



2017 KANSAS AND MISSOURI DEPARTMENTS OF
TRANSPORTATION
RESEARCH PEER EXCHANGE - SUMMARY REPORT

IMPROVING THE QUALITY AND TIMELINESS OF RESEARCH REPORTS.

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INTRODUCTION

The transportation research programs at the Kansas and Missouri Departments of Transportation (KDOT, MODOT) hosted a peer exchange to discuss improving the quality and timeliness of research reports.

The host states contributed to the funding of the Support Services for Peer Exchange Pooled Fund (TPF-5[301]) to engage the Texas A&M Transportation Institute (TTI) to assist with peer exchange planning, facilitate meetings, take notes of the discussion at each session, and prepare the peer exchange final report.

The Kansas and Missouri Departments of Transportation planned the sessions pertaining to improving the quality and timeliness of research reports. This report documents the discussions, outcomes, and takeaways of the peer exchange participants. This peer exchange report is structured as follows:

- Peer exchange background.
- Peer exchange participants.
- State research program overview, successes, and challenges.
- Key takeaways from the research peer exchange.

- Research peer exchange agenda (Appendix A).
- State transportation research program representatives (Appendix B).
- State transportation research program presentations (Appendix C).

PEER EXCHANGE BACKGROUND

The use of peer exchanges was established to provide State Departments of Transportation (DOTs) research, development, and technology programs with the opportunity to examine and evaluate their own programs through a collaborative team of peers, experts, and persons involved in the process, where the exchange of vision, ideas, and best practices could be fostered to benefit both their programs and the program of the peer team participants. Peer exchanges also may be used to examine more focused areas of the State DOT's research program.

PEER EXCHANGE PARTICIPANTS

The peer exchange participants included staff members from research programs in the DOTs from Colorado, Iowa, Kansas, Maryland, Minnesota, Missouri, New Mexico, Utah, and Wisconsin. Other guest participants included the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA), Transportation Research Board (TRB), Kansas State University, University of Kansas, and University of Missouri. Contact information for participants is provided in Appendix B.



2017 KDOT/MoDOT Peer Exchange Participants.

From left to right: Shannon Fiecke (MnDOT), Dawn Perkins (FHWA-MO), Roger McBride (KSU), Renee McHenry (MODOT), Rick Kreider (KDOT), Randall Soderquist (NMDOT), Kevin Ward (FHWA), Rick Backlund (FHWA-KS), Lori Sundstrom (TRB-NCHRP), Bill Stone (MODOT), Dave Meggers (KDOT), Christopher Jones (KSU), Brian Worrel (IDOT), Amanullah Mommandi (CDOT), Amanda Jones (KDOT), Jen Harper (MODOT), Steve Schrock (KU), Audrey Atkinson (KDOT), Doug Daugherty (FHWA), Susan Barker (KDOT), Hua Xiang (MDOT), Kevin Nichol (UDOT). Not pictured: Dave Ahlvers (MODOT), Mustaque Hossain (KSU), Carlos Sun (MU).

DISCUSSION AND KEY TAKEAWAYS

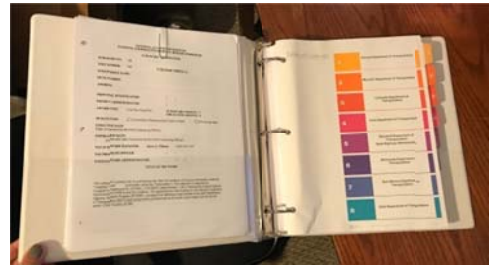
On several occasions during the peer exchange and near the end of the peer exchange, participants were given the opportunity to reflect on the presentations and discussion and provide “key takeaways”. The theme for the peer exchange was “Improving the Quality and Timeliness of Research Reports.” Provided below is a summary of the peer exchange take-aways from discussion on research report challenges, including: deliverables, grammar, the use of technical writers, report length, data management, performance measures, and the commitment required for project champions. The following summarizes the key takeaways identified by the participants from this discussion:

- Ensure research projects address the priorities of your department. Consider broadening the scope of standard research practices to understand why the research is being done. Transportation can be a tool to solve problems, rather than the problem itself. When selecting projects for funding, consider the agency’s strategic plan and focus areas, the value of the research, and the return on investment. Highlight high priority and high profile research projects. DOTs are encouraged to track involvement and show the value of participating on panels or acting as a PI/PM on a research project.

- Establish procedures that ensure active oversight and a set of warning signs for the entire project lifecycle that signal if the project is going off track to avoid surprises. Consider developing or utilizing a kick-off meeting checklist to ensure all aspects of the project are covered and stress the importance of communicating staffing issues early in the process. Include the schedule of deliverables and project milestones in the proposal or contract. Establish performance measures.
- Precise explanations and a clear objective are needed at the beginning of a project to produce a decent final product. Consider providing a “model” product to use as an example for expected deliverable quality. Define what “quality” means to the program and how it should be applied to deliverables.
- Strong final reports are the result of a series of critical steps in the research process, and fully reflect the strength and coherence of that process.
 - Concise reporting is a key element, including the length and volume of the report.
 - Report quality is a key factor as well, including technical editing for grammar, punctuation, and formatting errors.
 - Consider hosting a meeting or conference call for university researchers to discuss report writing, editing, and publication requirements and set expectations. Consider mandating technical writers and editors, or providing a list of approved editors.
 - Consider outsourcing communications and marketing responsibilities if in-house staff does not have the required expertise.
- Consider including procedures to cancel a research project in the contract or master agreements for poor performance or other reasons. Consider imposing consequences for late deliverables. Explore retainage options or contract language to prevent PIs from proposing on new RFPs until deliverables have been submitted.
- Consider discussing technology transfer procedures and documentation in the contracting phase and include in the implementation plan for a research project. The DOT PM and the PI work together to develop technology transfer, and consider requiring for each project.
- Assess overhead rates for both public institutions and private industry, and review the impact on research project budgets.
- Outline the requirements and expectations for data management plans at the beginning of a project. Determine when to discuss the cost of storing and securing data pre- and post-publication. Explore options for repository and define reasonable standards. Utilize DOT and research librarians. National guidance is needed for data management to avoid multiple sets of standards in different states.
- Recognize project champions, reward volunteers, and show appreciation for staff involvement in the research program. A variety of ways to recognize staff were discussed, including nominating research projects for and recognizing projects that were selected for the Sweet 16, acknowledging participation on panels and national contributions, and give awards for innovative projects at departmental conferences.

PEER EXCHANGE NOTEBOOKS

The host states prepared binders containing examples of standard research agreements, contract documents, university agreements, project management checklists, task order templates, progress report templates, and report guidelines from participating peer states. Each participant received a binder. The information in these binders can be obtained by requesting the '2017 KS-MO Peer Exchange Notebook from KDOTRESEARCH.Library@ks.gov



STATE RESEARCH PROGRAM OVERVIEW, SUCCESSES, AND CHALLENGES

Each state participating in the KDOT/MoDOT Research Peer Exchange discussed their research program structure, processes, research activities, successes, and challenges. The following section summarizes the presentations by each state, in the order of presentation.

KANSAS DEPARTMENT OF TRANSPORTATION



The Kansas Department of Transportation (KDOT) Research Bureau has 20 employees, including nine engineers and subject matter experts in construction/materials. The Bureau is in the process of reeducating staff due to turnover in the last year. The Research Bureau operates with a \$5.8M budget for research funded through SPR-II and state funds. The Bureau has in-house, university-led, and national/regional research projects.

Each year, KDOT hosts a “Research Needs Day” with instate universities to discuss research ideas and needs for the upcoming funding cycle. KDOT has adjusted the schedule for the 2018 Research Needs Day to accommodate schedules for hiring graduate students. It is suggested that KDOT provide the needs and goals of the agency prior to the meeting to increase efficiency and effectiveness, and refine problem statements and scope of work.

The KDOT Research Bureau is facing two major challenges: timeliness of reports and quality of report writing. KDOT has identified the following factors related to late deliverables: changes in scope, unanticipated changes in research, departure of PI/researcher, and changes in the availability of graduate students. The Bureau is focusing on minimizing late reports and tracks the technology transfer process to verify the DOT is not the cause of the lengthy review time or making the deliverable late.

KDOT policy on late deliverables is that area panel leaders with more than three late projects due to delays in the Project Monitors’ review of the reports (more than 60 days) will not be given any additional University Research Projects until one of their projects is completed. Furthermore, any PI/Co-PIs involved with a project classified as late will not be awarded any additional projects as PI (or Co-PI) until the late project is completed.

KDOT is also seeking guidance on handling report quality issues, such as grammar and punctuation errors, mandating technical writers, report length, publishing reports, and data management.



MISSOURI DEPARTMENT OF TRANSPORTATION



The Missouri Department of Transportation (MoDOT) Research Program has an overall budget of \$4.6 million, with \$1 million dedicated to NCHRP projects and \$640,000 to pooled fund studies. The program is managed by three research staff and one librarian. The majority of contract research at MoDOT is performed by University researchers. There are 31 active research projects at MoDOT; 58 percent are under contract with Universities and 42 percent with private industry. MoDOT performed a SWOT analysis in 2014 and identified their internal support, willingness to accommodate partner needs, librarian expertise, relationship with the local FHWA office, increased involvement with RAC, and understanding of the budget process as strengths of their research program. The staff size, organizational hierarchy, other responsibilities, and a disconnection from district activities were identified as weaknesses or challenges for the MoDOT research program.

MoDOT uses a qualification based selection process for proposal selections. The selection team is comprised of research staff, division staff, and an FHWA representative, except when conducting follow-up or implementation research, or when University Transportation Center funds are available. A member of the MoDOT research staff works with a technical expert to develop the RFP documents. MoDOT has executed basic, task order agreements with three Universities: University of Missouri-Columbia, Missouri University of Science and Technology, and University of Missouri – Kansas City. St. Louis University is contracted via a standard research agreement.

Research projects are monitored by a technical advisory committee through quarterly progress reports, mid-project presentations, in person meetings or conference calls, draft reports, final reports, and final presentations as needed. The report publishing process begins when the PI submits the draft report to the technical panel project managers for review. The PM provides feedback to the PI, who then makes revisions as necessary, and submits the final report. MoDOT indicated the following issues with the report review process:

- Poor writing quality, grammatical errors, and inconsistent formatting.
- Insufficient editorial oversight from PIs.
- Difficult to read and contain too much detail, therefore becoming a barrier to technology transfer.
- PIs requesting no-cost contract extensions due to delays in submitting reports.
- Inconsistent completion of the technical report documentation page, data management plans, and 508 compliance.

The research program would like to develop report quality and timeliness guidelines for PIs to follow and will evaluate which requirements belong in the RFP and contract versus exist as a departmental guide. Other possible solutions identified by the research program include: imposing length limits for the main body of the report, requiring that reports go through a comprehensive technical editing cycle prior to submission, rejecting reports that do not meet basic standards or requirements, extending the review period, applying consequences to delayed deliverables, and educating PIs on required documentation. MoDOT is also considering editorial options, such as requiring PIs to use a technical editor, hiring an in-house technical editor, or developing partnerships with regional UTC editors. The research program is also determining how to implement accountability measures if the pattern of late deliverables and poor report quality does not improve, such as re-educating to reinforce departmental expectations, reporting to their supervisor, or prohibiting specific PIs from participating in RFPs until demonstrated steps for improvement are taken.

COLORADO DEPARTMENT OF TRANSPORTATION



The research program at CDOT has two main research types, applied and basic, and nine research program areas: environmental, water quality, and sustainability; structures, geotechnical, and hydraulics; safety, traffic operations, planning, and ITS; pavements and materials; LTAP and library services; field services; research implementation; state transportation innovation council; and technology transfer. Research at CDOT is conducted by in-state universities, out-of-state universities, consultants, and internal staff.

Project statement solicitation begins in August and problem statements are due in November. The oversight team then reviews, screens, and ranks problems statements for the Research and Implementation Council (RIC) from November to January. In February, the RIC provides a final rank and assigns funds to selected problem statements. Principal Investigators (PIs) finalize the scope of work and create study panels from March to October.



The CDOT research program received approximately \$3.1M in funding from SPR funding in FY2016. CDOT also administers the Local Technical Assistance Program (LTAP) in Colorado. In FY 17, this program had a \$431,250 budget, primarily funded by the FHWA (42 percent), but also through CDOT

(22 percent), local governments and associations (23 percent), and Colorado University (13 percent).

Additional language has been added to the CDOT contract to enhance the quality and timeliness of research reports including:

- Recommendations to implement research findings.
- Requiring a signed statement indicating a technical review has been conducted on all reports.
- Final presentation of the research to the CDOT study panel members, committees, and other interested parties.

CDOT has recently finalized the 2018 FHWA Stewardship and Oversight Agreement, a five-year collaborative agreement with the USGS, and a five-year interagency contract with the University of Colorado.

IOWA DEPARTMENT OF TRANSPORTATION

The IDOT Office of Research and Analytics is part of the Performance and Technology Division. The overall budget is approximately \$7.1 million; half comes from SPR Part II funds, with the other half from IHRB, state funding, and other grants. IDOT currently has collaboration agreements with Iowa State University, the University of Iowa, and the University of Northern Iowa. These agreements include coordination of research and expertise, transportation research focus groups, semi-annual collaboration meetings, support initiatives beyond Iowa (NSF, NCHRP, TRB, and USDOT), and a 26 percent negotiated overhead rate.

IDOT requires Universities to sign a “Use of Research Basic Agreements” (URBA). This agreement states that any research within the DOT, that does not want to use research money, must agree with the contract. The contract includes data management plans, technology transfer documentation, and final reports. Final reports must include executive summary findings, conclusions, recommended courses of action, and steps for implementation, as appropriate. Technology transfer documents are one- to four-page summaries that include implementation recommendations. Publication services are budgeted for most projects, including editing, design, format, and technical illustrations.

Another part of project guidelines is the inclusion of Technical Advisory Committees (TACs). The functions of the TAC are to develop and approve the scope, schedule, and budget; perform quarterly reviews for the progress, schedule, and budget; and approval of significant project changes. As a standard practice at IDOT, universities shall not receive payment for unsatisfactory work. The DOT provides written notices of these objections, and the university is granted 30 days to resolve the issue. The last 10 percent of the payment can be held until the TAC is satisfied or progress has been finalized on the deliverables. IDOT outlined four focus areas for future projects:

- **Mobility:** improving the accessibility, reliability, time, and costs associated with the movement of people and goods.
- **Safety:** reducing transportation fatalities and serious injuries through system-wide, multimodal, data-drive, and proactive strategies.
- **Technology:** exploring both current and potential technologies and incorporating them effectively into existing agency functions.
- **Sustainability:** considering how transportation supports economic, social, and environmental progress with a long-term perspective.

All project solicitations must fall under a focus area to be considered for funding. IDOT has recently implemented a new tracking mechanism for contracts to determine the quality of projects by asking why the research is being done, rather than what is being done on the project.

MARYLAND DEPARTMENT OF TRANSPORTATION



The Maryland Research Program is part of the Office of Policy Research in the MDOT State Highway Administration. The program is funded primarily through SPR-II funds, at \$3.5 million per year. There are three FTEs, and the Research Division manages seven open-end agreements with in-state universities. Projects are solicited through a selection process that starts with a 'research needs request' from Senior DOT Managers. Once the needs requests are reviewed and selected, a RFP is issued and sent to the university partners. After proposals are submitted, the Research Division forms selection panels to review the submissions. Once proposals are selected and submitters are notified of selection/non-selection, the Research Division then submits the annual Research Work Program to the FHWA for approval. After details are approved and finalized, NTPs are issued for new projects.



MDOT discussed improving internal and external communications to enhance efficiency, and recognized the following strengths of their research program:

- “Excellent customer service” as denoted by frequent customer feedback from technical offices.
- Use of successful management tools for the program such as: SharePoint lists for tracking task orders, customized workflows for information sharing, and a Research Engagement survey conducted in September.

MDOT identified the following challenges in their research program:

- Organizational changes.
- Responsibility changes mainly resulting in increased workload with fewer staff members.
- High staff turnover and knowledge loss.
- Quality of final reports.

MINNESOTA DEPARTMENT OF TRANSPORTATION



The Minnesota Department of Transportation (MnDOT) Research Services is within Transportation System Management program in the division of Modal Planning and Program Management. Under the supervision of the director of research programs, research projects are managed by four project advisors and four project coordinators. Research Services also has four staff in finance and contracting, three in marketing and communications, and five full time staff dedicated to the transportation library.

In FY 2016, MnDOT Research Services had a budget of \$12.9 million, funded 38 percent through the local road research board, 34 percent from the state research program, and 25 percent from FHWA SPR-II funds. Of the \$3.2 million SPR-II funds, 41 percent is dedicated to multi-state pooled fund studies, 30

percent to single-state planning and research projects, and 29 percent for federal program support. The majority of funding for research projects at MnDOT is for dedicated programs such as LTAP and CTS, traffic and safety projects, and materials and construction projects.

Annually, the MnDOT Research Program publishes between 40-50 reports and technical summaries, between 5-15 transportation report syntheses, and between 5-10 guidebooks, handbooks, software tools, and other related materials. Reports are distributed through MnDOT's website, blog, social media channels, email and print newsletters, press releases, and TRID/state transportation libraries email distribution list.

The report publication process is well documented at MnDOT, and includes language indicating requirements for Universities and consultants. Universities are required to comply with MnDOT report publishing guidelines and use the MnDOT report template and cover. All reports should be free of spelling and grammatical errors, checked for plagiarism, and include a summary and technical documentation page. Any software produced as a result of the research project must comply with MnDOT guidelines, and MnDOT must be notified of any presentations related to the research project. Consultants do not have report requirements in their contracts, only what is outlined in the specific work plan. They can choose to use MnDOT's report template or use their own; the MnDOT User Manual was developed for consultants without a guidebook template.

The publication process includes separate tasks for draft and final reports, four months for draft report preparations, two months for editorial and technical review, and two months for project close-outs. MnDOT provides a report template and guidelines for all projects and sends automatic reminders to PIs for draft and final report due dates. MnDOT has recently improved the report template to include the new agency logo and color scheme, as well as utilize a modern, web-friendly font. MnDOT has a contract with UMN to coordinate technical and editorial reviews, ensure ADA compliance, and review executive summaries and technical documentation pages.



For each project, MnDOT uses a consultant to write a two-page technical summary. The summaries include the project purpose, outcomes, recommendations, costs, and sponsors. For the summary, the project PI, technical liaison, and DOT PM are interviewed for quotes related to the project. The technical summary process begins when the draft report is submitted to MnDOT and is paid for through the MnDOT marketing department. The technical advisory committee reviews the summary prior to publishing. Once published, the summary is converted to a blog post and advertised through MnDOT social media channels.

The transportation research syntheses (TRS) are short turnaround synthesis papers that address a specific research topic. These documents include summaries of completed and in-progress research, reports about the state of the practice across the country, and go beyond the scope of literature searches. The resources used in a TRS are clearly organized and summarized, with contact names, web links, and other specifications. A template is available for a TRS report.

Each research project is evaluated upon completion. The project evaluation identifies the expected benefits from the research, how the research will be used, additional recommended research, who

should receive the results, and roadblocks for deployment. The project evaluation and technical summary are completed concurrently.

MnDOT recognizes the following ongoing challenges:

- High percentage of amendments for publication delays.
- Reports turned in after contract ends, but prior to editorial review.
- Copyright permission questions, different rules for different universities and consultant contracts.
- Report template can be tricky to use.

In the future, MnDOT plans to provide HTML versions of technical summaries, expand the research project pages on the MnDOT website, add relevant research from other MnDOT offices, add topic-level pages with a short summary, contact information, links to past and current research, and the ability to subscribe to project updates.

NEW MEXICO DEPARTMENT OF TRANSPORTATION



The NMDOT presentation outlined both challenges facing the research bureau and actions taken to improve these issues. The main challenges facing the research bureau currently related to the process of selection for research projects, such as:

- Lack of strategic plan for the research department.
- Projects are often not aligned with NMDOT goals and objectives.
- Insufficient stakeholder engagement, both internal and external, and the
- Research project solicitation and selection process is flawed.
- Lengthy funding timelines and frequent extensions.
- Insufficient analysis to determine what research projects were innovative, cost-effective, timely, and implementable.
- Inadequate analytical framework to identify promising research ideas,
- Inadequate analysis of feasibility.
- Minimal or no participation from the technical panel.
- Insufficient oversight, deliverables were not met, e, poor technical writing=, and reports =not disseminated as there was no audience.
- Insufficient data or information on implementation.
- Insufficient explanation by Research Bureau staff about research report expectations, no consequences for failure to achieve these expectations.

The Research Bureau has taken the following actions for organizational improvement:

- Creation of a strategic plan with a vision, mission, goals, and action items to act as a reference point for research project selections.
- Emphasis on the importance of innovative, timely, cost-effective, and implementable solutions to current and future transportation challenges.
- Outreach to districts, divisions, and executive management to ascertain challenges they were facing.
- Adjusting members of the Research Oversight Committee to provide a more engaged, cross-cutting representation of the department.

- Completion of an initial, but not comprehensive, review of every component of the research process lifecycle.
- Creating a sense of ownership and awareness among staff in the changes the department wanted to make.

Overall, these steps provided a new decision-making framework where research priorities could be effectively identified, and the research performed would be considered relevant to colleagues and stakeholders. To increase progress moving forward, the NMDOT Research Bureau would like:



- Improved understanding of what they want as an end product from the research project process.
- Precise explanation of what is expected from the research project advocate, sponsor, and PI.
- Precise oversight of the research.
- Identify warning signs that the project is off track.
- Establish precise repercussions for poor work.
- Establish accountability at every stage of the project process.
- Openly and continuously communicate expectations.

The Research Bureau has implemented the following to improve final report deliverables:

- Engineering coordinator and implementation engineer are now more engaged at the outset concerning feasibility and implementation of the project.
- Description of the project lifecycle process and explanation of expectations provided to advocates and sponsors early in the process.
- Identify the proposed target audience and get a precise understanding of what the audience needs as a research product to pursue change in a policy or practice.
- Clarify roles of all participants in the research project process.
- Describe the project and provide an explanation of expectations to the Research Oversight Committee prior to decision to fund.
- Describe the project and provide an explanation of expectations – including the potential for project termination – to the technical panel as they draft the scope of work and other components of the RFP.
- Review of all internal procedures, instruction style, writing and other manuals for accuracy and clarity.

There are further steps planned for final report improvement that include: changing the organizational structure of the Bureau to be more persistent, employing better understanding of how to assess projects, providing better oversight through a precise project review process, and better communication throughout the project process. Other goals are to examine and revise reimbursement of services, and establish definitive language for termination consistent with state procurement rules. For improving reports, the Research Bureau would like to improve technical writing for progress, quarterly, and final

reports; improve resource documents and templates to guide quarterly and final reports; determine or identify a high quality “model” or template report that captures what is wanted in progress, quarterly, and final reports; and to include language in RFPs and contracts that requires “high-quality” final reports.

UTAH DEPARTMENT OF TRANSPORTATION



The UDOT Research and Innovation Division (RID) has recently completed a major effort to develop the current organizational chart and has hired a FTE to serve as the meeting coordinator to arrange and schedule all project meetings. The RID has 101 active research projects and field evaluations, of which 66 are UTRAC and Rapid--Response, 25 are pooled fund, and 10 are experimental features. In 2017, 67 problem statements were submitted to the Utah Transportation Research Advisory Council (UTRAC) research program and 22 were selected for funding.

The UDOT RID has four main goals:

- Idea discovery.
- Innovation implementation.
- Sharing and communicating.
- Access to information.

The UDOT RID networks with internal and external stakeholders in Utah, other DOTs, and national groups, as well as scans technical publications, surveys, and problem statements to stay up to date with current and ongoing research efforts and to generate new, innovative ideas.



Information from UDOT RID is shared and communicated by leveraging the DOT’s involvement on national committees, supporting STIC and EDC initiatives, responding to national solicitations and grants, performing technology transfer, hosting TRB visits, peer exchanges, and webinars, and circulating information about surveys and awards. UDOT also has an Innovations Working Group that meets quarterly to develop problem statements that are applicable in Utah, but also in line with other states and national research ideas.

The RID provides access to information by publishing research and other reports, maintaining technical manuals, circulating new books and periodicals, coordinating leadership book discussions, updating research summaries, updating benefits of research summaries, and updating committee members on the RID website. The RID also publishes the Innovations and Efficiencies Report and a quarterly newsletter.

The RID is responsible for compiling the annual UDOT Innovation and Efficiencies Report. Each year, all UDOT units are asked to provide information about projects that have been implemented within the previous year that brought new and improved practices, especially those that improve the efficiency of the agency. This year, the report highlights 16 primary projects and presented another 69 in five categories: technology, engineering, construction, maintenance, and community. The quarterly newsletter contains state and national news, research summaries, funding opportunities, upcoming webinars, and innovations.

UDOT includes quality assurance for research reports in the contract language. UDOT sets clear expectations for a high level of effort in literary style, grammar, graphical presentation, and technical accuracy upfront. UDOT expects documents to be prepared in accordance with DOT Guidelines for Preparing Utah Department of Transportation Research Reports, which is available on the UDOT web site. This document provides an overview of what is expected in reports, specifics on the typographical and visual features, and how to address the use of copyrighted materials. In addition to the Guidelines, UDOT provides a Word template for the researchers to use that utilizes the formatting, layout, and applicable sections addressed in the Guidelines, a flow chart outlining quality control through the review process, and project management checklist.

TRANSPORTATION RESEARCH BOARD – NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM



The National Cooperative Highway Research Program (NCHRP) within the Transportation Research Board (TRB) has a \$28 million annual budget and funds approximately 110 new projects valued between \$50,000-\$1M each year. The NCHRP publishes 60 reports annually, and there are 13 project managers. The NCHRP creates project oversight panels comprised of state DOTs, local government, universities, consultants, industry leaders, and others relevant to the project topic.

The NCHRP outlined seven elements for a successful research project:

- The right contract.
- Documented procedures.
- Active and adaptive project management.
- Elevation process.
- Formal process to change the scope of work.
- Relationships and communication.
- Recognition.



The NCHRP suggests the contract for a research project should contain the following:

- Fixed price and/ or language regarding retainage.
- Approved work plan.
- Schedule of deliverables.
- Progress reports.
- Annotated outline of the final report.
- Format and style guide.
- Require the use of a technical editor.

The NCHRP noted the importance of starting a research project with clear objectives and project milestones, as it is largely unproductive to impose quality expectations at the end of a research project.

The PI should set a reasonably achievable schedule to complete the research and consider anything that will affect the schedule at the beginning of the project. Research projects should begin with a kick-off meeting with the contractor. At the meeting, deliverable quality expectations for interim and final deliverables are set and a risk assessment is performed. The PI should report on potential risks in quarterly reports.

It is important for the project manager to review interim documents in a timely manner to correct issues in real time and provide positive feedback. It is important to critically review the first and second deliverables to ensure expectations are being met. PMs should reject deliverables that are unsatisfactory or poorly written.

NCHRP meets with the contractor's upper management to review progress on all research projects, as well as to elevate any project problems. The NCHRP contracts office issues cure letters if necessary.

NCHRP suggests recognizing contractor and in-house staff performance for positive reinforcement with a simple email or formal letter. Dissemination activities can be used to highlight excellent performance and publicize overall program performance.

UNIVERSITY PERSPECTIVES

KDOT and MoDOT work closely with Kansas State University, the University of Kansas, and the University of Missouri. These three universities were invited to provide their perspective on the research process, summarized in the following section. MoDOT also works closely with the Missouri University of Science and Technology but key staff was unable to attend the peer exchange. Universities partner with KDOT and MoDOT on federal and state level research projects. It is key to set expectations, monitor projects, and understand the goals of both the university and the DOT up front. The DOT must communicate research priorities in order for the universities to submit effective proposals on relevant topics.



Research and report quality start at the very beginning of a project, so it is important to set expectations early and understand the commitments of both the university and the DOT. Students are trained on writing experience and have access to writing resources such as workshops, technical/writing classes, ESL classes, class projects and reports, writing of thesis and dissertation, and competitions. They are encouraged to keep report content clear and simple. Many universities have a technical writing department that reviews reports free of charge and is available for students. However, the continuous turnover with students presents a challenge for report writing quality. Universities suggest using a style guide or page layout/editor template for deliverables to help limit report length and ensure formatting standards.

Students are involved in meeting project milestones and deliverable expectations, as it is an opportunity to learn about project scope, budget, and schedules. Encouraging the students to be involved in this



process can provide a sense of ownership of the work, but the responsibility still lies with the PI. The University would like the DOT to consider linking a KTRAN project to support a PhD student so that the complete body of work could become the thesis/dissertation while still addressing the priorities of the research program.

It is important for the DOT PM to understand they can, and should, talk to the university PI as they work together very closely. Implementing formalized facetime by the sponsor at the mid-project review and closeout meetings would be appreciated by the University, and forces researchers to stay on track. The review process can sometimes be lengthy and creates uncertainty on how and when university researchers are able to move on to new projects.

There was also a discussion on transportation report styles versus trending report styles mainly regarding voice and citation of sources. Transportation reports use third person and TRB numeric citations; however the University of Missouri noted an increasing trend in first person voice and flexibility regarding style formatting (ASCE, APA, and MLA). Report formatting, such as automated numbering, referencing, and labeling, often results in reference errors. The use of non-contiguous numbers, by subsection, for figures and tables will resolve some of the most common formatting and reference errors, but is generally not accepted in DOT deliverables.

There are several benefits to using technical editors including having an extra set of eyes view the report, lack of familiarity with content can ensure clarity, editors can help improve quality of writing, and it can be affordable. Comment reviews should be questioned before changes are accepted. However, there can be some disadvantages to requiring technical editing such as lead time for review and editing, lack of technical knowledge can lead to unhelpful comments, and the quality of editing often varies by editor.

FEDERAL HIGHWAY ADMINISTRATION



Representatives from the Kansas and Missouri FHWA division offices participated in the peer exchange. The following summarizes the information shared with participants. As a whole, the FHWA is transitioning and working to craft a better research program with input from focus areas. Research offices are visiting states and gearing up for more partnerships. The expectations are centered on learning, increased communication, and higher quality deliverables. The stewardship and oversight role has shifted; the FHWA now delegates to states and every state has a different agreement with their FHWA region/office. NEPA Assignment has been delegated to many states as well.

FHWA representatives encouraged the participants to use their peers as resources, work together and collaborate on research projects, and to communicate early and often with their FHWA division office. It is important to be aware of what other states are doing to ensure research is not being duplicated.

Although it is important to understand the universities' perspective on diversity, student turnover, report writing challenges, etc., it is important to keep in mind there are still contractual obligations that must be met. DOTs are urged to identify deliverables at the beginning of a project, set project milestones, establish timelines and deadlines, and document all decisions and information. Adequate time for deliverable review should be built into contract agreements.

The FHWA recognizes there is great research happening, but stressed the importance of showcasing the work through the addition of multimedia presentation deliverables, presenting at local and regional meetings, project videos on YouTube channels, creating short technical reports and summaries, and adding value to the overall research project.



APPENDIX A. RESEARCH PEER EXCHANGE AGENDA

This appendix contains the agenda for the KDOT and MoDOT Research Peer Exchange.

KDOT/MODOT RESEARCH PEER EXCHANGE
Improving the Quality and Timeliness of Research Reports
October 17–18, 2017 at the Great Wolf Lodge in Kansas City, KS.

DAY 1—TUESDAY, October 17th

8:00am WELCOME AND INTRODUCTIONS

Welcome to Kansas City and introductions of peer exchange participants.

8:30am CURRENT STATE'S PRACTICES - 30 min. each [20 min. presentation /w 10 min. Q&A]

KS – Rick Kreider

MO – Bill Stone

CO - Amanullah Mommandi

10:00am Break

10:30am CURRENT STATE'S PRACTICES (Cont.)

IA – Brian Worrel

MD – Hua Xiang

MN – Shannon Fiecke

12:00pm Lunch

1:00pm CURRENT STATE'S PRACTICES (Cont.)

NM – Randall Soderquist

UT – Kevin Nichol

TRB – Lori Sundstrom

2:30pm Break

3:00pm UNIVERSITY COMMENTS

KU – Steve Schrock

KSU – Chris Jones/Roger McBride

MIZZOU – Carlos Sun

4:30pm REVIEW DAY 1

5:00pm ADJOURN

DAY 2—WEDNESDAY, October 18th

8:00am FHWA COMMENTS

FHWA(KS) – Rick Backlund/Doug Daugherty

FHWA(MO) - Kevin Ward/Dawn Perkins

9:00am OPEN DISCUSSIONS/POTENTIAL IMPROVEMENTS

9:30am DISCUSS ADDITIONAL REPORT CHALLENGES (Such As):

Deliverables, Grammar, Mandating technical writers, Length, DOT champion's commitment, Data management, Performance measures

10:00am Break

10:30am DISCUSS ADDITIONAL REPORT CHALLENGES (Cont.)

12:00pm LUNCH

1:00pm DEBRIEF/PREPARE RECOMMENDATIONS

3:00pm LEADERSHIP PRESENTATIONS

5:00pm ADJOURN

DAY 3 – THURSDAY, October 19th

8:00am

Reserved for KDOT/MODOT to help resolve any ambiguities prior to TTI working on the final report.

APPENDIX B. TRANSPORTATION RESEARCH PROGRAM REPRESENTATIVES

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FEDERAL HIGHWAY ADMINISTRATION



U.S. Department
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APPENDIX C. PEER STATE SLIDE PRESENTATIONS

Peer state slide presentations used during the KS/MO DOT Research Peer Exchange may be requested from KDOT by emailing a request to KDOT#RESEARCH.Library@ks.gov.

The following slide sets are available by request:

- Colorado Department of Transportation.
- Kansas Department of Transportation.
- Kansas State University.
- Maryland Department of Transportation.
- Missouri Department of Transportation.
- New Mexico Department of Transportation.
- University of Kansas.
- University of Missouri.
- Federal Highway Administration.
- Transportation Research Board – National Cooperative Highway Research Program.