U.S. Department of Transportation

Federal Highway Administration

Program Review

Program Management Improvement Team

SPR Subpart B Research Program

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FINAL REPORT

U.S. Department of Transportation
Federal Highway Administration

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Executive Summary

Observations

With limited time available, Division staff members are engaged in their State's various research committees and technical groups. Two Divisions also actively view Research as an opportunity to contribute to FHWA's strategic objectives. This leads to questions of how best to spend that time: help ensure regulatory compliance, serve on various State DOT committees and technical groups, or instead focus on FHWA's strategic objective of advancing innovation? Should the answer to that question vary based on the conditions within each state? While the FHWA's newly released risk based stewardship and oversight (S&O) guidance provides generic direction, it is unclear to us how Divisions should provide S&O specifically to the State DOT's Research Program.

No Division or State we visited had complete awareness of what constituted full compliance with the regulations we tested. Moreover, since five of the states we visited were randomly selected for this review, this condition likely prevails elsewhere. We heard a variety of reasons for this lack of awareness, including years of experience, competing collateral duties, lack of definitive guidance, and viewing Research as a low-threat risk based on dollar volume alone.

Borrowing from the proven promotional concepts of the Every Day Counts Program (EDC), SPR funded State DOT research projects can contribute to innovation when research results are implementable, have been tested through initial implementation, and are market ready. Some State DOT research programs are not able to identify a solid link between the completion of their research projects and market readiness, and instead view their program as a success when the federal monies are spent in accordance with the approved program plan. Two State DOTs visited, though, were able to describe their successes in terms of implementation and quantifiable benefits of research conducted. These State DOTs placed strong emphasis on implementation throughout the research cycle, from problem identification through incorporation of results into State DOT plans, specifications, and processes.

SHRP2 was cited as a 'best practice' example of collaborative decision-making that identifies strategic research needs that can be implemented by the broad transportation community. EDC encourages use of a State Transportation Innovation Council (STIC) to facilitate selection of innovations most important to the transportation industry through collaboration among the various stakeholders. Only one State DOT we visited has a fully implemented STIC that has integrated its research program, SHRP2 and EDC into one single program. This State facilitates the STIC through a clearly defined process to identify research needs and move innovation rapidly forward to implementation by

engaging the entire transportation community. To facilitate this goal, the State DOT expends 35% of the SPR Subpart B funds on technology transfer activities, including facilitation of the STIC. One other State DOT we visited is in the early stages of use of such a broader collaborative effort. The other States in our review were not able to demonstrate efforts to integrate research with EDC and SHRP2.

The FHWA Research & Technology (*R&T) Agenda* was launched to market and display what FHWA is doing, as well as to receive input on national research needs and priority areas. The A*genda* is based on input from strategic "roadmaps" for each of the major FHWA program areas that outline future research needs. It provides high level information to stakeholders, including State DOTs, about the roadmaps, but does not specifically list their details on *TFHRC's* external web site.

Marketing efforts related to the *Agenda* have not yet succeeded in helping the State or Division staff understand its linkage with their State's transportation research needs. Nor do Divisions yet understand how they can contribute to strengthening this linkage. Through the development of the *R&T Agenda*, TFHRC, working with other Headquarters program offices, has taken initial steps to enhance collaboration with outside stakeholders in shaping national research goals. Our understanding is that efforts are under way to incorporate research as an objective in FHWA's 2016 Strategic Implementation Plan (SIP), under the National Strategic Objective of Advancing Innovation. Such ties to the SIP should aid in raising Division and State DOT awareness of the potential for research at the national and state levels to contribute to future innovation.

Review Purpose and Objectives

This review was conducted to aid the Office of RD&T in determining how they can better coordinate the FHWA-conducted Research and Technology (R&T) program with the SPR Research Program and how they can better assist Divisions in providing program management and oversight. The objectives of this review were to:

1. To determine how Divisions conduct their periodic reviews of the State DOT's SPR Subpart B program, identifying what is necessary for successful stewardship and oversight, where gaps may exist, successful practices and lessons learned, and

2. To determine how research program integration (e.g. EDC and SHRP2) occurs and to identify ways the intent of the FHWA R&T Agenda can be harmonized with the State DOT's research program.

Recommendations

The National Review Team recommends that TFHRC:

1. Develop a suite of risk-based tools to aid Division Office Research Coordinators in determining how best to spend their time providing stewardship and oversight of the State DOT Research Program;

2. Provide guidance to the Divisions as they help State DOTs understand how to more fully integrate their research programs into the STIC-supported culture of innovation; and

3. Include additional information on the various research "roadmaps" in the FHWA R&T Agenda public website in order to increase transparency of FHWA's national research efforts, which would also minimize possible duplication of research efforts and encourage collaboration and cooperation on those research efforts.

Background

23 USC 505(a) requires that States set aside two percent of the apportionments they receive from four of the core Federal-aid programs for State planning and research activities. 23 USC 505(b) further provides that of this amount, States must allocate 25 percent for research, development, and technology. These activities involve researching new areas of knowledge; adapting findings to practical applications by developing new technologies; and transferring these technologies, including the process of dissemination, demonstration, training, and adoption of innovations by users.

23 CFR 420 Subpart B specifies the requirements for research, development, and technology transfer (RD&T) activities, programs, and studies undertaken by State DOTs and their subrecipients with FHWA planning and research funds. 23 CFR 420.205(g) states that each State DOT must "develop, establish and implement a management process that ensures effective use of available FHWA planning and research funds for RD&T activities on a statewide basis." The process can be tailored to individual needs but must meet the minimum requirements and conditions set out in this subpart of the regulations. 23 CFR 420.209(d) also specifies that the FHWA Divisions shall periodically review the State DOT's management process to determine if the State is in compliance with the requirements of this program.

Definition of select titles and acronyms:

CFR	Code of Federal Regulations
EDC	Every Day Counts
FAHP	Federal-aid Highway Program
FHWA	Federal Highway Administration
SHRP2	[The] Second Strategic Highway Research Program
RBSO	Risk Based Stewardship and Oversight
Research Coordinator	FHWA Division staff member responsible for overseeing the State's SPR Subpart B Research Program
Research Director	State Department of Transportation staff member managing the Research Program funded, at least in part, with SPR Subpart B funds
R&T Agenda	FHWA's Research and Technology Agenda
R&T	Research and Technology

SPR	State Planning and Research
State DOT	State Department of Transportation
STIC	State Transportation Innovation Council
TIG	Formerly the AASHTO Technology Implementation Group, now known as the *AASHTO Innovation Initiative*
TFHRC	Turner Fairbank Highway Research Center
USC	United States Code
UTC	University Transportation Center

Purpose and Objectives

This review was intended to provide information, and recommendations, where appropriate, to the Office of RD&T to aid it in determining how they can better coordinate the FHWA-conducted Research and Technology (R&T) program with the SPR Research Program and how this office can better assist Divisions in providing program management and oversight of this program. FHWA's long-term vision, expressed in the FHWA R&T Agenda, includes better coordination of the FHWA R&T program with the SPR program but initial assessments determined that for this to happen FHWA needs better knowledge of how the SPR Research Program is being administered and conducted. This review sought information on the following topics:

- Research Coordinators' approaches in administering the State research program;
- Divisions' approaches to providing program management and oversight of the State's SPR RD&T, determining what works and where gaps may exist;
- Division staff time allotted to the research program;
- Areas where FHWA HQ can provide better assistance and collaboration to accomplish program activities stated in paragraph one;
- Division/State coordination methods;
- Research program integration (e.g. EDC and SHRP2) efforts and approaches;
- Ways Divisions and recipients/sub-recipients believe the intent of the FHWA R&T Agenda can be harmonized with the State DOT's research program; and
- Best practices and lessons learned to improve administration of the SPR RD&T program.

The specific objectives of this review were to:

1. To determine how Divisions conduct their periodic reviews of the State DOT's SPR Subpart B program, identifying what is necessary for successful stewardship and oversight, where gaps may exist, successful practices and lessons learned.

2. To determine how research program integration (e.g. EDC and SHRP2) occurs and to identify ways the intent of the FHWA R&T Agenda can be harmonized with the State DOT's research program.

Scope and Methodology

The site visits for this review were conducted between July and August 2014. We randomly selected five states for site visits: Oregon, Pennsylvania, Rhode Island, West Virginia and Wisconsin. Headquarters Program Office staff also asked that we visit a sixth state, Florida, during the course of this review.

To help us answer the objectives of this review, we conducted interviews with staff from the State DOT's Research Office, including each State Research Director. We also spoke with State DOT staff functioning as research project champions. To understand how the SPR Subpart B funding obligation/reimbursement process works, we spoke with applicable State DOT finance staff. We conducted phone or in-person interviews with University Transportation Center (UTC) representatives in each site visit state, including both administrators and professors who have functioned as Principal Investigators for research projects funded with SPR Subpart B funds. Where possible, we also spoke with the State DOT staff with the responsibilities for the Every Day Counts (EDC) and the Strategic Highway Research Program (SHRP2) initiatives, and the Local Technical Assistance Program (LTAP).

We spent much time speaking with Division SPR Subpart B Research Coordinators. We also spoke with Division leadership to understand their perceptions on the risk associated with SPR Subpart B Research program administration. To understand how the Division oversees the SPR Subpart B funding obligation/reimbursement process, we spoke with applicable Division finance staff.

To supplement all of this information, we also interviewed program office staff from FHWA's Office of Research, Development and Technology (RD&T) about both SPR Subpart B program administration and the FHWA Research and Technology (R&T) Agenda. To gain background on SHRP implementation, we spoke with FHWA's Director of Technical Services. Similarly, we spoke with the staff from FHWA's Center for Accelerating Innovation to better understand EDC implementation.

We reviewed the statutes and regulations guiding SPR Subpart B program administration as well as program guidance prepared by the Headquarters Program Office. We also reviewed the draft or approved Management Procedures for each State DOT visited and examined their most recent approved Research Program as well as several randomly selected completed research reports. We reviewed State DOT Research program websites as well as the EDC, SHRP2 and R&T Agenda webpages found on the FHWA public website. We reviewed FHWA's *R&T Agenda* SharePoint site and also examined Division Office program review reports of State DOT research programs obtained through the FHWA Program Review Library.

We read articles on EDC and innovation deployment found in *Public Roads* magazine. In addition, we reviewed select research papers from TRB on research deployment as well as independent research on technology deployment done for a 2011 California Department of Transportation Research Department Peer Exchange on *Characteristics of Organizations and Skill Sets of Individuals Successful at Accelerating Adoption of Innovation*.

Team Members

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Observations and Recommendations

Observation 1: It is unclear what FHWA considers to be successful implementation of a State DOT research program, making it difficult to determine what is necessary for successful stewardship and oversight of this program.

Division, State and UTC staff in all of the states we visited for this review were unanimous in believing their State's research program is successful and were ready to share their successful practices with us. Division and State staff also told us of their enthusiasm for this program and how they are continually working to improve the effectiveness of their research program and research results. However, no Division or State we visited appeared to have complete awareness of what constituted full compliance with the regulations we checked.

Is regulatory compliance the primary indicator of a successfully implemented State DOT research program?

If the State DOT's annual work program is implemented as approved and in compliance with program conditions, it is, arguably, successfully implemented. However, if it is not implemented as approved or in substantial compliance with program conditions, is the program still considered to be successfully implemented?

23 CFR §420.205(e) outlines an overall philosophy of how a State DOT's Research, Development and Technology Transfer (RD&T) program should be administered.

> The State DOTS will be allowed the authority and flexibility to manage and direct their RD&T activities as presented in their work programs, and to initiate RD&T activities supported by FHWA planning and research funds, subject to the limitation of Federal funds *and to compliance with program conditions set forth in subpart A of this part and §420.207.* [Emphasis added.]

To determine the extent of current efforts to provide stewardship and oversight on the State DOT's research programs funded under SPR Subpart B, we reviewed documents and interviewed State and Division staff concerning the status of the State DOT's annual research work program and State and Division knowledge of compliance with various conditions outlined in 23 CFR 420. The following figure (Figure 1) provides information on the compliance requirements we randomly chose to verify.

Figure 1

Has the Program Manager considered compliance with this regulation in the State DOT's administration of its SPR Subpart B Program?	**Regulatory Basis**	**Number of Sites Visited in which the Program Manager has considered what it will take to be in compliance with this Regulation**
The Program must be implemented in compliance with its approved work program.	23 CFR 420.117 and 420.205	6
Annual approval of State DOT Research and Development Work Program.	23 CFR 420.111, 23 CFR 420.115, 23 CFR 420.209	6
Documentation that describes the State DOT's management process and the procedures for selecting and implementing RD&T activities must be developed by the State DOT and submitted to the FHWA Division office for approval. Significant changes in the management process must be submitted by the State DOT to the FHWA for approval.	23 CFR 420.115, 23 CFR 420.209	5
Periodic reviews of the State DOT's Management Process of the RD&T.	23 CFR 420.209	1
The State DOT's RD&T work program must, as a minimum, consist of a description of RD&T activities to be accomplished during the program period, estimated costs for each eligible activity, and a description of any cooperative activities including the State DOT's participation in any transportation pooled fund studies and the NCHRP. The State DOT's work program should include a list of the major items with a cost estimate for each item. The work program should also include any study funded under a previous work program until final report has been completed for the study.	23 CFR 420.207	5
The State DOT's RD&T work program must include financial summaries showing the funding levels and share (Federal, State, and other sources) for RD&T activities for the program year.	23 CFR 420.207	2
The State must use an interactive process for identification and prioritization of RD&T activities for inclusion in an RD&T work program.	23 CFR 420.209 (a)(1)	6
The State must use all FHWA planning and research funds set aside for RD&T activities… to the maximum extent possible.	23 CFR 420.209 (a)(2)	6
The State must have procedures for tracking program activities, schedules, accomplishments, and fiscal commitments.	23 CFR 420.209 (a)(3)	2
The State must use support and use of the TRIS database for program development, reporting of active RD&T activities, and input of the final report information.	23 CFR 420.209 (a)(4)	5
The State must have procedures to determine the effectiveness of the State DOT's management process in implementing the RD&T program, to determine the utilization of the State DOT's RD&T outputs, and to facilitate peer exchanges of its RD&T Program on a periodic basis.	23 CFR 420.209 (a)(5)	1

The State must have procedures for documenting RD&T activities through the preparation of final reports. As a minimum, the documentation must include the data collected, analyses performed, conclusions, and recommendation. The State DOT must actively implement appropriate research findings and should document benefits.	23 CFR 420.209 (a)(6)	2
The State must participate in peer exchanges of its RD&T management process and other State DOTs' programs on a periodic basis. Note: FHWA has guidance defining "period" as at least once every 5 years for a minimum of 2-3 days.	23 CFR 420.209 (a)(7)	5
The State DOT must include a certification that it is in full compliance with the requirements of this subpart in each RD&T work program. Note, the language to be used for this certification is specified in the regulation.	23 CFR 420.209	3
Suitable reports that document the results of activities performed with FHWA planning and research funds must be prepared by the State DOT or subrecipient and submitted for approval by the FHWA Division Administrator prior to publication. The FHWA Division Administrator may waive this requirement for prior approval.	23 CFR 420.117 (e)	1
The FHWA's approval of reports constitutes acceptance of such reports as evidence of work performed but does not imply endorsement of a report's findings or recommendations. Reports prepared for FHWA-funded work must include appropriate credit references and disclaimer statements.	23 CFR 420.117 (e)	2
The State DOT must administer the RD&T program consistent with their overall efforts to implement section 1001(b) of The Transportation Equity Act for the 21st Century and 49 CFR part 26 regarding disadvantaged business enterprises.	23 CFR 420.121(c)	2
The nondiscrimination provisions of 23 CFR 200 etc. with respect to Title VI of the Civil Rights Act of 1964 and the Civil Rights Restoration Act of 1987 apply to all programs and activities of recipients, subrecipients, and contractors receiving FHWA research funds, whether or not those programs or activities are federally funded.	23 CFR 420.121(h)	2
Procedures for the procurement of property and services with FHWA research funds must be in accordance with 49 CFR and/or other applicable regulations.	23 CFR 420.121(j)	1
(a) Costs are eligible for FHWA participation provided that the costs: 1) are for work performed for activities eligible under the Section of title 23 applicable to the class of funds, 2) are verifiable from the State DOT's or the subrecipient's records, 3) are necessary and reasonable for the proper and efficient to accomplish of project objectives and meet the other criteria for allowable costs in the applicable cost principles, 4) are included in the approved budget or amendments thereto, 5) were not incurred prior to FHWA authorization, and (B) indirect costs are allowable if supported by a cost allocation plan and indirect cost proposal prepared, submitted and approved as required.	23 CFR 420.113	2
The State DOT must submit performance and expenditure reports, including a report from each subrecipient, that contain as a minimum: (i) Comparison of actual performance with established goals; (ii) Progress in meeting schedules; (iii) Status of expenditures in a format compatible with the work program, including a comparison of budgeted (approved) amounts and actual costs incurred; (iv) cost overruns or underfunds; (v) Approved work program revisions; and (vi) other pertinent supporting data.	23 CFR 420.117 (b)	0

As indicated in Figure 1, no Division or State we visited appeared to have complete awareness of what constituted full compliance with the regulations we tested. Moreover, since five of the State DOTs we visited were randomly selected for this review, it suggests that it is likely other Divisions/States are in similar situations regarding awareness of compliance with the requirements set out for the use of SPR Subpart B funds.

Oversight, for FHWA, has been defined as "The act of ensuring that the FAHP is delivered consistent with laws, regulations, and policies."[1] In addition, FHWA's stewardship and oversight guidance states:

> The FHWA maintains overall oversight responsibility for the FAHP and is ultimately responsible for ensuring financial integrity and compliance with applicable Federal laws and regulations. The FHWA remains accountable to the public and Congress for the FAHP and ensuring that it is delivered in an efficient and effective manner regardless of the approval authority or responsibility assumed by the State DOT. Though a State DOT may assume FHWA's responsibilities as described in 23 U.S.C. 106(c), nothing in Section 106 affects or discharges any responsibility of FHWA to oversee the implementation of Federal requirements.[2]

Similarly, stewardship is defined as "The efficient and effective management of the public funds that have been entrusted to the FHWA." While Division staff believe that the research funds were being spent appropriately and that the State DOTs provided reports documenting this, both the Research Coordinators and Financial staff generally acknowledge having a "vague" understanding how research funds are obligated and managed. While not universally the case, the States we visited had one Federal-aid project obligated to cover all of the individual research projects, as well as other RD&T activities, identified in the approved annual work plan. State DOT Research Directors told us how they can move funds among research projects and other RD&T activities to cover overruns in one project by using funds available from an underrun in another project which they believe is an important flexibility allowing them to more easily manage the SPR Subpart B-funded research program. Division staff told us they are generally aware about overruns and underruns from reports provided by the State but may or may not know why the budgets are changing. Two financial managers told us they considered the site visits for this review to be an opportunity to learn more about the SPR Research program.

[1] *Federal-aid Highway Program Stewardship and Oversight Agreement Guidance*, page 64 http://www.fhwa.dot.gov/federalaid/stewardship/140328_so.pdf,
[2] Ibid. pages 7-8.

The lack of comprehensive oversight and stewardship that we observed is likely based on many of the factors Division staff identified for us:

Division Office Research Coordinators' years of experience – Two Division Offices have experienced coordinators (over five years) while the remaining four have two years or less experience in the SPR Research Program. Similarly, their number of years with FHWA varied. We heard anecdotally that programs like Research are often given to a new person in the office as it helps them learn the broad range of FHWA responsibilities for the Federal-aid Highway Program. Conversely, one Division Research Coordinator said he believed his success in helping oversee a strong research program is based, in part, on years of experience with FHWA. That experience provides a clear understanding of the programmatic and funding options available throughout the agency that could be used by the State DOT for technology transfer and deployment. Without that, this program Coordinator would not have been able to bring all possible resources to the State for research implementation.

Time available to be spent on the SPR Subpart B Program – Based on discussions with staff and leadership, Division Office Coordinators spend an estimated range of 2-10% of their time on managing the SPR research program with the most common answer being 5%. There are 2087 employee hours in a year, of which only approximately 1851 hours are available for tasks as each employee is entitled to annual leave and paid holidays.[3] Thus, the range of work hours which is typically spent annually on SPR program management ranges from approximately 37 hours (2%) to 185 hours (10%) with 93 hours or slightly over two work weeks per year being the average time spent on SPR program management.

Research program management is often one of many collateral duties – Aside from SPR Subpart B research program management, each Division Office Coordinator has other major program area responsibilities, as well as other collateral duties. One Division Office Coordinator told us his duties as Research Coordinator constitute just one of 22 collateral duties. With little time and many demands, it is difficult for Division staff to stay aware of the intricacies of regulatory compliance in any program.

Lack of definitive guidance -- Several of the Division Office Research Coordinators we interviewed were not aware of any guidance from FHWA. Some were not aware of the regulatory requirements cited in 23 CFR 420. The

[3] This is based on 10 paid holidays equating to 80 hours and 156 hours of annual leave which is what an employee with more than three and less than 15 years of federal service would earn. This data was provided by Human Resources staff from the FHWA Lakewood Administrative Services Team.

SPR Guide prepared by TFHRC can be found on the following website http://www.fhwa.dot.gov/publications/research/general/spr/os.cfm. However, there is not a link to this guide on the State Planning and Research Program home page found at http://www.fhwa.dot.gov/research/partnership/spr/.

This Guide indicates it is an archived summary so it is questionable if the guide is current since the webpage for the guide states ***"****This summary report is an archived publication and may contain dated technical, contact, and link information.****"*** While it does provide information on some of the regulatory requirements, the guide does not provide information on all of the regulatory requirements surrounding State DOT Research programs and the Division's oversight of those programs. The Guide also contains a link to "Guidance on Use of FHWA Planning & Research Funds for Travel and Training" from 2005 which clarifies the use of SPR funds on travel and training and "FHWA, State DOT, and Metropolitan Planning Organization (MPO) Rights to Copyrighted and Patented Items Developed with FHWA Planning and Research Funds."

This webpage also provides information and a link to a separate 2010 guide on conducting effective peer exchanges: http://www.fhwa.dot.gov/publications/research/spr/10048/10048.pdf . Of note, these web pages contain conflicting information on the required frequency of peer reviews: the 2010 guide states "Under the Federal regulation, a State DOT must hold a peer exchange periodically, which means at least every 5 years, if not more frequently, and entails at least a 2 to 3 day agenda." However, the SPR guidance page still indicates they should occur every three years, which was once the required frequency.

Lack of an effective orientation program for Research Coordinators to help staff understand the program rules, regulations, policies, and expectations
Division staff stated that currently there is no new SPR Subpart B program manager orientation, such as a "boot camp" or "on-boarding process", to quickly help them understand SPR program management. [4] They tend to network with others who have these program responsibilities, especially if they know these individuals. However, even the Program Office's SPR Coordinator said that it is difficult to stay abreast of whom in the field has this program management responsibility as the task frequently changes hands.

[4] We understand TFHRC is currently preparing a Research 101 web-based course to help Division Program Managers better understand their program management responsibilities.

Lack of a discipline structure or other professional forums to support Research Coordinators and facilitate networking – We found the SPR program to be overseen by staff with a wide variety of program responsibilities. Our site visit contacts for this review included a bridge engineer, two planners, a planner/civil rights specialist, a program management analyst, and a Program Delivery Team Leader. That variety of staff would not normally come together in one discipline conference to be able to discuss research program implementation with the Program Office staff. Thus, it can be difficult for Division staff to have personal knowledge of whom to contact in Headquarters for assistance. For example, in one site visited, the Division's Research Coordinator asked us who to contact in Headquarters for program administration guidance. In addition, it is more difficult for staff with such a wide variety of program responsibilities to easily network with research coordinators in other Divisions as they would not all be able to interact during other Discipline training sessions.

The research program is seen as a low threat risk - All Divisions indicated that they considered the implementation of the SPR Subpart B research program to be a low threat risk. This conclusion was generally reached as a result of an informal assessment of risk, which may or may not have also considered other risk factors such as knowledge of program compliance or opportunities to contribute to strategic objectives. We were told this analysis was based primarily on the low funding levels of the research program relative to the entire Federal-aid Highway Program (FAHP) in their States. As a low risk program, FHWA Division leaders have determined that it is necessary and acceptable to devote fewer hours and resources to managing this program within the context of a large and increasingly complex FAHP.[5] While more about the risk assessment process will be discussed later in this section of the report, resource allocation based on perceived risk is consistent with FAHP stewardship and oversight guidance which states "The FHWA will employ a risk management framework to evaluate program areas and balance risk with staffing resources, available funding, and transportation needs.[6]

[5] The Offices of Infrastructure (HIF), Policy and Governmental Affairs (HPL), and Research, Development and Technology (HRT) all identified research issues among their top risks or risk responses (based on a word search) in the most recent, PY2015 unit risk assessments. See http://our/office/fhwa.dfs/risk/Lists/py15risks/word_research.aspx

[6] *Federal-aid Highway Program Stewardship and Oversight Agreement Guidance*, page 6 http://www.fhwa.dot.gov/federalaid/stewardship/140328_so.pdf

Two Divisions clearly identified a high opportunity risk associated with a successful research program.[7] They see research as an integral component of connecting a State DOT program to the agency strategic objective of Advancing Innovation.[8] However, one of the Research Coordinators for these Divisions, like his/her counterparts, was unaware of several of the program's regulatory requirements cited above.

Lack of periodic reviews – While stated in the regulation as a requirement for overseeing the program, only one Division we visited had conducted a formal "periodic review" of the SPR research program in the last five years. The regulations do not define periodic review, nor is there guidance to say how often it should occur or what a periodic review should accomplish.[9] This Division had conducted several reviews on the program since 2000, including a FIRE review in the last five years.[10] Without periodic reviews, it would be difficult for the Division to know if the State DOT's management process is in compliance with all stated requirements, and whether it is being implemented as approved. Assuming a periodic review were to take the form of a program review, conclusions reached as a result of such an effort would also aid in understanding the basis for reimbursement requests, and/or help confirm how the State DOT is administering its grant agreements with the sub-recipients who may be conducting the research using SPR funds.

[7]The international definition of risk is the "effect of uncertainty on objectives." A threat risk is defined as "a risk that has negative or detrimental impact or result" while an opportunity risk is "a risk that has positive impact, result, or benefit." See FHWA Risk Management Process User Manual last revised January 2013. http://our/office/fhwa.dfs/risk/RiskManagement/Risk%20Management%20Process%20User%20Manual%201-25-13.pdf

[8] The identification of research as an opportunity risk for the national initiative of *Innovation* is consistent with what is included in the 2016 Corporate Risk Assessment. http://our/office/fhwa.dfs/risk/Lists/corporate_register/AllItems.aspx. This may encourage more Divisions to consider how they can use the State DOT's research program as a catalyst for this agency opportunity risk.

[9] We used five years as a reasonable estimate of time in which a "periodic review" should take place, equating that to the time period over which a peer exchange should take place. 23 CFR 420.203 defines a peer review as "a periodic review of a State DOT's RD&T program, or portion thereof, by representatives of other State DOTs, for the purpose of exchange of information or best practices." In FHWA's *Guide for Peer Exchanges* "periodic" has been defined as "at least every 5 years, if not more frequently, and entails at least a 2 to 3 day agenda." See http://www.fhwa.dot.gov/publications/research/spr/10048/index.cfm for the *Guide for Peer Exchanges*.

[10] As of the date of this report, this FIRE Review is still in draft form so is not yet in the Program Review Library. FIRE reviews were not required to be included in the Program Review Library until April 2014. Thus, other Divisions may also have conducted FIRE reviews of their State DOT's RD&T program in the last five years but not loaded those reviews into the Program Review Library.

> The Divisions we visited do not appear to be unusual in this condition. The FHWA Program Review Library indicates 1100 reviews were conducted by FHWA Divisions in the last five performance years.[11] Of those only three are reviews of the SPR Subpart B research program.[12]

Whatever the cause of regulatory non-compliance, once identified, it can have serious consequences to the State's Research Program. Pursuant to 23 CFR 420.209 (d), non-compliance with program requirements can lead to a withdrawal of approval of FHWA planning and research funds for the State DOT's RD&T activities *until the State DOT is in full compliance*. 23 CCFR 420.209 (d) specifies

> (d) The FHWA Division Administrator shall periodically review the State DOT's management process to determine if the State is in compliance with the requirements of this subpart. *If the Division Administrator determines that a State DOT is not complying with the requirements of this subpart, or is not performing in accordance with its RD&T management process, the FHWA Division Administrator shall issue a written notice of proposed determination of noncompliance to the State DOT.* The notice will set forth the reasons for the proposed determination and inform the State DOT that it may reply in writing within 30 calendar days from the date of the notice. The State DOT's reply should address the deficiencies cited in the notice and provide documentation as necessary. If the State DOT and the Division Administrator cannot resolve the differences set forth in the determination of nonconformity, the State DOT may appeal to the Federal Highway Administrator whose action shall constitute the final decision of the FHWA. *An adverse decision shall result in immediate withdrawal of approval of FHWA planning and research funds for the State DOT's RD&T activities until the State DOT is in full compliance.* [Emphasis added.]

When considered from this perspective, regulatory non-compliance could be considered a key indicator that a State DOT's Research Program is not successfully implemented.

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[11] The Program Review Library can be found at http://our/office/fhwa.dfs/programreview/Library/Forms/State.aspx. All of the Reviews included in the Library and conducted by Divisions from Performance Years 2010-2014 were included in this calculation. While not included, 22 reviews have been added to the library for Performance Year 2015 as of November 25, 2014. None of these review titles indicate coverage of SPR Subpart B Research programs.

[12] The determination that three reviews are SPR Subpart B reviews was based solely on the title of the review and a brief scan of the review report if the topic could not be determined from the combination of the review's title, program area and sub-discipline. Thus, other Divisions may have conducted periodic reviews of the SPR Subpart B program in the last five years but we were unable to determine this from the Review Library. The three reviews identified were: Louisiana (2013), Illinois (2010), and North Dakota (2010). We understand Utah is currently finalizing a review of the SPR Subpart B program but that review is not yet loaded into the Program Review Library.

What are FHWA's objectives for Division Research Coordinators in overseeing a State DOT's SPR Subpart B funded research program?

The research programs we reviewed appeared to be meeting the overarching goals of the SPR Subpart B research program despite our perception that they were not in full compliance with all of the specific SPR Subpart B regulations. Those overarching goals are outlined in the general policy included in 23 CFR §420.105 which states:

> What is the FHWA's policy on use of FHWA planning and research funds?
> (a) If the FHWA determines that planning activities of national significance, identified in paragraph (b) of this section, and the requirements of 23 U.S.C. 134, 135, 303, and 505 are being adequately addressed, the FHWA will allow State DOTs and MPOs:
>
> (1) Maximum possible flexibility in the use of FHWA planning and research funds to meet highway and local public transportation planning and RD&T needs at the national, State, and local levels while ensuring legal use of such funds and avoiding unnecessary duplication of efforts;

The State DOT Research Directors for the states we visited told us of completed research projects which fulfilled State and local transportation research needs. Most of the State DOTs visited also consistently posted information on their completed project to the Transportation Research Information Services (TRIS) data system, enabling other States to be able to use the research rather than duplicating federally-funded research projects.[13] They also provided information on funds management processes to help demonstrate the steps they are taking to legally use their SPR research funds.

Another overarching premise of the SPR Subpart B Research program is that the states have great flexibility in designing and implementing their individual programs. This premise is specified in 23 CFR §420.205(e) which states:

> *The State DOTS will be allowed the authority and flexibility to manage and direct their RD&T activities as presented in their work programs,* and to initiate RD&T activities supported by FHWA planning and research funds, subject to the limitation of Federal funds and to compliance with program conditions set forth in subpart A of this part and §420.207. [Emphasis added.]

[13] 23 CRD 420.209(a)(4) states that [the State DOT management process, to be approved, must include] "Support and use of the TRIS database for program development, reporting of active RD&T activities, and input of the final report information." TRIS is now incorporated into TRID. TRID is an integrated database that combines the records from TRB's Transportation Research Information Services (TRIS) Database and the Organization for Economic Cooperation and Development's (OECD) Joint Transport Research Centre's International Transport Research Documentation (ITRD) Database. TRID provides access to more than one million records of transportation research worldwide. See http://trid.trb.org/.

Consistent with this, we found wide variations in the organizational structure, size, and management processes of the programs that we observed. However, the processes the State Research Directors described as used to select and manage projects were in general accord with their documented and approved management processes[14] and annual work programs. Moreover, most had documentation to show they met the requirements for peer reviews and implemented their suggestions to improve the research program.

In addition, State Research Directors spoke of their involvement with the AASHTO Standing Committee on Research (SCOR), the AASHTO Research Advisory Committee (RAC) and with TRB committees as other input they use to help ensure the strength of their research programs. They also told us of their positive working relationships with their Division Research Coordinators, which was supported by feedback from Division staff. One Research Director told us he very much wanted FHWA's involvement in the research program, as he believed FHWA helped ensure a compliant program, which he wants and believes is very important. He also said he believes FHWA staff can bring a national perspective to technical discussions that they otherwise may miss.

Perhaps indicative of this, Division Research Coordinators as well as other Division staff told us of their ongoing involvement in their State's research steering or advisory committees, technical advisory committees, and/or with expert technical groups established to oversee specific research projects. One Division staff member had even created a YouTube video about a current State research project to help the State market what they hoped a particular research project could accomplish.[15] In every state we visited, the Division Research Coordinators expressed passion for their State's research program and spoke of how its results improve the efficiency and effectiveness of the transportation system in their state. It became clear to us that it was through this type of involvement that the FHWA Research Coordinators believed they could add the most value to a program they intuitively believed is already successful.

This belief, however, appeared to be based on "what the Research Coordinator before me did" or "how the Division has always overseen this program." Only two Division Research Coordinators seemed to view involvement in this program as an opportunity to contribute to FHWA's strategic objectives as identified in the Strategic Implementation Plan (SIP). In FHWA's 2015 SIP, under the National Leadership goal, Strategic Objective 1 is identified as follows:

[14] One State DOT did not have an approved management process so was instead using their draft management process as their guiding document.
[15] The video can be viewed at https://www.youtube.com/watch?v=TkW32SyAmxs

Advance Innovation - FHWA is recognized as a leader in the development and promotion of innovative solutions that address current and emerging transportation issues.

> We will continue to elevate the state-of-practice by emphasizing Every Day Counts (EDC) innovations through State Transportation Innovation Councils (STIC) and the Strategic Highway Research Program (SHRP2) implementation assistance program. We will help State and local transportation agencies, tribes, Federal land management agencies (FLMA), private industry, and others adopt innovative practices, tools, and technologies to improve the delivery of federally funded projects and enhance the effectiveness of Federal highway programs. We will continue to provide assistance to States and their transportation partners seeking solutions to funding and financing highway transportation projects by deploying project-specific action plans for workshops, domestic scans, and other types of assistance that will increase partner capabilities. See FHWA's PY15 SIP.

One Division Research Coordinator spoke of his intent to bring this focus to the administration of his State's research program in the next fiscal year. In another state we visited, *advancing innovation* is clearly the impetus for FHWA's involvement in the program. The emphasis of this State's research program has expanded from focusing solely on funding research designed to meet that state's research needs to pursuing what will allow it to best advance innovation in the state. Advancing innovation may be done by using SPR Subpart B funds for technology deployment and technology transfer rather than primarily using them to fund research projects. The Secretary of this State's DOT and the FHWA Division Administrator are actively involved in the State Transportation Innovation Council (STIC), which also links EDC and SHRP2 to the research program.

Through our site visits, we observed the variety of ways Division Research Coordinators currently assist their State DOT's SPR Subpart B funded research program in being successful. For us, the question then became: Is the minimal involvement the Division staff currently devote to this program the right minimal involvement? Is it best for them to spend their time helping ensure regulatory compliance or is it best they spend their time by serving on their State's research steering or advisory committees, technical advisory committees, and/or with expert technical groups established to oversee specific research projects? Or, should they, instead, be focused on how State research programs can help FHWA progress on its strategic objective of advancing innovation? Or would the answer to that question vary based on the conditions within each state? Since we found nothing to guide us in answering these questions it was unclear to us what FHWA would like Division Research Coordinators to accomplish when overseeing this program.

Could FHWA's risk-based stewardship and oversight program be used to define what constitutes a Division's successful stewardship and oversight of the SPR Subpart B research program?

None of the Divisions we visited had conducted a formal, documented risk assessment, grounded in objective data about the State's research program. Nonetheless, all of the Division leaders we interviewed said that when conducting risk assessments for performance planning they informally determined the research program to be a low threat risk because of the low dollars associated with this program in comparison to the Federal-aid funds associated with construction dollars, for example. Through their normal program involvement, they also believed that their States' programs are successful as a further justification to support a low threat risk assessment.

However, FHWA has adopted a risk based, data driven approach to stewardship and oversight of the Federal-aid Highway Program. Guidance was issued on March 28, 2014 that identified the core principles of Risk Based Stewardship and Oversight (RBSO)[16]:

- Risk-based: risk assessment is implemented throughout the performance planning process.
- Data driven: decisions are grounded in objective data and information to the extent possible.
- Value added: actions are taken with a primary objective of improving programs and projects.
- Consistent: Actions are based on consistent approaches to planning, risk assessment, and [Stewardship &Oversight] S&O.

Basing a risk assessment on small dollars or a perception a program is successful is not consistent with the RBSO core principles. FHWA's risk management process states that a key step in the risk management process is to "identify risk context."

> In this step you will identify your objectives, gather information, understand the business environment, and determine how you will approach risk management. This is where you will think about unit, program, stewardship, oversight or other objectives, consider your internal and external context, and establish the criteria for managing risk.

[16]This document and supporting materials can be found at http://www.fhwa.dot.gov/federalaid/stewardship/140328.cfm

It is unclear to us how risk-based stewardship and oversight of the research program is accomplished by the Divisions we visited. There was little documentation to support the identification of specific "unit, program, stewardship, oversight or other objectives" or "the criteria for managing risk" for this program. Nor did we find program office guidance that provided risk management criteria or suggested objectives which would identify how Division Research Coordinators can best add value to the program, which is the third RBSO core principle. Such guidance from the Program Office would also serve to help ensure "actions are based on consistent approaches to planning, risk assessment, and S&O" i.e. the fourth core principle of RBSO.

Even if the Division staff had ready access to tools to easily and consistently apply RBSO principles to their research program, it still may not have changed the overall risk assigned to the research program compared to other Division managed programs. However, those principles, once applied, could be used by the Division's Research Coordinator to determine how best to be involved in the State's research program. "Risk management is a tool for focusing limited resources to efficiently manage our programs and advance our strategic objectives."[17] Perhaps some Divisions need to initially focus on actions designed to ensure the regulatory compliance of the research program. Perhaps others would determine it best to continue to provide technical assistance in selecting or overseeing individual research projects. And still other Divisions might determine it best to focus their limited available time for State research programs in a manner which supports FHWA's strategic objective of *Advance Innovation*.[18]

[17] Risk Management Process User Manual, page 1
http://our/office/fhwa.dfs/risk/RiskManagement/Risk%20Management%20Process%20User%20Manual%201-25-13.pdf

[18] **Strategic Objective 1 – Advance Innovation** - FHWA is recognized as a leader in the development and promotion of innovative solutions that address current and emerging transportation issues.
We will continue to elevate the state-of-practice by emphasizing Every Day Counts (EDC) innovations through State Transportation Innovation Councils (STIC) and the Strategic Highway Research Program (SHRP2) implementation assistance program. We will help State and local transportation agencies, tribes, Federal land management agencies (FLMA), private industry, and others adopt innovative practices, tools, and technologies to improve the delivery of federally funded projects and enhance the effectiveness of Federal highway programs. We will continue to provide assistance to State DOTs and their transportation partners seeking solutions to funding and financing highway transportation projects by deploying project-specific action plans for workshops, domestic scans, and other types of assistance that will increase partner capabilities. See FHWA's PY15 Strategic Implementation Plan (SIP)

Recommendation 1: In cooperation with Division representatives, TFHRC should develop a suite of tools to aid Division Office Research Coordinators in their stewardship and oversight of the State DOT Research Program. These tools could include, for example, up-to-date listings of Division Office Research Coordinators, clear program management objectives that Division Research Coordinators should work to achieve, regulatory checklists, sample risk assessment criteria, etc. The tools, coupled with the March 2014 Risk Based Stewardship and Oversight Guidance, would aid Divisions in determining how they can best spend their limited time available for this program area in order to address potential risks, whether threat or opportunity, and to adjust their activities accordingly.

Observation 2: With EDC, SHRP2, and other similar initiatives, the transportation industry has changed the way it deploys new technologies by implementing a collaborative *culture of innovation* to encourage and sustain rapid change and adoption of new innovations. Opportunities exist to integrate State research programs more fully into this culture of innovation and accelerate the adoption of research results into the state of practice.

A *culture of innovation* first requires research results that have been tested through implementation and which can be successfully deployed.

Recently, through EDC, SHRP2 and other similar initiatives, FHWA has begun to emphasize and communicate the value that a collaborative culture of innovation can bring to the transportation industry. This culture of innovation allows the transportation industry to encourage and sustain rapid change and the adoption of new innovations, helping it meet the challenges facing the transportation industry.

> "America's highway system faces a significant challenge: an aging infrastructure, growing traffic volumes and limited staffing and funding resources. *The need for widespread use of innovation to meet customer needs is essential. Programs like the Every Day Counts (EDC) initiative, and the Second Strategic Highway Research Program (SHRP2), as well as others are designed to bring a focus on new ideas and better ways to more quickly deliver transportation to America. They focus on using proven marketing approaches and dedicated teams to deploy innovations faster and more effectively...*" [Emphasis added.] [19]

Logically, the widespread use of an innovation evolves from what was initially learned in completed and fully implemented research projects. Implemented research can then be considered for widespread technology deployment through such programs as Every Day Counts (EDC). "The concept of Every Day Counts is that there is a constant focus on identifying and deploying new innovation, on an on-going basis, which keeps everybody, at all levels, on their toes looking for a better mousetrap."[20] SPR Subpart B funded State DOT research projects can contribute to the pipeline of possibilities for the better mousetrap only when research results have been successfully tested through initial implementation.

However, some of the State DOT research programs we visited were not able to identify a solid link between the completion of their research projects and research project implementation. Nor did some of these research programs have a defined process in

[19] http://www.fhwa.dot.gov/stic/deployment.cfm
[20] FHWA Acting Administrator Greg Nadeau in YouTube Every Day Counts (EDC) Overview https://www.youtube.com/watch?v=Bek7OP2D49g#t=41

place to facilitate the implementation of completed research projects. Completion of a research project itself does not automatically mean the results can or should be implemented into a changed process, procedure, or specification which could save money, accelerate project delivery, improve safety, etc. [21, 22] Instead, completion of a research project means that a Principal Investigator completed the research that was within the scope of the approved agreement/contract and that a research report (i.e. the final deliverable of the research grant) has been completed and accepted by the State DOT. When this happens, all of the approved funding for that particular research project also ends.

Because the approved funding has ended and the researcher is no longer involved in the project, it is somewhat ambiguous how implementation of the research findings is expected to occur. Moreover, several State DOT Research Directors told us that while they might want research projects to be implemented, their program is deemed successful if the federal monies are spent in accordance with the approved program plan, regardless of the number of research project results that are implemented. Nor do their research project management processes focus on implementation. Instead they describe research project management processes that focused primarily on completion of the final deliverable, the research project.

State Research Directors also told us that research findings are typically considered as fully implemented if a change in practice occurs that is generally accepted by State DOT staff. Once research results are incorporated into project plans and special specifications, if a contractor wants to bid on that project, he/she must use the new technology being implemented. In that manner, new technology slowly spreads throughout the transportation community. However, in three of the six states we visited, we were told such things as “it’s difficult to know when implementation is complete;” “it can take a long time to complete, and as a result, it is difficult to track;” “it happens as people find the time to implement the results;” “we can’t make DOT staff implement change” or “we’re a small staff so don’t have the resources to do much to encourage research implementation once the report is complete.” As the following example

[21]One State visited had data to support implementation of approximately 60-70% of their research. Another State thought they implemented a similar portion of their research. Two additional States said that 60-70% should be a target or what they would like to achieve through their research programs. However, not all research must be implemented to be considered successful research. A research project may be deemed successful when it provides data to validate a current or existing experimental or special practice or specification. The remaining 30-40% of research projects may not be implementable at the current time or may not end with the type of results the State DOT is interested in implementing. .

[22]By its very nature, certain research results may be anticipated but, in reality, are not acceptable for various reasons and, therefore, are not implementable. If, for example, a research projects determines that a certain design of roundabout is unsafe and should not be implemented, it should not and will not be determined that the research project was unsuccessful.

indicates, albeit done on a national scale, implementation of any new technology requires planning and a commitment of resources and can take time to complete:

> In 1994, a SHRP1 research report introduced Superior Performing Asphalt Pavements (Superpave).[23] It was only in 2005, when the Superpave mix design was adopted by 35 State DOTs and the Superpave binder standard was adopted by all 52 DOTs, that initial implementation was determined to be successful and complete.[24] Of note, a 2002 *Public Roads* article noted that at that point implementation still needed to move beyond the State level to the municipal and commercial levels.[25] When looking back on Superpave implementation, those involved said that successful research and implementation begins with awareness of the opportunities and picking those that have a good chance for success. They also pointed to the development of a plan that identified the steps and funding to train and equip staff, conduct pilot programs, refine results and develop a rollout schedule as necessary to implement the research successfully.[26]

In our site visits, State DOT Research Directors told us implementation of their research reports could involve similar, numerous steps. However, they noted that since the funding for the research project ends at the acceptance of the research report they would need to find funding to support all of these types of activities which can be difficult due to tight State transportation budgets. They also identified a variety of other steps they take that are designed to encourage buy-in and facilitate research implementation, including the steps identified in Figure 2:

Figure 2

Steps State DOTs Take to Encourage Buy-in and Facilitate Research Implementation	
Identification of a Research Champion	Identification of a DOT champion, advocating for the research project *and its implementation.*
	DOT "needs" drive the research program. Research proposals must be initiated by a DOT employee who then functions as a project champion.
Leadership support for research projects	State DOT leaders approve the final selection of research projects, helping to ensure leadership buy-in and support for the projects chosen.

[23] Superior Performing Asphalt Pavements (Superpave): The Product of the SHRP Research Program at http://onlinepubs.trb.org/onlinepubs/shrp/shrp-a-410.pdf
[24] *Design Standards for U.S. Transportation Infrastructure: The Implications of Climate Change* at http://onlinepubs.trb.org/onlinepubs/sr/sr290Meyer.pdf
[25] *See Superpave Comes of Age* by Cathy Frye in *Public Roads magazine found at* https://www.fhwa.dot.gov/publications/publicroads/02sep/10.cfm
[26] Ibid.

	Reorganized organizational structure to tie in research to performance management and to elevate research to the executive level of DOT. The Secretary is the Chair of SCOR, which gives final approval to research project selection.
	The Secretary is a co-chair of the STIC which focuses on implementing innovations, new technologies, procedures, etc.
Research information and results presented in a manner readily understood by many audiences	Prepares *Research Notes*, which are short documents outlining, in plain language, the research conducted, its results and information on the implementation of the research report findings. See http://www.oregon.gov/ODOT/TD/TP_RES/pages/researchnotes.aspx.
	Research Showcase magazine features articles about the benefits of State DOT-funded research See http://www.dot.state.fl.us/research-center/Publications_and_Media.shtm.
	DOT Innovations, which is newsletter providing brief information on research implementation, is prepared and distributed. See http://www.vancerenz.com/researchimplementation/default.asp?Show=Newsletters.
	Putting Research to Work briefs which are plain language documents that describe in two pages the initial problem as well as the research objectives, methodology, results and recommendations. For a sample, see http://wiresearch.wi.gov/wp-content/uploads/WisDOT-WHRP-project-0092-12-01-brief.pdf.
	YouTube videos on research results. See http://www.youtube.com/watch?v=Tqlu9vVlRQ4 and http://www.youtube.com/watch?v=8p2e3iB9H58.
	Brief statements on what has changed as a result of the implementation of some research projects are included in the annual work plan.
Coordinated use of Local Technical Assistance Program (LTAP) center to share information about research results	This State directs SPR funds to its Local Technical Assistance Program (LTAP) Center to encourage innovation, technology deployment and implementation. See http://www.youtube.com/watch?v=Tqlu9vVlRQ4 for an example of an LTAP training video on the use of Geosynthetic Reinforced Soil Bridge Technique (an EDC initiative). LTAP meetings include discussions of new technologies and how they can be used to save time, money and better serve the traveling public.
	The LTAP Center actively informs local agencies about DOT research products. In this way, the LTAP Center helps to perform technology transfer of the DOT's transportation research products, the effect of which is to promote wider application of the results and contribute to the improvement of the entire transportation network within the state.
	LTAP produces a newsletter that highlights research results and incorporates research results into periodic training.
Use of Technical Advisory Groups (TAGs)	TAGs assist the STIC to evaluate, promote and guide implementation of innovations.
	TAGs monitor progress of the research project and help guide the project into useable/implementable results.

Contrary to the other State DOTs we visited, staff in two States had much more information to share with us concerning the successes of their research, what had changed from its implementation, and how the public would benefit from the research conducted in their states. These State DOTs place strong emphasis on research implementation at the earliest problem identification stage of the research cycle and increase their emphasis on implementation as the research project gets close to completion (i.e. the report is final). Of note, these States follow this process for every research project, even if the implementation plan states that no action should be taken based on the research results.

These State DOTs also focused on the development of metrics for tracking the implementation of research results. Based on the data they were able to provide us, that strong emphasis and tracking appeared to increase the likelihood that research results would be integrated into State DOT plans, specifications and processes.

How these State DOTs place a strong emphasis on research implementation is outlined in Figure 3:

Figure 3

Additional Steps Taken by State DOTs that Emphasize Research Implementation	
There is a clear investment in implementation	Allocates $250,000 of SPR funds for a task based contract with a consultant who completes the work needed to implement research results. This can include such steps as drafting specification revisions, preparing training materials, and providing training presentations.
	"We invest in implementation. SPR funds are reserved and then used on an as needed basis to support implementation."
Agency focus on implementation of research	The initial proposal for research includes discussion of how research could be implemented; all follow-up meetings between the DOT champion, the project manager, the research coordinator, the Research program staff and the PI include discussions of projections for implementation.
	At the time of the research needs solicitation, an annual implementation survey regarding the implementation status of research results developed through projects completed the prior fiscal year is distributed. The purpose of this survey is to improve research results implementation tracking, documentation, and analysis. It consists only of a single, two-part question that requests the status of the implementation of the research results, ranging from "not implementable" to "implemented," and an explanation of the identified implementation status. Functional area research coordinators will receive surveys identifying the projects completed within their respective areas. *Implementation surveys must be submitted for new needs requests to be processed.*

	Three months prior to the anticipated completion of a research project, research program staff meet with the project champion and project manager to discuss and document specifically what will need to be done to implement the research results. They complete an implementation plan documented in the research tasks and complete an implementation checklist that drives the implementation work of the consultant. Tasks are identified, assigned to a consultant or DOT staff person and monitored for completion.
Use of metrics to track and monitor research implementation as well as the results of research implementation	One State DOT recently started tracking the implementation of all implementable research by identifying what gets implemented, how long it takes to fully implement and the cost, time, and safety savings accruing from implementation as well as such factors as safety improvements and man hours saved.[27] This enables them to more easily provide information on the value accruing to their State from their investment in research. It also encourages leadership buy-in to investment in research because they are able to demonstrate the value that research brings to their State DOT.
	In 2008 the State DOT reviewed the outcomes of research conducted since the inception of the program. Initial evaluation revealed promising results and identified potential areas of improvement. Of the 60 projects completed, 30% impacted or validated current practice, an indicator that the program was achieving a moderate level of success under the policies and procedures in place at that time. However, 25% of the projects surveyed had no tangible evidence of follow up after completion of the research. The State DOT considered this to be an opportunity to take proactive steps in promoting review and action on completed research projects. As a result of these findings, the State DOT modified policies to encourage consideration of past efforts in each Technical Oversight Committee's (TOC) annual meeting to prioritize research ideas. The intent of this policy was for the TOCs to identify the activities required to implement completed research projects. This could include additional research, pilot projects, or other technology transfer activities. Twenty additional projects were completed after the initial analysis, bringing the total number of projects to 80. Comparison between analysis periods indicates that implementation of the new policy resulted in identification of more projects with known outcomes and fewer projects deemed as pending action.

Collectively, these practices are consistent with best practice information cited in a 2011 preliminary investigation done for a Caltrans peer review. This investigation was designed to identify the approaches various State DOTs use to develop an effective research implementation program that encourages and accelerates innovation. The identified approaches included:

- Encouraging management support,

[27] This State DOT measures and reports on the impact of implemented research in the following categories: Safety Improvements, Infrastructure Condition, Congestion Reduction, System Reliability Improved, Freight/Economic Benefit, Environmental Benefit, Project Time Reduced, Materials Saved, Man Hours Saved, Variation Reduced (Process or Materials) and Liability to the [State] DOT Reduced.

- Staffing for implementation,
- Considering implementation throughout the research process,
- Communicating research results,
- Ongoing monitoring of implementation, and
- Encouraging Innovation.[28]

However, as experience with technology implementation such as Superpave, and EDC technologies such as adaptive signal control systems and geosynthetic reinforced soil integrated bridge systems have indicated, "[just] because an innovation is found to work doesn't mean the hundreds of federal, state and local transportation agencies, as well as contractors, consulting engineers, and academics are going to embrace it."[29,30] Thus, SPR Subpart B funded State DOT research projects can contribute to the pipeline of innovations for implementation only when the right research projects are chosen.

A culture of innovation includes a structured, collaborative process to choose the right research projects.

Almost all of the State DOTs we visited told us they have specific processes in place to help ensure they choose the right research projects. These processes reflect the beliefs of the Superpave participants who said choosing the right research project was important to successful implementation. State DOT Research Directors said they have the most success in getting research implemented if they only select the *applied research* problem statements that have the potential to resolve specific issues facing their DOT.[31] This focus is so strong that five of the six State DOT Research Directors we interviewed said they spend research dollars only on applied research projects which: 1) identify actual transportation problems or concerns within that state; 2) which have real potential for implementation; and 3) which, when implemented, have the

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[28] See Implementing Research Results: Highlighting State and National Practices Preliminary Investigation For Caltrans Division of Research and Innovation Produced by CTC & Associates LLC Requested by *:* Rebecca Boyer, Caltrans Division of Research and Innovation March 8, 2011 http://www.dot.ca.gov/newtech/researchreports/preliminary_investigations/docs/research_implementation_preliminary_investigation_3-8-11.pdf

[29] Before EDC, only two counties in two States used geosynthetic reinforced soil–integrated bridge systems. Since the start of EDC, 35 States have built more than 100 bridges using the technology. See http://www.fhwa.dot.gov/publications/publicroads/13novdec2013/05.cfm

[30] http://www.fhwa.dot.gov/everydaycounts/

[31] 23 CFR § 420.203 defines *Applied research* [as] the study of phenomena to gain knowledge or understanding necessary for determining the means by which a recognized need may be met; the primary purpose of this kind of research is to answer a question or solve a problem. In contrast, *Basic research* [is defined as] the study of phenomena, and of observable facts, without specific applications towards processes or products in mind; the primary purpose of this kind of research is to increase knowledge.

potential to improve the surface transportation system in that state.[32] However, we also heard that research projects that do not initially lead to implementation could still be considered successful because they might rule out certain elements which could then lead to more focused research. Conversely, if an implementation plan is not developed, allowing research results to linger "on the shelf", then the identified problems that prompted the research go unaddressed.

While the actual process to select research projects varied in each state we visited, most problem statements are solicited from university or DOT staff. Once problem statements are identified, they go through an iterative process by internal State DOT stakeholders, with the State DOT Secretary or CEO or his/her designee making the ultimate selection of which projects will be funded.

In general, the approach most of the State DOTs we visited use to select research projects is quite similar to the way FHWA historically has deployed and encouraged the adoption of new technology, once developed. According to an *Implementing Innovations* article in *Public Roads* magazine, FHWA typically used an internal, top-down approach to encourage adoption of highway innovations. Once FHWA officials determined whether the new technology met existing needs, they typically promoted the technology to State and local transportation agencies through conferences, newsletters, and/or other communication tools.[33]

In contrast, FHWA has now embraced a different approach to accelerate the deployment of targeted transportation improvements. With the creation of the EDC initiative in 2010, FHWA began to embrace a more collaborative approach to deploying promising transportation improvements that differed from the traditional top-down, internally-driven approach. In EDC-2 and EDC-3, FHWA has worked even more collaboratively with State DOTs, local governments, tribes, contractors, universities, industry groups and other stakeholders to identify the innovations to champion in order to facilitate interest and buy-in to the selected innovations.

This approach is consistent with how the SHRP2 innovations are selected for targeted implementation. While EDC focuses only on the broad deployment of proven innovations, SHRP starts with the identification, selection and conduct of applied research projects followed by the targeted deployment of select technologies resulting from SHRP research. In interviews we conducted with an FHWA official involved with

[32] State DOTs focus strongly on applied research, sometimes to the chagrin of principle Investigators. We spoke with two professors who have served as principle investigators who told us they thought DOTs were spending too much of their research money on applied research designed to resolve a specific, finite problem. They said they would prefer broader problem statements which would allow them more freedom to find, perhaps, better solutions that could eventually be better for the State DOT.
[33] See *Implementing Innovations* by Kathleen Bergeron in *Public Roads* magazine found at http://www.fhwa.dot.gov/publications/publicroads/13julaug/02.cfm

SHRP2 we learned that the entire SHRP process now involves a much more collaborative process than what was used in SHRP1. We were told that feedback from AASHTO and some State DOTs indicated that they would have been more supportive of some of the SHRP1 technologies chosen for implementation had they first been involved in the process to select the initial research projects and to identify the implemented research that would be most beneficial to target through SHRP. Thus, SHRP2 changed to use a more collaborative approach to determine what should be researched and what should be targeted to receive the resources needed to fully implement new technologies:

> In establishing SHRP2, Congress recognized that *developing breakthrough solutions to complex challenges requires both large-scale collaboration and intensive focus*. As a result, SHRP2 has concentrated resources in four broad focus *areas identified by state transportation agencies* as essential to the Nation's health, safety, economy, and quality of life. This approach, which integrates research from multiple disciplines and involves input from all highway stakeholders, not just transportation agencies, is fundamentally different from the broad, discipline-based research programs that have been the mainstay of the highway industry for more than half a century. [Emphasis added.][34]

This approach has been successful: several State and Division staff we spoke with cited SHRP2 as a 'best practice' example of a collaborative decision-making process used to identify strategic research needs that can eventually be implemented with the support of the entire transportation community, once the research projects are completed. They also told us how SHRP2 successfully uses a defined strategy to achieve full deployment. Perhaps indicative of this, we spoke with staff in one State DOT who told us of their pride that their State DOT had been chosen to be *Proof of Concept* and *Lead Adopters* for a particular SHRP2 technology.[35] They told us of their belief that this technology would greatly improve their risk management processes for

[34] http://www.fhwa.dot.gov/goshrp2/About/FocusOnSHRP2

[35] These are the stages of SHRP product implementation. The three levels of participation offer progressive assistance based on the current level of readiness of each product and on the applicant's experience with each product. The *Proof of Concept* Pilots are intended primarily for products that may have had limited trial testing or need additional refinement. The *Proof of Concept* level offers highway agencies opportunities to help evaluate the readiness of a product, and to gain more experience in the use of the product. The *Lead Adopter* Incentive provides assistance for organizations to participate as lead adopters in the implementation of a product. As lead adopters, these organizations take a more active role in product implementation, may assume a greater risk in implementing the product, and may be called on to help communicate the use of the product and assist with implementation for other interested organizations. The *User Incentive* provides assistance to organizations that are interested in a product but may not wish to participate at the lead adopter level at this time. The *User Incentive* offers an opportunity for an organization to assess the product and to make organizational changes that may be needed to facilitate future product implementation. See http://www.fhwa.dot.gov/goshrp2/ImplementationAssistance/FAQ

rapid renewal projects, despite it being a change to their long-standing State DOT practices. They also said that they did not believe they would now be implementing this technology without the financial support provided through SHRP2.

Recently, to further facilitate the strategic selection of the innovations most important to the entire transportation industry in each state, FHWA has begun to encourage the implementation of STICs. In one of our site visits both State DOT and local transportation officials told us how their STIC helps foster innovation by using a collaborative process to identify broad, strategic research needs, helping to ensuring the support of the transportation community for research which will be conducted.[36] This STIC also selects and oversees the widespread deployment of select technologies resulting from successfully implemented research.

This is consistent with what FHWA is suggesting STICs can accomplish. STICs encourage innovation and cooperation throughout the transportation industry by using a collaborative approach which recognizes the different perspectives various partners bring to the table. In addition, FHWA encourages the STICs to consider all sources of innovation deployment, which could include the results of their own implemented research as well as the deployment of selected EDC, SHRP2, and AASHTO Technology Implementation Group (TIG) technologies.[37,38] FHWA also encourages the STICs to develop their own implementation plans and performance goals, institutionalizing a practice we found to also be one of the practices of State DOTs that emphasize research implementation.[39]

Opportunities exist to more fully integrate State DOT research programs into the culture of innovation and accelerate the adoption of research results into the state of practice.

Only one State DOT we visited has a track record of a fully implemented STIC concept that has also integrated its research program, SHRP2 and EDC into one single program. This program is focused on creating an industry-wide culture of innovation which strategically encourages and sustains rapid change and adoption of new innovations, whether the innovation is an EDC technology, a SHRP2 technology or a technology resulting from the State's own research projects. In this state all of these programs are managed by a single program office, which, in this case, is its Research Office. Thus, the same people not only manage "traditional" State DOT initiated research projects but are also actively involved in community wide technology

[36] The STIC only identifies broad, strategic research needs. The State DOT then uses that input to determine which the actual research projects it will fund are.
[37] See *State-Based Innovation Deployment Approach* at http://www.fhwa.dot.gov/stic/deployment.cfm
[38] The AASHTO TIG is now known as the *AASHTO Innovation Initiative.*
[39] Ibid.

deployment and transfer initiatives. This integrated approach to innovation helps accelerate the adoption of research results into the state of practice.

To accomplish this, staff from this office facilitate STIC activities through a clearly defined, collaborative process which results in STIC participation in

1) Determining broad, strategic research needs as identified by the state's transportation community; and
2) Determining which already-implemented and tested technologies their transportation community will support for industry-wide implementation.[40]

Through these STIC activities contractors, academia, LPAs, planning partners, state resource agencies, consultants, the State DOT and FHWA all partner to create a culture of innovation and accelerate the adoption of research results into the state of practice. For this state, in FY14-15, 35% of the SPR Subpart B dollars once considered primarily to be research funds will now be directed towards technology transfer activities which include providing State resources to facilitate the STIC process.[41]

This state is not alone in the value the State DOT believes it can gain from combining internal research with EDC/SHRP 2 initiatives to more rapidly deploy innovations that benefit the State's transportation programs as a whole. One other State DOT we visited has recently reorganized its research program and high-profile technology deployment programs such as EDC and SHRP 2 so that they are now located under one organizational umbrella, reporting to the Secretary of Transportation. This state is now in the beginning stages of creating a collaborative, broad based Innovation Review Committee (IRC) and STIC, both of which are committed to supporting the Department's goals of accelerating piloting, testing and adoption of promising materials, technologies and/or processes whether those materials, technologies or practices result from their own research projects or are identified through EDC or SHRP2. *The IRC will function as a team used for collecting and evaluating potential internal innovations* and the STIC will function as a resource for gathering input from key external stakeholders when necessary [Emphasis added].[42]

In the other states we visited, we did not find this type of integration between the State DOT's research programs and a STIC or STIC-like organization which focuses on technology deployment. Those State DOT Research Directors were not able to tell us details concerning the role the State DOT's research program plays or could play in

[40] The Research staff receive active assistance from an FHWA Division staff member who champions research and research implementation, EDC and SHRP2 as key components of a culture of innovation.
[41] A portion of this goes to LTAP activities but other dollars go towards STIC activities and support as well as other technology transfer projects.
[42] http://www.fhwa.dot.gov/stic/charters/wi.cfm

their STIC although each of those States has a recently signed STIC charter. Similarly, in four of the six State DOTs we visited, the Research Office did not manage, or was not otherwise actively integrated into either one or both of the EDC and SHRP2 initiatives. In these states, other offices in the State DOT have been assigned responsibility for one or both of these programs, thus separating research from the State DOT's high-profile innovation deployment initiatives. Thus the staff which help ensure EDC and SHRP2 initiatives become state of the practice in that state do not consider State research results for the same type of high-profile deployment activities. This negates the concept recognized through the EDC initiative that there needs to be "a constant focus on identifying and deploying new innovation, on an on-going basis, which keeps everybody, at all levels, on their toes looking for a better mousetrap." Doing so enables the transportation industry to be able to meet its current challenges.[43] If the State research programs could be more fully integrated into all of their STIC's activities, it could accelerate the adoption of their research results into the state of practice.

Recommendation 2: To complement the Research 101 training currently under development, TFHRC should also provide guidance to the Divisions as they help State DOTs understand how to more fully integrate their research programs into the STIC-supported culture of innovation. Doing so will help accelerate the adoption of their research results into the state of practice. At a minimum, this guidance should include information on 1) focused emphasis on implementation and 2) collaboration practices which encourage all stakeholders to be involved in identifying research needs, thus facilitating potential buy-in to research implementation and technology deployment.

[43] http://www.fhwa.dot.gov/everydaycounts/

Observation 3: TFHRC faces challenges in generating the interest and involvement in the *R&T Agenda* which is necessary to allow it to harmonize its *Agenda* with the State DOTs' research programs.

The *R&T Agenda* was launched as a better way to market and display what FHWA R&T is doing, as well as to display and receive input on national research needs and priority areas:

> "The FHWA Research and Technology (R&T) Agenda Web site tells the FHWA R&T story—what we do and why we do it. The site provides a high-level overview and context of FHWA's R&T and shows the cross-cutting work of the Agency's offices. Our intent is to improve accessibility of the FHWA R&T portfolio to stakeholders and provide a means for stakeholder input."[44]

Moreover, the Agenda identifies

> "the R&T strategic objectives which drive R&T programs in infrastructure, operations, safety, policy, planning and environment, Federal lands, exploratory advanced research, and innovative program delivery. The site also presents the major, national-level R&T challenges facing the United States and how FHWA is addressing them."[45]

In interviews with TFHRC staff we were told that the *R&T Agenda* is based on FHWA Program Office (including TFHRC) input and has been in existence approximately one year. We were also told that FHWA typically selects its research projects from strategic "roadmaps" for each of the major program areas which outline future research needs over a period of several years. The roadmaps are created based on ad hoc data collection processes and internal FHWA decision-making processes. TFHRC said they view the *Agenda* as a means to provide high level information to stakeholders, including State DOTs, about the roadmaps, although the roadmaps are not specifically included as part of the description of the *Agenda* on TFHRC's external web site.

TFHRC staff told us the *Agenda* is envisioned to be dynamic from year-to-year because of changing research priorities and needs and stakeholder input. To help obtain stakeholder input, TFHRC leadership and staff have marketed the *R&T Agenda* with the following activities:

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[44] See the FHWA Research and Technology Agenda webpages. This explanation is found at http://www.fhwa.dot.gov/research/fhwaresearch/agenda/map.cfm)
[45] Ibid.

- As of September of 2014, the Program Office has visited four Divisions and State DOTs to discuss the *R&T Agenda*.
- Twice a year the Program Office hosts webinars which include discussion of the *R&T Agenda*.
- In September 2014, TFHRC briefed new Division Administrators at the Fall Business Meeting.
- All FHWA Headquarters Program Offices were solicited for input into the R&T Agenda.
- The Program Office informally requested feedback from Division Administrators several months ago to help them identify and display nationally significant research areas of common interest among the states.

We were also told that planning is now under way to more actively solicit input from Divisions in the new calendar year.[46]

However, all the State DOT Research Directors visited told us they do not currently have an in-depth understanding of the *Research and Technology (R&T) Agenda* nor do they see how it can apply to their States. Thus, any marketing done for the Agenda has not yet succeeded in helping the State DOT research staff understand how it can benefit their State or why their input is needed. In essence they said they could not easily see "what is in it for me" even after an explanation of what the *Agenda* is intended to accomplish.

As stated in Objective 2 for this review, TFHRC is interested in ways to be able to harmonize its *R&T Agenda* with State DOT's Research Programs. [47] Five of the State DOT Research Directors with whom we spoke did not view TFHRC as an important resource to them to further their research objectives. One Research Director told us he viewed TFHRC as similar to a 51st State DOT research program. Moreover, he did not view it as being transparent in its management of its research program. For example, he indicated that he was unable to find meaningful information on TFHRC's current projects in the Research-in-Progress (RIP) database which TRB has established and which States use, nor could he find information on how research projects are identified,

[46] As an example, see the November 12 email from Michael Trentacoste soliciting Division input on their State's top three research needs.
[47] See Review Objective 2: "To determine how research program integration (e.g. EDC and SHRP2) occurs and to identify ways the intent of the FHWA R&T Agenda can be harmonized with the State DOT's research program.

selected or managed.[48,49] All of the State DOT Research Directors we spoke with told us they know TFHRC can be called on for assistance but only one spoke of recent experience working with TFHRC on specific issues. In addition, they all said that for research projects of national significance they would first consider leading or participating in a pooled fund study or suggest the issue as a potential NCHRP research project.

It is important to note that TFHRC staff were immediately able to tell us of several examples where they have recently provided active assistance to State DOTs. Thus what we heard from our site visit State Research Directors may not be what we would hear from all States. Nevertheless, these comments illustrate the necessity for and importance of the outreach activities TFHRC staff need to conduct in order for them to be able to harmonize their *Agenda* with those of State research programs, as is its apparent objective.[50]

Of similar concern, on one site visit we spent time with both Division and the State DOT's research staff in viewing the webpages which describe the *R&T Agenda* . However, even gaining that insight into the *Agenda* did not interest this State's or Division's staff in the R*&T Agenda*; they simply did not see it as applicable to their State's research needs. Until State and Division staff can more easily understand the linkage and alignment between FHWA's *R&T Agenda and* their State's transportation research needs, it is unlikely TFHRC will be able to easily harmonize its perspectives with State DOT's research programs.

This harmonization is, perhaps, made even more difficult to accomplish because Divisions do not understand the role they can fulfill in aiding TFHRC in harmonizing the *Agenda* with State DOT research programs. The *Agenda* is intended to be based on many inputs, including from State DOTs and various transportation advocacy groups as well as those from Divisions' leadership and FHWA Program Offices. For the past ten months, TFHRC has informally sought input from Divisions on their State's top three research needs through a SharePoint site established for information sharing and

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[48] The Research in Progress website (http://rip.trb.org/) allows users to:

- Search the entire Research in Progress database by various fields
- Browse project records by subject category
- Use a look up for searching by index terms, individuals, organizations or location
- Subscribe to receive e-mail notification of new RiP records in specific subject areas

States are required to post their new research in the Research in Progress database as indicated in FHWA's State Planning and Research Guide Summary Report webpage found at http://www.fhwa.dot.gov/publications/research/general/spr/os.cfm

[49] A search in TRID, TRB's TRIS/ITRD database, using the keyword term TFHRC resulted in 88 records which cited TFHRC.

[50] See Review Objective 2: "To determine how research program integration (e.g. EDC and SHRP2) occurs and to identify ways the intent of the FHWA R&T Agenda can be harmonized with the State DOT's research program.

collaboration. However, that informal solicitation to Divisions did not result in any input on the *Agenda*.[51]

The *R&T Agenda,* as described on its website, is being marketed to raise awareness and, thereby, understanding, as well as being a framework to gather input. Nonetheless, during our site visits, the Divisions did not yet appear to understand why they need to provide their State's input into the Agenda. The Division leaders we visited were aware of or familiar with the *R&T Agenda* but did not have a detailed understanding of it. Two of the six State DOT Research Coordinators were not aware or had never heard of it until our visit. The one Division Research Coordinator who said he has a good understanding of the *Agenda* has plans to incorporate the *R&T Agenda* as one of the central themes into that State DOT's annual 'Research Forum' meeting.[52] He said he views this as an opportunity to promote innovation and share FHWA's research priority areas.

TFHRC told us that *the R&T Agenda* is not currently linked to the FHWA Strategic Implementation Plan (SIP) and was not originally intended to be. However, Divisions' activities and levels of involvement in various programs are largely determined through the annual performance planning process that considers the Division's risks--both threats and opportunities--and other Division priorities based on meeting SIP goals and objectives. Thus, the *R&T Agenda*, as a separate, stand-alone document may not receive as much attention from Divisions as it would if it were tied, in some manner, through the SIP to the Agency's strategic goals and objectives.[53]

Without support from Divisions, it may be more difficult for TFHRC to harmonize its Agenda with State DOT research programs. Through the development of the R&T Agenda, TFHRC, working with other Headquarters program offices, has taken initial steps to enhance collaboration with outside stakeholders in shaping national research goals. More work is necessary, however, to help States and Divisions understand why their input is needed and what the Agenda will accomplish.

[51] On November 12, 2014, Divisions were formally asked to provide this input in an email from Trentacoste, Michael to all Divisions.
[52] This State DOT's Research Forum includes DOT, academia and industry representatives.
[53] Our understanding through conversations with TFHRC leadership is that efforts are under way to incorporate research as an objective in FHWA's 2016 Strategic Implementation Plan, under the National Strategic Objective of Advancing Innovation

Recommendation 3: TFHRC, working with other FHWA Program Offices, should include additional information with more detail on the various research "roadmaps" in the FHWA R&T Agenda public website in order to increase transparency concerning the purpose and direction of the FHWA's national research efforts. This would also serve to inform State DOTs and other transportation organizations about TFHRC's future research directions to minimize possible duplication of research efforts and to encourage collaboration and cooperation with TFHRC on those research efforts.

Successful Practices

See the charts included in Observation 2 for lists of successful practices used by site visit States that encourage research implementation.

Appendix

SPR Subpart B Research Program National Review Charter

Review Team Charter
Review Subject:
Administration of State Planning and Research (SPR) Research, Development and Technology Transfer (RD&T) Activities (Subpart b).
Target Audience:
FHWA's Office of Research, Development and Technology, FHWA's Office of Corporate Research, Technology, and Innovation Management's Innovation Management and Communications Team, FHWA Division Administrators, Division SPR Contacts, State DOTs
Purpose of Review:
23 USC 505(a) requires that States set aside 2 percent of the apportionments they receive from four of the core Federal-aid programs for State planning and research activities. 23 USC 505(b) further provides that of this amount, States must allocate 25 percent for research, development, and technology. These activities involve researching new areas of knowledge; adapting findings to practical applications by developing new technologies; and transferring these technologies, including the process of dissemination, demonstration, training, and adoption of innovations by users. 23 CFR 420 Subpart B specifies the requirements for research, development, and technology transfer (RD&T) activities, programs, and studies undertaken by State DOTs and their subrecipients with FHWA planning and research funds. 23 CFR 420.205(g) states that each State DOT must 'develop, establish and implement a management process that ensures effective use of available FHWA planning and research funds for RD&T activities on a statewide basis.' The process can be tailored to individual needs but must meet the minimum requirements and conditions set out in this subpart of the regulations. 23 CFR 420.209(d) also specifies that the FHWA Divisions shall periodically review the State DOT's management process to determine if the State is in compliance with the requirements of this program. This review is intended to provide information, and recommendations, where appropriate, to the Office of RD&T to aid it in determining how they can better coordinate the FHWA-conducted Research and Technology (R&T) program with the SP&R Research Program and how this office can better assist Divisions in providing program management and oversight of this program. FHWA's long-term vision, expressed in the FHWA R&T Agenda, includes better coordination of the FHWA R&T program with the SP&R program but initial assessments determined that for this to happen FHWA needs better knowledge of how the SP&R Research Program is being administered and conducted. This review will seek information on such topics as • Research Coordinator's approaches in administering the state research program; • Division's approaches to providing program management and oversight of the State's SPR RD&T, determining what works and where gaps may exist; • Division staff time allotted to the research program; • Areas where FHWA HQ can provide better assistance and collaboration to accomplish program activities stated in paragraph one. • Division/State coordination methods; • Research program integration (e.g. EDC and SHRP 2) efforts and approaches; • Ways Divisions and recipients/sub-recipients believe the intent of the FHWA R&T Agenda can be harmonized with the State's research program; and • Best practices and lessons learned to improve administration of the SPR RD&T program
Scope of Review:
The site visits for this review will be conducted between July and August 2014, with a final report scheduled for issuance the week of November 17, 2014. We randomly selected six states for site visits: Florida, Oregon, Pennsylvania, Rhode Island, West Virginia and Wisconsin. The National Review Team (NRT) will accomplish this review by visiting the states selected to interview FHWA Division and State DOT officials and review documentation of the State's SPR program administration. In addition to the site visits, the review team may also conduct a short survey designed to corroborate the information collected during the fieldwork stage of the review.

Review Objective(s):					
1. To determine how Divisions conduct their periodic reviews of the State DOT's SP&R Sub-part B program, identifying what is necessary for successful stewardship and oversight, where gaps may exist, successful practices and lessons learned. 2. To determine how research program integration (e.g. EDC and SHRP 2) occurs and to identify ways the intent of the FHWA R&T Agenda can be harmonized with the State's research program.					
Team Leader(s):					
Dave Bruce					
Team Members:					
Matt Lupes		Anne Luedders		Stew Sonnenberg	
Team Sponsor(s):					
Michael Trentacoste, Associate Administrator for the FHWA Office of Research, Development and Technology; Jan Brown, Director of Field Services West					
Budget:					
$25,000					
Time Frame:	Approximately 5 months	**Starting Date:**	June, 2014	**Estimated Completion Date:**	November, 2014
Potential Constraints:					
None known					
Timing of Progress Reports:					
Progress status reports will be provided to the sponsors on an approximately monthly basis. Final report is due by the week of November 17, 2014					
Sponsor Signatures and Dates:					
By signing and dating the Charter, the Sponsor indicates approval of it as written. Michael Trentacoste Janice Brown					

U.S. Department
of Transportation
Federal Highway Administration

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