions are shown in the Pre-Qualified Products Listing (PQL) which is also on the internet.

2.2.3 Research Project Development Schedule

Solicit Research Ideas from KDOT staff, local govt. staff, KTA, university faculty, and industry associations	June 15
Research Ideas Due	Aug. 15
Research Program Council Meeting to Reviews Ideas, Program Status, Set Policy	Sept. 1
Area Panels Begin Interaction with Faculty to Discuss Needs Submitted	Sept. 8
Host Research Needs Day for Faculty, Area Panel Leaders and other staff	Oct. 25
Request for K-TRAN Research Project Statements from KU and KSU	Nov. 1
K-TRAN Research Project Statements (Preproposals) Due	Dec. 1
Research Technical Committee Meeting to Assign RPS to Area Panels	Dec. 15
Area Panel Evaluations Completed	Feb. 1
Research Technical Committee Prioritizes RPS into a Candidate Project List	Feb. 15
Research Program Council Approves K-TRAN Program and Budget	Mar. 1
Area Panels Leader Name Project Monitors, Project Numbers Assigned	Mar. 15
Provide Project Related Information to PI's, PM's and University and KDOT Staff Involved in Administrative Process	Mar. 15
Orientation and Training Provided to Project Monitors	Apr. 1
Response E-mail Sent to Submitters of Project Statements and Ideas	Apr. 1
Annual Reports of SPR Research Due to FHWA	Apr. 1
Detailed Proposals Prepared for Each Project and Approved by Project Monitor	Apr. 15
Agreements Prepared and Signed for Each Project starting before July 1	May 1
Draft SPR Work Program and Cost Estimate Submitted to FHWA	May 12

2.3 Transportation Research Board

The Transportation Research Board (TRB) is a division of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The National Research Council is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The mission of the Transportation Research Board—one of six major divisions of the National Research Council—is to promote innovation and progress in transportation through research. In an objective and interdisciplinary setting, the Board facilitates the sharing of information on transportation practice and policy by researchers and practitioners; stimulates research and offers research management services that promote technical excellence; provides expert advice on transportation policy and programs; and disseminates research results broadly and encourages their implementation.

2.3.1 TRB State Representatives

The Engineer of Research is the designated TRB State Representative for KDOT. The TRB representative informs KDOT staff about TRB activities, receives all TRB publications, and advises TRB of current and contemplated research activities of the department.
General responsibilities of the TRB representative are as follows:
- Maintain an awareness of general procedures concerning the operation of TRB committees, NCHRP, Transportation Research Information Service (TRIS), and other special activities;
- Keep others in the Agency and other related state agencies informed of TRB activities;
- Recommend qualified people for membership in TRB committees and panels;
- Update and submit selective distribution forms for TRB publications annually;
- Update and return the information services (TRIS) summaries of ongoing research projects, and report initiation of new research;
- Supply TRB copies of the Agency's research reports and other reports of research as appropriate;
- Coordinate responses to TRB-initiated solicitations and questionnaires;
- Assist TRB staff members in scheduling meetings with agency personnel during field visits;
- Submit items for consideration for the *TRNews*; and
- Encourage Agency personnel to submit papers for presentation at TRB meetings and for publication.

KDOT activities with TRB are covered in SOM 1.8.4 Transportation Research Board (See Attachment H).

2.3.2.A Transportation Research Information Service

TRB maintains and operates the Transportation Research Information Service (TRIS), a computerized information storage and retrieval system that contains over 500,000 abstracts of published transportation research articles and reports and summaries of ongoing research projects. TRIS Online is available for all researchers on the internet. TRB also maintains a

Research-in-Progress (RiP) website that provides access to the RiP database and a data-entry system that allows users in State Departments of Transportation and University Transportation Centers to maintain information on their current research projects.

Research unit staff searches TRIS Online directly via the Internet or indirectly by making requests to TRB staff.　Research unit staff also provide services, such as topical searches, for other KDOT staff upon request. In addition, project summaries and abstracts of completed transportation research appear periodically in various TRB publications.

2.3.2.A.1 TRB Library

The TRB library provides the Agency with access to an extensive collection of transportation literature and provides assistance in locating information available in other libraries.　The library is located in the TRB offices.

A.2 TRB Publications

TRB distributes a variety of publications. As a member state, KDOT receives a full complement of all their publications.　Publications are mailed directly to recipients in subject areas of interest and also are now made available electronically to all staff with computer access through TRR Online.　Full sets of all publications are received by the KDOT Library and are maintained for future reference.　All TRB publications are also available to KDOT staff through the KDOT electronic library.

TRB publishes the following:

- *TRNews*, a bimonthly magazine of TRB and transportation community activities;
- The Transportation Research Record series, documenting research papers presented at the TRB Annual Meeting in January each year;
- The Transportation Research Circular series, documenting presentations and committee activities;
- CRP (NCHRP, TCRP, etc.) Project Reports and Synthesis Series, and
- Major policy studies and other special projects conducted through the work of project committees, staff, and consultants.

The TRB representative is responsible for informing TRB of the needs and changes for future publications and annually updating to the publication distribution.　A list of bureaus/persons receiving TRB publications by subject area is maintained on the Intranet.　Please contact the Engineer of Research if you wish to be added to the mailing list or change subject areas.

Additional copies of TRB publications may be obtained by contacting the KDOT Librarian.　If extra copies are not on hand in the library, they will be ordered from TRB.

3.0 PROGRAM DEVELOPMENT

3.1 Solicitation of Research Ideas

3.1.1 Purpose

The solicitation for research ideas is used to identify research ideas for the in-house and K-TRAN work programs. Any emphasis areas arising from the Research Program Council meeting are included.

There are several benefits to this type of solicitation process. Field and operating staff can submit problems with the expectation of receiving an objective review. Agency contractors and suppliers can air their concerns within a formal review process. The academic community can use the emphasis areas to submit potential problems within their field of expertise.

3.1.2 Process

Solicitation requests are sent via electronic mail to all staff with addresses annually. All staff are encouraged to submit problem statements. A reminder note is sent near the end of the solicitation period.

Solicitation requests are also sent by e-mail to universities within the state with civil engineering and transportation research graduate programs, local government officials and major associations/organizations representing contractors and suppliers associated with transportation.

A form entitled RESEARCH PROJECT IDEA is included with the solicitation request. (See Attachment B) The form contains the following information: project title, problem statement, research objective, urgency, and application of results including cost/benefit relationship and submitter information.

All submitted research ideas are expected to be on this form when submitted to the Research Committees for review. The Engineer of Research or other committee members may take ideas in any form and use the information to complete the forms.

3.1.3 Submission Schedule and Details

The Engineer of Research will make the solicitation request to all potential submitters by June 15th each year. The problem statements can be submitted at any time for future review. Submitters typically have a submission deadline during the last week of August to be included in the review by the Research Program Council and inclusion in the research needs list for the upcoming fiscal year program. The review policy is flexible to allow for late needs. With Area Panel Leader approval, needs identified after the Research Program Council meeting may become project statements under consideration at any time prior to the winter Area Panel meetings.

3.1.4 Research Idea Screening

All research ideas received are reviewed initially for appropriateness by the Research Program Council. Research ideas that are controversial, have been completed by others, are underway by others, should be completed with budgeted funds or are unlikely to be accomplished or are unneeded are removed from the list. Ideas that can be addressed either by response or in-house research are identified and forwarded for appropriate action by the Bureau of Materials and Research or other appropriate Bureau.   Some ideas originating from local government officials thought to have solutions available are forwarded to the Director of the Local Technical Assistance Program (LTAP) for response.

Approved K-TRAN research ideas become a needs list that is provided to the Research Technical Committee including the university liaison members. The list is also sent to other university contacts prior to the annual Research Needs Day that is held during late October. Each idea (need) is assigned to Area Panel Leaders who work with their area panel members to clarify the intent of each idea, to generate interest among faculty at the university and to expand the ideas into potential research project statements (also called preproposals). Each year on or before November 1st, a formal solicitation for research project statements is made to KU and KSU administration and faculty. Information about annual solicitation is maintained on the internet (see Attachment C). Twenty-five copies each of the numbered and collated sets of research project statements are due to the Engineer of Research on or before December 1st.

3.2 Project Prioritization

Setting priorities for the problems received in the solicitation process allows the agency to develop a work program within its budget.   Prioritization allows that the most important problems to be addressed and advanced for action. A work program depends upon an easily understood program development process. The prioritization portion of the process should be comprehensive in the scope of the selected projects, involve parties from a wide variety of experiences, open for review to all parties and involve Agency management.

3.2.1 Research Project Statement (Preproposal) Screening

The Chairman of the Research Technical Committee assigns preproposals received from the universities to the appropriate Area Panel Leader.   The Area Panel reviews each assigned preproposal. The Area Panel will discuss the preproposals as they relate to:

- the function of the agency,
- the emphasis areas of the Research Program Council,
- the technical merits of each problem,
- the estimated cost of each problem, and
- the relative ranking of the preproposals according to evaluation guidelines.

The Area Panel members will discuss all problems submitted. Any questions about the intent of the principal investigator and KDOT needs are clarified.   The assigned preproposals are

prioritized by the Area Panel prior to a Research Technical Committee meeting scheduled during early February.

At the Research Technical Committee meeting, each Area Panel Leader makes a presentation on the preproposals assigned. Preproposals that are acceptable for funding are presented in priority order by university to the KDOT members of the Committee. The presentation includes the expected benefits and level of critical need to KDOT.   Each KDOT Research Technical Committee member votes for preproposals in their priority order by university on a form provided for that purpose. (See Attachment D) The Chairman tabulates the ballot results for presentation to the Research Program Council. The actions of the Committee are documented in the official minutes of the meeting. (275I-2)

3.2.1.A. Evaluation Guidelines

Guidelines have been developed to assist the Research Technical Committee in formulating and recommending research projects for inclusion in the annual program. These guidelines will be used during the review of research ideas for development into complete proposals for further consideration. The guidelines used are:

- Relevance to critical research needs of KDOT.
- Relevance of proposed research idea to the theme of K-TRAN.
- Amount of overlap of the proposed research idea with other programs or completed research. (Proposed research should not be targeted for research topics or issues currently underway through the Strategic Highway Research Program 2, National Cooperative Highway Research Program, other Cooperative Research Programs, or the Local Technology Assistance Program.)
- Duration of proposed research project. (Project statements should be prepared with the most cost-effective duration considering the required workload, typical length of graduate study programs and other factors. The correct length of time shown should result in the project being completed without any cost extensions.)
- Extent to which minorities and handicapped persons are involved in the research, either as participants, recipients or beneficiaries.

3.2.2 Approval of Annual K-TRAN Program

The Chairman of the Research Technical Committee provides a prioritized list of the preproposals for consideration by the Research Program Council at a meeting scheduled during late February or early March. The Research Program Council should be updated on the process used to develop the list as well as any special situations, review the budget, discuss the recommendations of the Research Technical Committee, approve a final categorized list of projects, allocate funding and discuss the policy implications of the recommendations. Any policy changes or emphasis areas for the next solicitation are also discussed. The actions of the Research Program Council are documented in the official minutes of the meeting (275I-1) and the annual K-TRAN Program spreadsheet.

3.2.3 Assignment of Project Monitors

The Area Panel Leaders for the preproposals approved to become projects in the annual program appoint a Project Monitor for each project. The Project Monitor serves as the official KDOT representative on the project and typically has expertise or knowledge about the subject that will be the focus of the research effort. The Project Monitor may create a technical advisory panel to assist with the project. The Project Monitor is responsible for negotiating the agreement with the university, supplying any data needed, monitoring progress of the research effort and recommending approval of the final report.   Project monitor responsibilities and a checklist of activities to be performed are described in more detail in the "Instructions for Project Monitors" available on the intranet (Attachment F-1). Guidelines for research project authors are included in Attachment F-2.

3.2.4 Approval of In-house Research Projects

Research ideas received from the annual solicitation that are directed to the Bureau of Materials and Research by the Research Program Council, experimental feature projects, requests for development of specifications, test methods and/or procedures received from Management, and requests for assistance with technical design, materials, construction and/or maintenance problems that may require the adaptation of new technologies are usually directly assigned to the appropriate staff person by the Chief of Materials and Research or the Engineer of Research. Expansion of the idea, experimental feature, et. al. into a brief work plan is done without review and approval by the Research Technical Committee.   Priorities are assigned based on how critical the need is for the results. This work effort may be accomplished with Federal SPR, Project (Federal or State) or Research Unit overhead (State) funds depending on the circumstances.

Research studies that are sufficient in scope to warrant a separate summary line item in the Annual SPR Work Program and Cost Estimate are approved in advance using the procedures described in SOM 1.5.2 (Attachment A).   Other studies, experimental feature projects, et. al. are included with the list under SPR Study 73-1 "Implementation of Research and Development Findings".

3.2.4.A Approval of Transportation Pooled Fund Projects

Proposed transportation pooled fund (TPF) projects are reviewed for potential KDOT participation on an ad hoc basis as soon after receipt of the solicitation as feasible. The process begins by directing the proposed work plan and other documentation to the bureau(s) with technical expertise to evaluate the project. If the bureau recommends participation, the request is then reviewed by the Engineer of Research, the Chief of Materials and Research and the Chief of Transportation Planning to determine if funds are available and gain concurrence.   If all concur, a recommendation is made to the Deputy Secretary for Engineering and State Transportation Engineer to approve KDOT participation if the pooled fund project proceeds. The Engineer of Research then enters the commitment and Technical Advisory Committee (TAC) member on the TPF website. Notification is also sent to the TAC member, Technology Transfer Engineer and FHWA Assistant Planning and Research Engineer.

If KDOT serves as a "lead state" on a TPF project, then administration is accomplished in similar fashion to other federally funded research projects. Approval is obtained for the total anticipated cost of the project and KDOT commitment.   Once partners are found and needed funds committed, the project proceeds to contract.   With approval of the Deputy Secretary for Engineering and State Transportation Engineer, the contractual process may proceed with in state universities before all funds are transferred to KDOT and obligated in advance. The KDOT (lead state) member of the Technical Advisory Committee (consisting of one member from each partner) serves a Chair and also as the Project Monitor. An administrative contact is also named by each partner to assist with the transfer of funds and related paperwork. The Engineer of Research normally serves as the administrative contact for KDOT on TPF projects. On TPF projects that KDOT has committed funds, the Engineer of Research is delegated signature authority to initiate the transfer of SPR funds to the lead entity (FHWA Forms 1575 and 1576).

3.2.5.A. Development of Research Proposals or Work Plans

The assigned K-TRAN Project Monitor helps the Principal Investigator accomplish the following general tasks during development of the Proposal for the approved project. KDOT researchers assigned as a Principal Investigator on a formal research project also follow the same procedures.

A.1 Discussion with Submitters

The Principal Investigator should have discussions with the problem submitter as needed. The Principal Investigator should probe for all conditions or circumstances under which the problem exists. This information will be used in discussions with other affected units and to conduct a literature review. Follow-up discussions may be held with the submitter to refine the Proposal or work plan.

A.2 Discussion with Affected Units

The Principal Investigator should involve the management of the units that may be affected by the study. Discussions will determine if the proposed study might improve the operation of the unit. If the submission came from outside the organization, the affected unit will be asked to assess its potential for implementation. Refinements should result from these discussions.

A.3 Literature Review

After discussing the problem with the submitter and the affected units, the Principal Investigator will conduct a literature search. The details of the search are discussed in section 5.2, TRIS Database. The search will provide insights to the problem area. This information can help avoid unnecessary duplication of ongoing or completed research and enhance the study results. Staff and faculty may also do their own search directly using TRIS Online which is available on the internet. The TRB Research in Progress Database is available on the internet and should be search to determine if other related research projects may be in progress.   Links to these

databases can be found on the Research Unit website. The KDOT Librarian and/or TRB Librarian also make literature searches upon request.

3.2.6 Product

The solicitation and research screening process provides the most complete and accurate information in the program development process. All the necessary participants are involved in the solicitation process. Sufficient guidance is provided to the participants in defining the research problem statements and a complete screening of each problem involves literature and submitter reviews. With this effort completed, the other committees and management have assurance that their discussions toward a decision are well founded.

3.3 FHWA Research Work Program Requirements

3.3.1 Purpose

The documents assembled by a state research organization help define and justify the expenditure of resources. The research work program is the single document that concisely describes all the activities undertaken, both on a technical and financial basis.

3.3.2 Process

3.3.2.A. Requirements

On July 23, 1994, the FHWA issued a final rulemaking on 23 CFR, Parts 420 and 511, State Planning and Research Program Administration. The RD&T Work Program requirements were defined in section 420.209. They are as follows:

(a) The State's RD&T program shall, as a minimum, consist of an annual or biennial description of activities and individual RD&T activities to be accomplished during the program period, esti-mated costs for each eligible activity, and a description of any cooperatively funded activities that are part of a national or regional pooled fund study including the NCHRP contribution. The State's work program shall include a list of the major items with a cost estimate for each item.

(b) The State's RD&T work program shall include financial summaries showing the funding levels and share (Federal, State and other sources) for RD&T activities for the program year. States are encouraged to include any activity funded 100% with State or other funds.

(c) Approval and authorization procedures in section 420.115 are applicable to the State's RD&T work program.

3.3.2.B. FHWA Certification Requirements

The final rulemaking on 23 CFR, Parts 420 also stipulates certification requirements. They are found in section 420.213**.**   The rules require KDOT to certify that it is following the

management process as defined by this Manual and to recertify if any significant changes are made. Significant revisions will be documented with changes to this Manual and have to be approved by the FHWA before a recertification can be issued.

3.3.3 Product

The activities of the research unit are concisely and completely described in a single document. The elements of the work program describe the technical and financial responsibilities of the research unit for the term of the plan.

4.0 PROGRAM EVALUATION

4.1 Project Level Reporting

4.1.1 Purpose

As the research effort focuses on customer benefit, it is conducted with an eye toward implementation. The implementation process is aided by the exchange of information, which starts with clear, concise and complete project reports. These reports detail the progress and accomplishments of a research project and are written with the customer in mind.

The proper reporting of the individual parts, represented by the projects, will enhance the evaluation of the entire research program.

4.1.2 Process

4.1.2.A. Technical Status

A.1 Tasks

Each of the major tasks outlined in the project work plan will be briefly described, whether they have been completed or are still in progress.

A.2 Schedules

The planned and actual time schedule for the project will be shown.

A.3 Problems/Resolutions

Financial, staff, equipment and technical problems will be discussed, as they affect the individual tasks. Their resolution, or attempts at resolution, will also be stated.

4.1.2.B. Technical Findings

B.1 Accomplishments/Implementation Efforts

Milestones such as an interim report, completion of data collection, etc. will be used to describe the completion of a task. Each task may result in an accomplishment. The significance of the accomplishment will be discussed with respect to its advancement of an implementable product. This section of the report is the most important to the end users. The potential success of the research and proposed plan for implementation of the results is stated here by the Principal Investigator. On K-TRAN projects, a formal Research Implementation Plan that states what findings will be implemented, assigned responsibilities for implementation and a timetable; and costs and benefits of implementation is completed for each project. The Research Implementation System, which also addresses benefits for the entire program, is discussed in more detail in section 4.2.2.A.

4.1.2.C. Financial Status

C.1 Budget

The line items of budgeted funds for salaries, overhead, travel, equipment and miscellaneous category will be shown as necessary. Contracts will list the same items.

C.2 Expenditures

The line item expenditure of funds will be shown for salaries, overhead, travel, equipment and a miscellaneous category. The same line items will be listed for contracts. The budget and expenditures will be shown in the same table.

4.1.2.D. Reports

Cyclical reports can be produced on a quarterly, semiannual or annual basis.

The Project Monitor for K-TRAN projects and Engineer of Research for in-house (Section 2.2.2.C) are the principal reviewers of the cyclical and interim reports. Meetings may be scheduled to review the findings in these reports if needed.

D.1 Frequency

K-TRAN project progress reports will usually be written quarterly or as detailed in the Proposal, incorporating the information in 4.1.2.A. through C.   Reports will be prepared on a semi-annual basis for SPR funded research and on an annual basis for in-house research reports and experimental features, etc.

D.2 Interim

Projects that have a significant accomplishment during the course of the research will be detailed in an interim report. In addition to the information in 4.1.2.A. through C., the interim report will discuss the implementation process and expectations. This report covers a significant part of the research, including impediments to implementation and suggestions for overcoming the impediments.

D.3 Final

The Project Monitor and Area Panel Leader associated with the project (or Principal Investigator and Engineer of Research) are aware of the findings prior to the final report. The research community and operational units affected by the work must be informed. The final report is the most lasting and complete document of the research and will be carefully assembled to include at least the following information:

- Technical Report Documentation Page (Form DOT F 1700.7) including a brief description (abstract) of the work and conclusions

- Preface, Notice, Disclaimer Page;

- Introduction, including the problem, its background and a concise history of research

- Recommendations, based on the findings and conclusions; suggestions for additional research

- Implementation Plan, defining the procedure to introduce the results into practice, including suggestions for organizational responsibility

- Work Plan, including the experimental research plan, data collection, description of sites and activities and an analysis of the data

- Findings and Conclusions.

Draft final reports on projects funded with SPR funds will be submitted to the FHWA Division Office in digital format for review and approval prior to publication. All reports will be published using English units except instances where SI is accepted standard practice.

D.4 Final Report Numbering Schemes on Published Reports

K-TRAN project reports are published using the standard K-TRAN report cover (front and back). The report number will include the K-TRAN project number (example: K-TRAN: KSU-08-4).

Reports for projects funded with SPR funds or state only funds will be assigned a sequential project number for each calendar year that includes the funding sources (example using SPR funds: FHWA-KS-08-1; example using only state funds: KS-08-2).

4.1.3 Product

The project reports are the official documentation of the research. Quarterly and semi-annual reports are used to monitor progress. The interim and final reports form the basis for discussion of the research and presentations to the transportation community. The output of this section is the technical and financial status of a project in cyclical and final report form that is the basis for the implementation effort.

Electronic copies of all published reports are created in Adobe PDF format and stored in the KDOT Document Management System. Report summaries (one-pagers) are also created for each new published report. Access to these publications is made using the KDOT Electronic Library Catalog (intranet) or the KDOT Research Reports Catalog (internet). Electronic copies are sent to the Transportation Research Board for linking to the TRIS Online database.   Digital

copies have essentially replaced paper copies for most distribution. Currently on sixty paper copies are printed primarily for distribution to libraries.

A link to published reports and summaries will be sent by e-mail to our distribution list which includes the following:

FHWA Division Office
FHWA Midwest Resource Center
FHWA Associate Administrator for RD&T
National Technical Information Service (NTIS)
U. S. Department of Transportation Library
Transportation Systems Center (TRISNET)
Northwestern University (TRISNET)
University of California (TRISNET)
TRB Librarian
Research Director or designee in each of the states, D.C. and Puerto Rico and
others named on AASTHO SCOR/RAC Website Distribution List
KSU Civil Engineering Department
KU Civil, Aeronautical and Environmental Engineering Department
KSU Hale Library
KU Library
Kansas Historical Society Library and Archives
Kansas Turnpike Authority
U. S. Corps of Engineers Waterways Experiment Station Library
Wichita Mid-Continent Airport
Linda Hall Library, Kansas City, MO
City of Overland Park
Research Program Council
Research Technical Committee
Research Idea Originator
Principal Investigator
Project Monitor
KDOT Library
Mid-America Transportation Center, University of Nebraska
International mailing list

An electronic copy of the annual and semiannual SPR funded project reports is sent to the FHWA Division Office and placed on the KDOT Intranet. An e-mail with the link is sent to selected KDOT technical staff. The annual work program also comprises the report for the period ending June 30th. The draft SPR work program and cost estimate is due by May 12th each year. The published approved SPR work program is due by October 1st. The annual and semi-annual reports for the period ending December 30th are due by April 1st of the following year.

4.2 Overall Program Performance

4.2.1 Purpose

The public expenditure of funds is subject to careful scrutiny. The profit motive doesn't exist in the public arena, hence, these programs must prove their value in other ways. After carefully selecting problem statements and developing the work program, the research effort must follow well-defined procedures that result in unbiased and meaningful results. On an individual project basis, these results are very meaningful. On a program basis, the projects should be aggregated to define the cumulative effect of the program.

4.2.2 Process

4.2.2.A. Implementation Results

The implementation efforts of the individual projects were discussed in section 4.1.2.B. Summary tabulations of the project efforts will document the progress for the entire program. The tabulations will include implementation discussions for all major projects. All partial or full implementations will be documented on major projects. Although a project may have been formally closed out, records of the subsequent implementation successes will be maintained for at least three years, thereafter. The initial Research Implementation System report will be requested at the time the final report is submitted for final editorial review. Annual Progress Report updates, if necessary, will be sent to the K-TRAN Project Monitors one year after the initial report was completed with a due date of February 15 or August 15 to allow incorporation of data into the biannual K-TRAN Status Reports.

4.2.2.B. Accomplishments

The work program is the sum of all activities planned for the year. These activities are primarily projects, technology transfer efforts and technical assistance, seminars and implementation efforts. Milestones are achieved for each of these activities. A record of each of these activities will be kept.

4.2.2.C. Funding Adherence

Each research fund source has been programmed for the various activities (projects) in the work program. In addition, each activity (project) has a specific budget. A record will be kept for both the project level and funding source expenditures by coding time and other expenditures to the correct project number assigned for that activity. Allowances are made for over spending on the individual SPR projects for the year, but the total program funds for SPR or other funding sources cannot be exceeded. Progress reports will reflect the reasons for the individual project over or under runs.

4.2.2.D. Schedule Adherence

The projects are the most important activities as far as schedules are concerned. Most other activities can be planned throughout the year. The ability to adhere to the schedule for a project is contingent on many factors. The Principal Investigator and Engineer of Research or Project Monitor will be in frequent communication with each other to avert major slippage.

The quarterly, semiannual or annual report (section 4.1, Project Level Reporting) will reflect the estimated level of completion for each project. The planned and actual time schedules will also be shown.

4.2.2.E. Benchmarking

The achievements of the research program cannot easily be reflected on a total performance basis. The diversity of the activities is too large to permit their summation. However, the quality of the program can be judged by observing the progress of some of the measurable parameters. Benchmarking not only demonstrates progress but it also improves the progress by a quality improvement thrust. Some of the factors that will be benchmarked to show the performance of the program are:

- Programmed funds

- Staff research projects

- Contract research projects

- Accomplishments

4.2.3 Product

The documentation of a successful performance of the research effort is important to continue to receive the management and financial support that it requires. Objective and quantifiable parameters can give the basis for this support. Overall program performance can be measured by a combination of the achievement of implementation and milestones and a qualified adherence to financial and scheduling limits.

The formal process for tracking the benefits of the K-TRAN research program is the Research Implementation System. This is shown in general terms in Figure 4.

For each K-TRAN project, implementation is considered at each step of the project development process from the proposal to the final report. Once the final report is published, the Project Monitor with assistance of the PI and Area Panel Leader prepares a Research Implementation Plan that details what findings and recommendations from the project will be implemented along with the responsible parties and the expected costs and benefits of doing so. Annually, thereafter a progress report is completed that documents the implementation effort. Once the implementation effort is completed, a final report that documents the triennial benefit of the research project is completed.
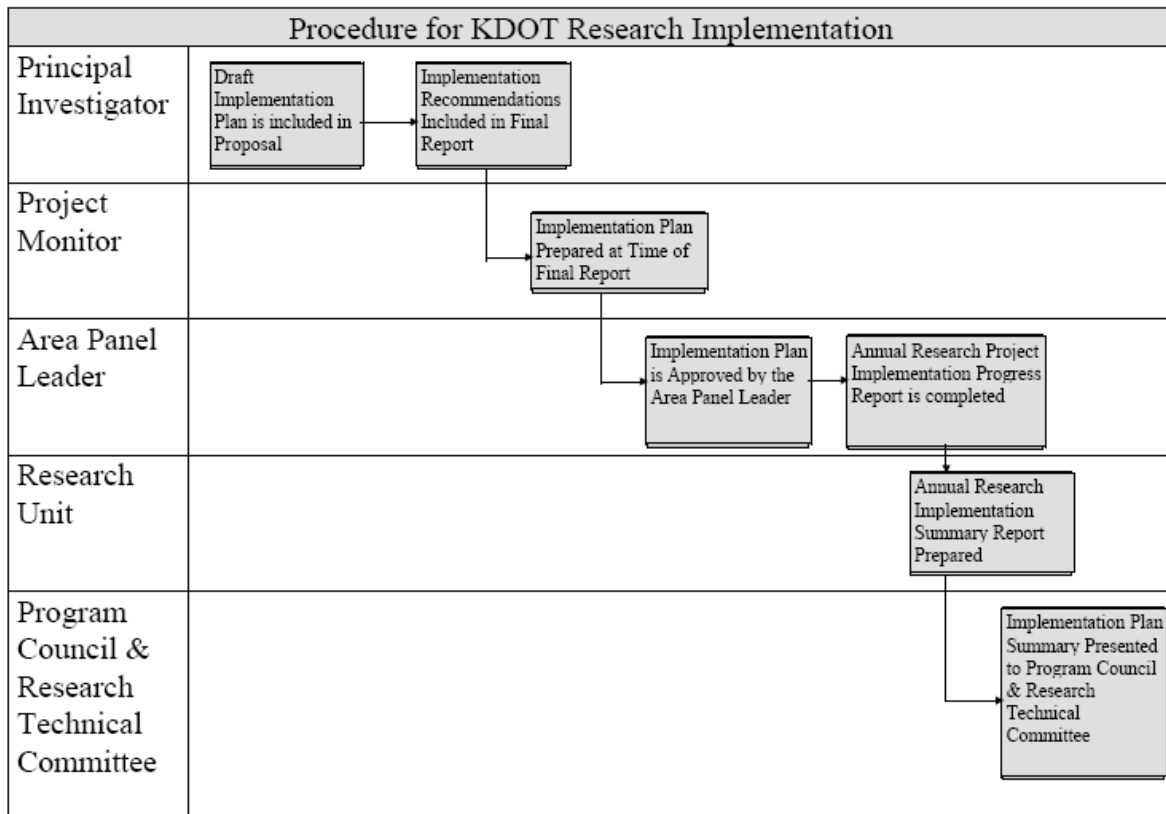
Figure 4

After the project report is published, the project monitor is requested to complete the Research Implementation Plan (Attachment E-1) and initial copy of the Research Project Implementation Progress Report (Attachment E-2). The Research Implementation Plan includes a rating form for the project monitor to rate the principal investigator. A similar form (see Attachment E-4) is also provided to the principal investigator to rate the project monitor. Annually until implementation is completed an updated copy of the Research Project Implementation Progress Report is requested from the Project Monitor by the Research Unit. Instructions for completing the form are provided to the project monitors (See Attachment E-3). These instructions were included in research report KS-03-9 titled "Guidelines for Estimating the Triennial Benefits of Kansas Transportation Research and New Developments (K-TRAN) Research Projects" by Robert W. Stokes, Michael W. Babcock, Eugene R. Russell, Margaret J. Rys, Kansas State University, July 2004. The Technology Transfer Engineer and staff are responsible for issuing, collecting and summarizing the data from these forms. An "Implemented K-TRAN Projects" spreadsheet, "Status of K-TRAN Projects" spreadsheet and "K-TRAN Status Report" are all updated twice each year with new information received from the project monitors.

The "K-TRAN Status Report" is presented to the Research Program Council at the September and March meetings. These reports are available on the K-TRAN web site on the intranet.

The SPR Annual Work Program and Cost Estimate, and semi-annual reports of research due April 1st each year constitute the formal summary reports prepared for the in-house research program. Part II of the work program has information about the SPR funded portion of the research program and Part IV has information about the state funded portion.

Summary reports (one-pagers) are prepared to briefly document the accomplishments of each published research report.

4.3 Peer Exchange

4.3.1 Purpose

A quality research program depends upon its ability to implement effective and timely solutions to the problems of the Agency. It is the execution of the procedures and processes developed by staff and management that promote the attainment of this objective. One technique designed to improve the quality of the program is a peer exchange discussion of the research procedures of all the team members involved.

4.3.2 Process

4.3.2.A. Team Review of Research Unit

A.1 Team Members

The peer exchange team of at least six members will consist of representatives chosen from the other state highway agencies, FHWA, universities, the Transportation Research Board, the private sector, or other agencies. At least two of the members of the team will be Research Directors from other state highway agencies.

A.2 Meeting Agenda

The peer exchange team will spend at least two days with staff of the research unit and agency. Although the items of the agenda may vary due to requests of the review team, the basic agenda will cover topics such as these:

- Discussion of the research unit's management system, as described in the research manual.

- Development of the strategic plan.

- Scope of the research program, including all the activities in the work program.

- Examples of a project as it advances through the system, including the solicitation, selection, choice of researcher, project progress and technology transfer activities.

- Discussion with selected clients.

- Review of resources.

- Review of staff training program.

- Review of contract process.

- Review of technology transfer efforts and implementation activities.

- A discussion of recommendations in the form of the processes of other states.

A.3 Review Issues

The peer exchange team will define the topics to be discussed at the peer exchange based on the minimum requirements of the FHWA, the interests of the team members and KDOT staff. Processes related to program development, project progress, technology transfer issues and administrative procedures will be discussed.

A.4 Peer Exchange Report

The peer exchange team will write a report on the visit that documents the meeting. Copies of the report will be filed with the research unit and the FHWA Division Office.

A.4.1 Meeting Frequency and Location

The research unit will host a peer exchange every three to five years at a location in Kansas.

A.5 Agency Response

A.5.1 Analysis of Exchange Findings

The peer exchange is a vigorous effort conducted for the benefit of the research unit. It will be accomplished by qualified peers to improve the research process. The recommendations of the team will be discussed with research staff and agency management. Consideration will be given to incorporating those recommendations that can improve the quality of the research program.

4.3.2.B. External Review

B.1 Team Member

The Engineer of Research will serve as a peer exchange team member. He/she will perform, in another state, the same exchange of information that was described in Section 4.3.2.A, Team Review of Research Unit. Any service is subject to approval of out-of-state travel by the Secretary of Transportation at the time of the request. KDOT does not expect to provide a team member more often than twice every three years.

4.3.3 Product

The peer exchange process is designed to let the states interact with other states on a formal basis. Staff can both learn from and give guidance to other agencies on the research process. This is an excellent opportunity to participate in and gain the benefits of a non-intrusive review of the agency's research process.

The process should result in recommendations covering the problem solicitation process, work program, contract research effort, project monitoring, project reporting, technology transfer and implementation efforts.

5.0 TECHNOLOGY TRANSFER

5.1 Outline of Activities

5.1.1 Purpose

Research may be described as the careful, systematic study to establish facts in a specific field, but the crux of the effort for the state is in the application of research results. Technology transfer in research goes beyond the use of the results of the research projects conducted by the unit. Research staff has acquired an expertise in a range of transportation fields. That expertise is continuously in demand by the operating units of the agency. Further, the field of transportation is dynamic, a fact that compels the research staff to keep the transportation community of the state abreast of the latest developments.

5.1.2 Process

5.1.2.A. Customers

Everyone benefits from the transportation system, and hence, from research into the system. In section 1.2, Purpose, the immediate beneficiaries of research were stated to be the Agency, its employees and other transportation agencies and users. The technology transfer activities of research will be directed to the immediate customer, with the larger community in mind.

5.1.2.B. Partners

The partners of research, as defined in section 2.1.2.A., Outreach Partners, are also the beneficiaries of research. Gaining the support of the beneficiaries of research was outlined in section 2.1, Customer Support Development. The partnerships formed with Agency operating units, universities, companies, transit authorities, consultants, local governments, regional agencies, FHWA and the public will require constant renewing. The transfer of technology cannot be accomplished without the concurrence and assistance of these partners.

5.1.2.C. Outreach Activities

Research staff will be active participants in the technology transfer activities in the following ways:

- The progress of the research projects will be regularly examined to determine whether the deliverables are amenable to implementation.

- The results of research projects will be advanced for implementation.

- The expertise of staff will be available to the operating units of the agency for problem solving.

- The results of promising research from other agencies and publications will be made available to the agency's operating units.

- Information on FHWA Demonstration projects will be disseminated to agency staff, and analyzed for a potential workshop session.

- Research staff will be actively involved in the installation and analysis of experimental features in construction.

- As noted in section 2.1, Customer Support Development, research staff will actively participate in the development of committees, institutional discussions and seminars to involve potential partners in the research process.

- Staff will attend important regional and national meetings and disseminate the results.

5.1.3 Product

All possible methods of collecting and disseminating information on transportation improvements will be pursued within the limits of available resources. The results of this activity will foster implementation, avail the research partners of staff expertise and keep the transportation community apprised of the latest advances in the field.

5.2 TRIS Database

5.2.1 Purpose

The basis of research support is the information it provides clients. Despite the expertise of the staff, there are many informational requests made of research that require literature searches. An analysis of problem statements and informational requests must consider the literature defining the state of the art of the subject. The Transportation Research Information Service (TRIS) is the single most comprehensive file of literature on all subjects in the field of transportation. The research unit will contribute project information to this system.

5.2.2 Process

5.2.2.A. Reporting To TRIS Database

Ongoing research activities will be reported to the TRB Research in Progress database. Completed projects with published reports will be reported to the TRIS database. Electronic copies of full text reports will be furnished for linking to the abstracts in TRIS Online. The reporting will include the status of existing projects, significant changes to existing projects, the addition of new projects, the completion of projects and significant technology transfer activities.

5.2.2.B. TRIS Searches for Information

A search of a computerized file for information on a subject starts with a selection of the appropriate key words. If the keywords are too broad in scope, too much information will be returned. Conversely, if the keywords are too specific, very limited information may be returned.

A selection of keywords should be made after discussing the subject with the client. Only then can the search structure be properly established. The search must be structured correctly so that the information returned to the user adequately covers the subject. TRIS access options are described in Section 3.2.5.A.3.

5.2.2.C. Synthesis

If appropriate, a summary of the findings of the search will be developed from the abstracts of the search. This will serve as the basis for defining further study of the subject. If the search is made for a client, a review of the synthesized material with the client should be the most helpful means of deciding follow up review procedures. If the search is made as part of the literature review process at the outset of a project, the synthesis will serve as background material for the research.

5.2.2.D. Further Review

A study of the abstracts should lead to an in-depth review of some articles. For the more esoteric subjects, this is a necessary step. It could lead to additional keywords and the suggestion that another informational system may have to be accessed.

5.2.3 Product

The TRIS database should provide the research unit with the best possible background on the issue under question and distribute agency research results to a broad audience.

5.3 Local Technical Assistance Program (LTAP)

The Local Technical Assistance Program (LTAP) is a high-profile technology transfer program sponsored by FHWA. The program, established in 1981, encourages cost-effective improvements to roads and bridges owned and maintained by local government.

Federal-aid LTAP funds are available for nominally 50 percent of the program funding. The remaining 50% match consists of KDOT 80-20 SPR funds. Additional work is accomplished because KU waives a portion of the indirect costs normally charged on a federally funded project. Through training courses, production of users' manuals, on-site demonstrations, and a strong network of technical expertise available to the local governments, the program furthers the implementation of highway innovations at the local level. The funds available and the people-intensive focus enable new processes, methods, and other innovations to be more easily applied to local highway practice.

The LTAP Center is located at the University of Kansas and is operated by Transportation Center (KUTC) staff. The Technology Transfer Engineer in the Research Unit functions as a program administrative director and technical advisor. The Center provides proposals of work for the coming performance time frame and is awarded funds based on the proposals. The Center has a close association with agency technical personnel, who facilitate the flow of technical information to the Center and its customers.

Research (Section 19)
Fiscal Year 14 - 15

Goal 1: Continuously improve the performance of the Office of Engineering

Objective 1.1: Meet 85 percent of target goals established for marketing of technical information and research results with publications and formal presentations current FY. Target: 85%, Exceed: 93.5%
- **Input:**
  - Project capsules required (projects started)
  - Technical summaries required (final reports published)
  - Publication submittal goal (one/completed project)
  - Presentations goal (one/completed project)
  - Articles goal (one/Technology Today publication)
- **Output:**
  - Project capsules published on time (90 days)
  - Technical summaries published with final report
  - Publications submitted
  - Presentations given per project
  - Article published in Tech Today
- **Efficiency:**
  - Percent of target goals met

Objective 1.2 Meets 85% of $\geq$ 3 on AMRL/CCRL proficiency sample test results per year. Target: 85%, Exceed: 93.5%
- **Input:**
  - Number of proficiency tests conducted by LTRC labs for AMRL/CCRL
- **Output:**
  - Number of ratings $\geq$ 3
- **Efficiency:**
  - Percentage of ratings $\geq$ 3

Goal 2: Deliver cost effective products, projects and services in a timely manner

Objective 2.1: Sixty percent of research projects final reports delivered with PRC approval by scheduled completion date each fiscal year. Target: 60%, Exceed: 66%
- **Input:**
  - Date projects scheduled for completion
  - Date final reports receive PRC approval
  - Number of projects scheduled for completion current fiscal year
  - Projects extensions granted due to justifiable cause
- **Output:**
  - Number of final project reports approved by PRC by scheduled completion date current fiscal year
- **Efficiency:**
  - Percent final draft reports delivered to editing by scheduled completion date

Objective 2.2: Seventy percent of research projects final reports published within one year of project end date for projects completed previous fiscal year. Target: 70%, Exceed: 66%

- **Input:**
    - Number of projects ended previous fiscal year
    - Date final reports approved for publication
- **Output:**
    - Number of final project reports published within one year of project end dates
- **Efficiency:**
    - Percent final reports published within one year of project end dates

Objective 2.3: Reduce the number of final reports published late by 10%. (greater than one year from end date) Target: <11 Projects, Exceed: < 10 projects

- **Input:**
    - Number of project reports pending publication greater than one year past project end date previous fiscal year
    - Project end dates
    - Date final reports approved for posting / publication
- **Output:**
    - Time between project end date and posting / publication date for each project
    - Number of project reports pending publication greater than one year past project end date current fiscal year
    - Difference in number of late reports between fiscal years
- **Efficiency:**
    - Percent reduction in late reports from previous fiscal year compared to current fiscal year

Goal 3: Improve customer service and public confidence

Objective 3.1: Receive an average rating of 3.5 on customer satisfaction surveys for research projects published each fiscal year. Target: 3.5 rating, Exceed: 3.85 rating

- **Input:**
    - Research published current fiscal year
    - Rating results received from completed research project surveys
- **Output:**
    - Average rating of research projects receiving ratings of 3.5 out of 5 or better

Objective 3.2: Receive an average rating of 3.5 on customer satisfaction surveys for technical assistance project results delivered to DOTD each fiscal year.

Target: 3.5 rating, Exceed: 3.85 rating

- **Input:**
  - o Technical assistance requests received current fiscal year
  - o Technical assistance project results delivered current fiscal year
  - o   Rating results received from technical assistance satisfaction surveys
  - o
- **Output:**
  - o Average rating received on technical assistance surveys 3.5 out of 5 or better

Goal 4: Effectively develop and manage our human resources

Objective 4.1 Ensure employees complete 95% of required training as identified in STP, Leadership and individual development plans each fiscal year. Target: 95%, Exceed: no exceeds option

- **Input:**
  - o Number of employees
- **Output:**
  - o Number of required classes completed or applied for
- **Efficiency:**
  - o % of employees that have completing required training or applied for required classes

Objective 4.2: Achieve seventy -five percent compliance with safety monthly "tailgate" meetings as required to pass state safety audit. Target 75%, Exceeds: 82.5 %

- **Input:**
  - o Number of employees
- **Output:**
  - o Number of employees in compliance with safety training monthly meeitngs
- **Efficiency:**
  - o % of employees in compliance

Objective 4.3: Achieve 90 percent compliance with required safety training courses required for LTRC employees and students working in LTRC lab and field units. Target 90%, Exceeds: 99 %

- **Input:**
  - o Number of employees
- **Output:**
  - o Number of employees in compliance with safety training requirements
- **Efficiency:**
  - o % of employees in compliance

Goal 5: Effectively manage the financial resources available to the Office of Engineering

Objective 5.1: Sixty five percent of projects to expend funds within +/- 20% of the estimated budget each fiscal year. Target: 65%, Exceed: 71.5%

- **Input:**
    - Number projects this fiscal year
    - Estimated funds budgeted for each project
        - July planning & January biannual update
    - Actual funds expended on each project
- **Output:**
    - Actual funds expended on each project current FY
    - Number projects that expended funds within +/- 20% of estimate current FY
- **Efficiency:**
    - Percent projects that expended funds within +/- 20% of estimate

Objective 5.2: Manage and restrict non-personal services expenditures not to exceed 97% of budget authority. Target: 97%, no exceeds option

- **Input:**
    - Total fiscal year budget allocation for non-personal services
- **Output:**
    - Total fiscal year expenses for non-personal services
- **Efficiency:**
    - Percent fiscal year expenses vs budget authority for non-personal services

Objective 5.3: In past 5 years, seventy five percent of completed research projects provide recommendations for implementation of results endorsed by the Project Review Committee. Target: 75%, Exceed: 82.5%

- **Input:**
    - Implementation status summary from completed projects
    - Number of completed research projects within last five years
- **Output:**
    - Number of project with recommendations for implementation of results that have not yet been adopted
- **Efficiency**
    - Percentage of project within last five years with recommendations for implementation of results endorsed by the Project Review Committee.

Goals for Technology Transfer & Training Section 33
FY 14 -15
May 22, 2014

Goal 1: Continuously improve the performance of the Technology Transfer & Training Section

1. **Objective:** Revise 3 outdated LTRC technical training courses by identifying and including the most effective delivery technique (i.e., instructor-led, CBT, distance learning, etc.)" each fiscal year.
   a. **Input:**
      i. Number of outdated technical courses needing revision
      ii. Number of FTEs available to revise courses
      iii. Funding available to contract course revisions
   b. **Output:**
      i. Number of revised courses accomplished
   c. **Outcome:**
   d. **Efficiency:**
      i. Number of revised courses over target of 3
   e. **Quality:**
      i. Reduction of outdated course due to changes in specifications, procedures and policies
      ii. SME validation of new courses

2. **Objective:** Identify and begin development of 3 new training courses by incorporating the most effective delivery technique (i.e., instructor-led, CBT, distance learning, etc.)" each fiscal year.
   a. **Input:**
      i. Number of new technical courses identified
      ii. Number of FTEs available to develop courses
      iii. Funding available to contract course development
   b. **Output:**
      i. Number of courses completed
   c. **Outcome:**
   d. **Efficiency:**
      i. Number of courses over target of 3
   e. **Quality:**
      i. Reduction of new courses due to changes in specifications, procedures and policies
      ii. SME validation of new courses

Goal 2: Deliver cost effective products, projects and services in a timely manner

1. **Objective**: Ensure quality of course content by earning an average of 4.0 out of a 5.0 rating scale for 90% of internal LTRC/TTEC courses delivered each fiscal year
   a. **Input**
      i. Participant evaluations for each internal course delivered.
      ii. Total number of internal courses delivered.
   b. **Output:**
      i. Average course content rating received on participant evaluations for internal courses delivered.
   c. **Outcome:**

   d. **Efficiency:**
      i. Total number of internal courses delivered receiving an average evaluation rating of 4.0 and above in course content over total number of internal courses delivered.

2. **Objective**: Ensure quality of course content by earning an average of 4.0 out of a 5.0 rating scale for 90% of external courses delivered (vendor-provided) each fiscal year.
   a. **Input**
      i. Participant evaluations for each external course delivered.
      ii. Total number of external courses delivered.
   b. **Output:**
      i. Average course content rating receiving on participant evaluations for courses delivered by vendors.
   c. **Outcome:**

   d. **Efficiency:**
      i. Total number of external courses delivered receiving an average evaluation rating of 4.0 and above in course content over total number of external courses delivered.

3. **Objective:** Maintain internal and external participation in LTRC/TTEC course offerings at current levels each fiscal year.
   a. **Input:**
      i. Total number of participants previous year
      ii. Total # of private sector participants previous year
   b. **Output:**
      i. Total number of participants current year
      ii. Total # of private sector participants current year
   c. **Outcome:**
      i. % increase in participation
      ii. % increase in private sector participation

4. **Objective:** Maintain number of TTEC course offerings at current level each fiscal year.
   a. **Input:**
      i. Total # of courses offered previous year
   b. **Output:**
      i. Total # of courses offered current year
   c. **Outcome:**
      i. % increase in number of courses

Goal 3: Improve customer service and public confidence

1. **Objective:** Complete editing of 95% of reports/publications within 45 days after receipt from principal investigator each year.
   a. **Input:**
      i. Date report/publication received from principal investigator.
      ii. Date report/publication sent back to principal investigator.
      iii. Number of reports received
      iv. Number of FTEs available for editing.

   b. **Output:**
      i. # of reports/publications that met the required schedule.
   c. **Outcome:**
      i. Timeliness of getting report/publications to press resulting in better informed readership
   d. **Efficiency:**
      i. Number that met required schedule over number submitted each year.

2. **Objective:** Increase professional development opportunities for DOTD employees and external participants though workshops and seminars by 5 % each fiscal year.
   a. **Input:**
      i. Total # of professional development opportunities previous year
   b. **Output:**
      i. Total # of professional development opportunities current year
   c. **Outcome:**
      i. % increase in opportunities

Goal 4: Effectively develop and manage our human resources

1. **Objective:** Document individual employee development plans considering STP, leadership and additional training requirements on PPR's for 95% of employees each fiscal year.
   a. **Input:**
      i. Number of Tech Transfer staff that have individual development plans
   b. **Output:**
      i. Number of individual development plans developed.
   c. **Outcome:**

> d. **Efficiency:**
>> i. % of individual development plans developed and refined

2. **Objective:** Ensure 95% of employees complete required training as identified in STP, Leadership and individual development plans each fiscal year.
    a. **Input:**
        i. Number of employees w/ training requirements
        ii. # classes available
        iii. Individual training requirements
    b. **Output:**
        i. Number of employees completing training requirements
    c. **Efficiency:**
        i. Ratio of employees who complete training over total number of employees with training requirements

Goal 5: Efficiently manage the financial resources of Technology Transfer Section

1. **Objective:** Maintain funds for LTRC workforce development activities from private sector participation in TTEC course offerings, each fiscal year.
    a. **Input:**
        i. Private sector funds for workforce development activities previous fiscal year
    b. **Output:**
        i. Private sector funds for workforce development activities current fiscal year
    c. **Outcome:**
        i. % increase in funds in current fiscal year

2. **Objective:** Maintain the cost per participant at current levels each fiscal year.
    a. **Input:**
        i. Costs (Total)
    b. **Output**
        i. Number of participants
    c. **Outcome:**
        i. Cost per participant

3. **Objective:** Ensure that no more than 97% of the "non-personnel" approved allocated budget is spent per fiscal year.

    a. **Input:**
        i. Approved allocated budget less "non-personnel" budgeted item.
    b. **Output**

    i. Total expenditure amount of allocated budget less "non-personnel" budget
  c. **Outcome:** Percentage of approved allocated budget spent per fiscal year.

Goal 6: Enhance the safety and well-being of our citizens, visitors and staff

 1. **Objective:** Ensure overall compliance of 75% (DOTD Requirement) of Monthly Safety Meeting Document read by Section this fiscal year
  a. **Input:**
    i. Number of Employees
  b. **Output:**
    i. Number of Employees that read Monthly Safety Document
  c. **Outcome:**
    i. Percent compliance

MoDOT Research Vision Developed 6/19/2014

On Time/On Budget (Timeliness/Expenditure of Funds)
Strategies
- ➢ Continue Tracker Measure of On-Time and Budget
- ➢ Quarterly Review of Project Progress vs. Project Workplan/Budget before submittal to FHWA
- ➢ Percentage Progress reported on quarterly basis
- ➢ Evaluate estimate vs. expenditure through Enterprise Project Management system on monthly Basis

Build Relationships
Strategies
- ➢ Develop Research Newsletter/Summary as necessary to Highlight Research Innovations and Implementation Opportunities to targeted audiences
- ➢ Develop a formal process to solicit research ideas both internally and externally
- ➢ Develop Process to gather problems / issues within MoDOT (focus groups, surveys, blogs, etc.)
- ➢ University Visits on an annual basis
- ➢ Encourage partnering of University Research Opportunities through direct correspondence

Research Innovations/Implementable Research
Strategies
- ➢ Build on Relationships by defining Research Needs through during Research Needs Workshop each fall of the year.
- ➢ Continue to emphasis the importance of the Research Communication Planning Sheets
- ➢ Develop a mechanism to define Research Project Technical Advisory Committee (TAC) at the start of project
- ➢ Follow-up with TAC and Researcher (Principal Investigator) at completion of project to define an Implementation Plan and quantify benefits of the Research
- ➢ Pilot an evaluation of a targeted list of Research Projects to quantify costs that have been implemented over a 12 month period
- ➢ Actively seek implementable grant opportunities
- ➢ Review SHRP2 Implementation Assistance Projects and other Grant Programs to define benefits to the Department

New Product Process
Strategies
- ➤ Reorganize the New Product effort
- ➤ Investigate Best Practices of what other states are organized to evaluate New Products
  - o Technology used to track New Product submittals
  - o Organizational Structure and staff resources
- ➤ Vendor feedback of New Product process

Knowledge Management
Strategies
- ➤ Make MoDOT publications more visible and readily accessible (via social media, MoDOT Innovation Library website; State Publications Digital Library)
- ➤ Make internal and external knowledge resources available to MoDOT staff according to their research needs (via physical and digital means)
- ➤ Identify digitization opportunities; explore digital repository options
- ➤ Leverage knowledge and expertise of regional and national transportation knowledge networks and the Transportation Library Connectivity and Development Pooled Fund

Number of LTAP classes and attendees

Results Driver: Dave Ahlvers, State Construction and Materials Engineer
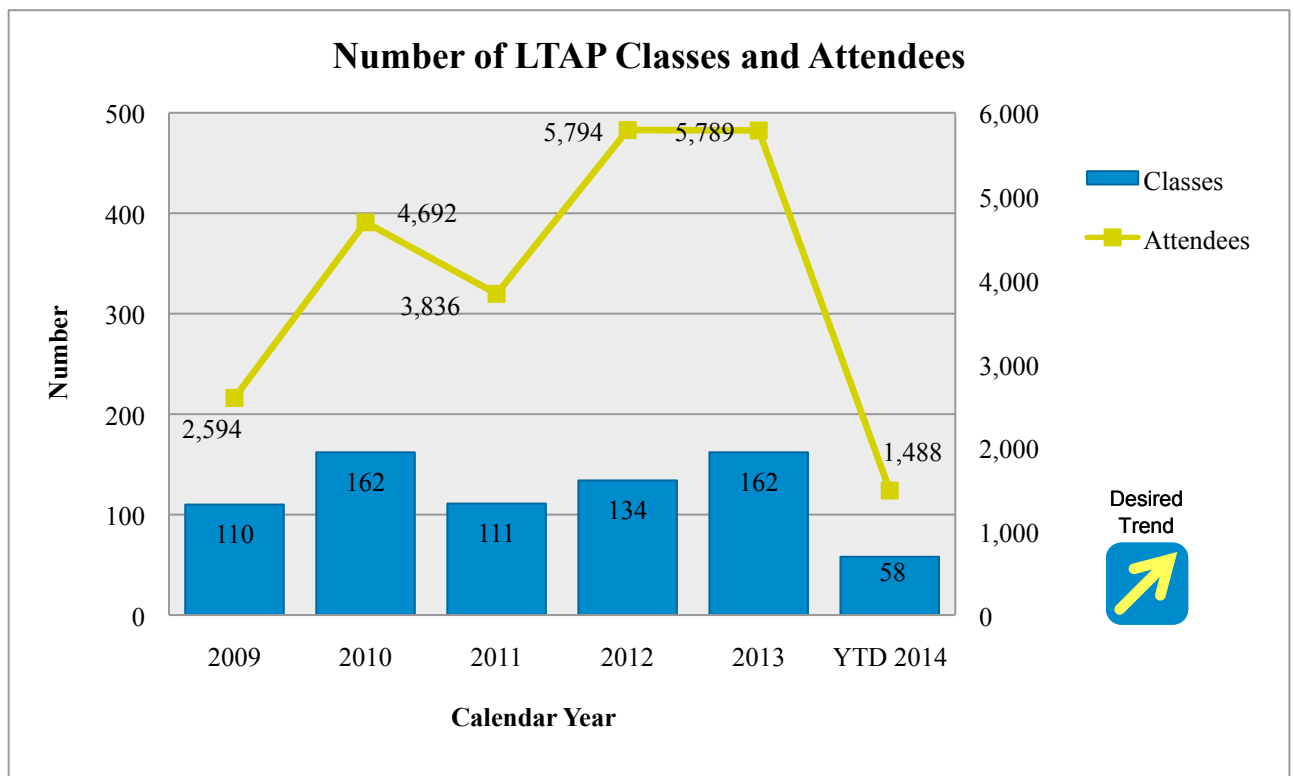**Measurement Driver:** Bill Stone, Research Administrator

Purpose of the Measure:

The Local Technical Assistance (LTAP) is a federally funded program to provide technical support, transportation information and training to Missouri communities that maintain local roads and bridges. The number of LTAP classes and attendees is an indication of how well Research is administering LTAP with the Missouri University of Science and Technology.

Measurement and Data Collection:

LTAP maintains a database of classes and attendees. The database is updated as classes are held.

Story:

For the second quarter of calendar year 2014, LTAP conducted 33 classes with 836 attendees. The number of classes is 33% less than the (44 classes) and the number of attendees is virtually the same as the attendees (840) compared to the same quarter of calendar year 2013. Overall there were 83 classes and 1792 attendees through the same period of Calendar Year 2013. The LTAP program continues to be asked to increase their class curriculum.

Number of library items circulated

Results Driver: Bill Stone, Research Administrator
Measurement Driver: Renée McHenry, Transportation Librarian
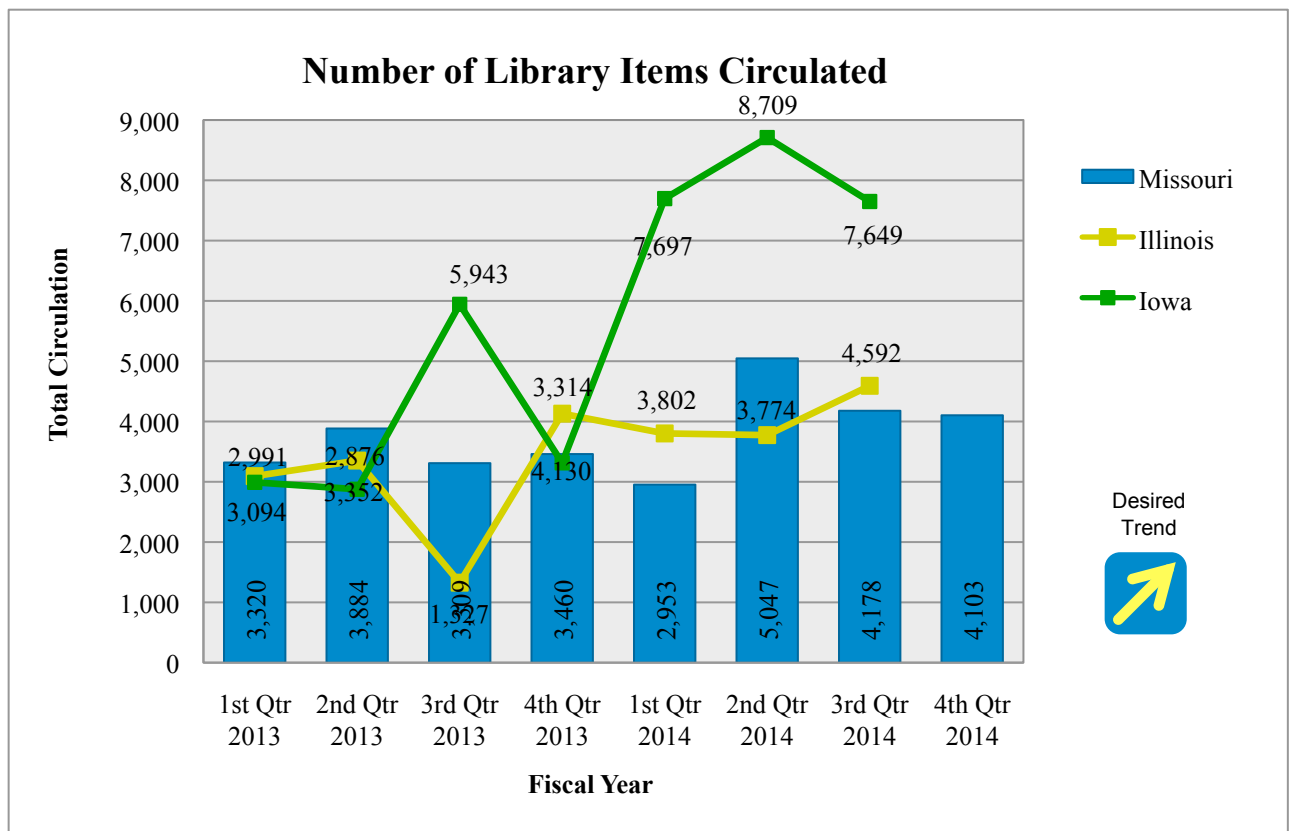
Purpose of the Measure:
This measure tracks the usage of library items at MoDOT. This includes checkouts, renewals and information provided through literature searches. The data comprehensively demonstrates the level at which the MoDOT Transportation Library and its librarian are being utilized.

Measurement and Data Collection:
This measure counts the usage or retrieval of documents, specific datasets, links to online material, hard copy or digital items from the MoDOT Library or its partners, and other resources acquired through the library that provide value added information to the library's customers. Data is gathered using circulation statistics from the Sierra integrated library system, from the Missouri State Publications Digital Library (Internet Archive repository) and from the Scribd social media website. Information is recorded according to standards agreed upon by the Midwest Transportation Knowledge Network. This is a quarterly measure with data collection beginning in April 2009.

Story:
Total circulation fell slightly by 2% over last quarter. Compared to last quarter, there was an 11% increase in the circulation of documents in the State Publications Digital Library while the circulation of library catalog, reference and Scribd items decreased. The number of MoDOT items in the State Digital Library now totals 474. Usage of these digital items (as defined by views or downloads) increased 12% over last quarter.

Number of research projects completed

Results Driver: Bill Stone, Research Administrator
Measurement Driver: Jen Harper, Research Engineer
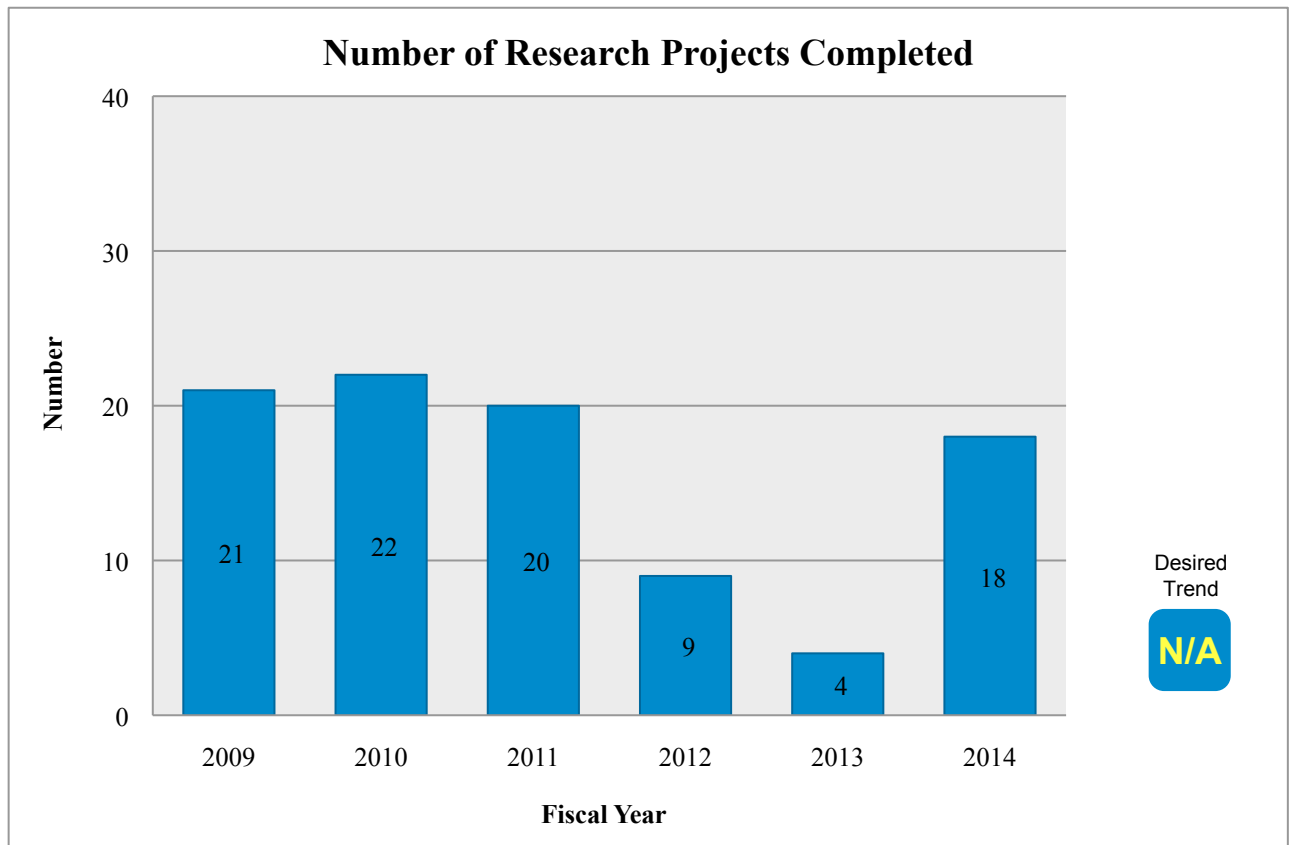
Purpose of the Measure:
The number of contracted research projects completed will help Research management evaluate staff productivity.

Measurement and Data Collection:
Research is responsible for coordination of contract research projects. Project information is compiled from the research project management software, known as Rational Portfolio Management (RPM) and evaluated for accuracy. Data for this measure is collected on a quarterly basis.

Story:
Six contract research projects were completed during the fourth quarter of FY 2014 for a total of 18 completed projects. This is up from four completed projects in FY 2013. Five of the six completed projects were completed within the original budget. The Pile Load project had an increased budget due to delays in construction of the bridge and additional testing required due to unexpected test results. The Hybrid Composite Beam (HCB) project and the Fiber Reinforced Polymer (FRP) Bridge Deck Panels project were planned to be completed but were not. The HCB project is in the process of finalizing the report which has taken longer than expected due to the complexity of the project. The FRP project was slightly delayed because the Principal Investigator moved to a different university and there was a delay while the contracting was updated. There were a total of 34 active research projects in the 4[th] Quarter fiscal year 2014.

Number of Research Projects Completed

Fiscal Year	2009	2010	2011	2012	2013	2014
Number	21	22	20	9	4	18

Desired Trend

N/A

Percent of active and completed research projects on time

Results Driver: Bill Stone, Research Administrator
Measurement Driver: Jen Harper, Research Engineer

Purpose of the Measure:
The percent of contracted research projects on time is an indication of how effectively researchers work to deliver projects on time. A higher percentage of research projects on time indicates that staff is providing timely research deliverables.

Measurement and Data Collection:
Based upon work summaries provided by the principal investigator, a contract period is established for each project at the time of its award. Using this information and comparing it to the completion date of the project, it can be determined if the project is on time. The percent of projects on time is based on the number of active and completed projects during a given quarter. The "average percent" for previous years is the average of each quarter's percent.

Story:
The percent of research projects on time include contract research projects that are active or completed during the quarter. During the fourth quarter of FY 2014, 85% of contract research projects were on time. The 85% represents five projects out of 34 that are either late or have a time extension. Many of these late projects have implementation pieces within a construction project and are dependent on the construction schedule which is difficult to anticipate at the beginning of the research project.

Active and Completed Research Projects on Time

Desired Trend