Transportation Research Board
Workshop

Optimizing the
Dissemination and Implementation
of Research Results

A Preliminary Summary

May 5, 2003

Sponsored by
TRB Committee on the Conduct of Research
and
TRB Committee on Technology Transfer
Contents

Click on a link below to jump to the section.

Purpose of the Workshop

Introduction to the Workshop

Workshop Agenda

Case Study Presentations

  • Anti-Icing – A Dissemination Success, by Wilf Nixon, University of Iowa
  • Unsuccessful Implementation Efforts – Lessons Learned, by Dick McReynolds, Kansas DOT
  • Seal Coat: An Example of Successful Implementation, by David Johnson, Minnesota DOT

Focus Group Summaries

  • New techniques and methods for sharing preliminary research findings
  • Efficient dissemination of published materials
  • Developing appropriate materials for the implementation of research results
  • Case Studies – Guidelines for Do’s and Don’ts
  • Identifying barriers to dissemination and implementation
Optimizing the Dissemination and Implementation of Research Results

Purpose of the Workshop

On May 5, 2003, over 60 transportation professionals from federal, state, city and county agencies, the private sector, and research and educational academia attended a Transportation Research Board workshop to address the process of research dissemination and implementation. This workshop was co-sponsored by the TRB Standing Committees on the Conduct of Research and Technology Transfer and was held at the National Academy of Science’s Keck Center in Washington, DC. The workshop represents one additional activity in a continuum of activities by the respective committees to promote improved research implementation practices and procedures.

The intent of this workshop was to identify useful strategies for ensuring that optimal use is made of research that is conducted. Research has many goals, but a key goal in a field such as transportation is to improve practice within that field. To the extent that this goal is considered a central focus of research activities, it is important that research be disseminated as effectively as possible to improve the practice as quickly as possible.

Introduction to the Workshop

Mark Norman, Director of TRB’s Technical Activities Division, and Bill Carr, former chair of the TRB Committee on the Conduct of Research, opened the workshop that was held in conjunction with the biennial meeting of the TRB state representatives. Mr. Norman officially welcomed the attendees on behalf of TRB and set the stage for the workshop. He stressed that since the state representatives only get together once every two years, that it was a unique opportunity for them to interact with the various members and friends of the standing committees who were present at the workshop. Mr. Norman also challenged the attendees to work together to reach some substantive conclusions on this critically important issue that can be shared with the greater TRB community through electronic circulars and other information sharing opportunities.

Mr. Carr gave the background on how the concept of this workshop was initiated by the Committee on the Conduct of Research in a continuing effort to support the needs of the TRB community and elevate the importance of effective research implementation. He reported that the project was one additional step in an ongoing action plan that the committee had established to promote better research implementation and communication.

While the subject of the workshop is of key importance to many standing committees, Mr. Carr specifically acknowledged the excellent partnership with the Committee on Technology Transfer their co-sponsorship of the workshop and their contributions to the program. Mr. Carr also acknowledged the contribution of Dr. Wilf Nixon, Professor, University of Iowa,
for providing leadership on this activity and shepherding this workshop to reality. He also commended the many volunteers who had served to plan the workshop, present as panelists, and participate as facilitators and scribes in the breakout sessions.

Workshop Agenda

Once the stage had been set for the workshop, a panel presented three examples of successful and unsuccessful case studies on implementation. Participants were able to ask questions and provide input regarding their own experiences with implementation. The presentations included:

- Anti-Icing – A Dissemination Success, by Wilf Nixon, University of Iowa
- Unsuccessful Implementation Efforts – Lessons Learned, by Dick McReynolds, Kansas DOT
- Seal Coat: An Example of Successful Implementation, by David Johnson, Minnesota DOT

Next the participants divided into five breakout groups for in-depth discussion on the following set of topics. The planning committee had previously identified these topics as critical factors in the dissemination and implementation of research results.

- New techniques and methods for sharing preliminary research findings
- Efficient dissemination of published materials
- Developing appropriate materials for the implementation of research results
- Case Studies – Guidelines for Do’s and Don’ts
- Identifying barriers to dissemination and implementation

Each focus group was led by a facilitator and given the charge of discussing the topic and reporting back to the full group using the following framework:

- What is the problem?
- How would we like things to look?
- Why haven’t we achieved this goal?
- What are the choices for getting there?
- Which are the most likely choices?
- How will we know if this works?

Following are the presentations of the panelists and the summaries of the five focus groups, as presented by a member of each group at the conclusion of the workshop.
Case Study Presentations
On
Successful and Unsuccessful Implementation
Anti-Icing – a Dissemination Success

Wilfrid Nixon, Ph.D., P.E.
IIHR Hydroscience and Engineering
College of Engineering
University of Iowa
Iowa City IA 52242-1585
wanixon@engineering.uiowa.edu
319-335-5166
The talk will briefly describe the nature of anti-icing, will discuss how the information was disseminated, and then discuss why the methods used worked so well.
What is Anti-Icing?

“The snow and ice-control practice of preventing the formation or development of bonded snow and ice by timely applications of a chemical freezing-point depressant.”

FHWA Manual of Practice for an Effective Anti-Icing Program

The FHWA Manual of Practice (available on the web at: http://www.fhwa.dot.gov/reports/mopeap/eapcov.htm) defines anti-icing as shown here. The definition is clear and short. This brings what is a fairly complex change in the way of doing business down into a one sentence description. It’s a busy sentence and each word is packed with meaning, but it’s all there – very helpful.
What does that mean?

- **Pro-active**
  - Do to the snow before it does to you
- **Mostly uses liquid chemicals**
  - Can use pre-wet solids
- **Needs new equipment, new operations method, and new chemicals**
  - Significant “barriers” to change

OK, let’s expand on the definition. It changes the whole premise of winter maintenance from reactive to proactive. It requires using liquid rather than solid chemicals. And thus it needs new equipment, new chemicals and a whole new way of doing business. In short, there’s every reason why agencies would resist such change. It’s not in any way a minor change, nor is it easy to do incrementally. The first step toward implementation is recognizing that it won’t be easy.
The process began some 15 years ago at the tail end of SHRP. It continued with T&E 28 and the Lead States process. Now some states have anti-icing as their standard of practice. So, on one level it’s a success. But, lots of states still aren’t anti-icing and most cities and counties aren’t either. So in that regard it’s not yet a complete success.
So, what’s helped anti-icing spread so well? First, twelve states were involved from the start. This meant that in at least 12 states, there were folk who knew the “language” and had tried the new method.

Second, it rapidly became apparent that failure was part of the learning process. So, rather than condemning those moments when things went wrong, they became seen as “learning moments” – ways to advance the body of knowledge.

Third, the manual, which is readily and freely available on-line, has some great charts that give recommended practice in most conditions likely to prevail during winter weather. In short, there’s a good, clear, how-to guide easily available.
More Critical Factors

- Lead States Team focused on communication and convincing skeptics
- Champions were out “preaching the good news”
- Key team members were not technical folk
- Great transition at the end of Lead States to SICOP

The Lead States team figured out their job wasn’t to improve the technology but to communicate it. Thus, some of the key folk on the team were non-technical people. In addition, some of those who cut their teeth on the technology in T&E 28 were out there as champions, preaching the good news to anyone who would listen. This cost some travel money, but was critical in creating a sense in the snow and ice control community that this was the next best thing.

Finally, when Lead States hit the sunset, the SICOP program was there to take over. Dissemination costs money, and SICOP provided (via the states) the conduit for that money to keep flowing.
The SICOP Role

- Continue to push the technology
- This costs money!
- Web site and reports and a focus on real world experience, not research
- Some critical results worth looking at briefly
- Stuff still ongoing

SICOP has the task of demonstrating the effectiveness of the new technology (and other new tech) rather than creating new research. It is a pooled fund study that requests about $2,000 from each state every two or three years for ongoing expenses, and also solicits additional funds for specific projects (such as the soon to be released computer based training in RWIS and anti-icing).

SICOP communicates very effectively via their web site (www.sicop.net) and the snow and ice list-serve.
The SICOP web site has a number of documents that show how well the new technology works. These case studies are well documented and provide compelling results.
What was learned in Idaho?

- US 12
- 83% reduction in accidents
- 83% reduction in abrasive usage
- 62% reduction in labor hours
- “If you don’t want those sort of savings, you probably shouldn’t be here!”

Probably the best case study was done in Idaho on US 12. They had real problems with black ice and frost on that highway and switching over to anti-icing lead to huge savings and an immense reduction in accidents. Such data are strongly compelling!
Equipment Resources

- Some excellent stuff available
- Iowa DOT
  - [http://www.dot.state.ia.us/maintenance/manuals/equipment/index.htm](http://www.dot.state.ia.us/maintenance/manuals/equipment/index.htm)
- SICOP web site has some equipment specs too
  - [http://www.sicop.net/documents.htm](http://www.sicop.net/documents.htm)

Another challenge for folk who wish to switch to anti-icing is figuring out what equipment is needed and how to specify or build it. There is a great report by the Iowa DOT with this info, and various other spec type documents at the SICOP web site.
Communication issues

- The web site is clearly critical but is not enough nor even the most important
- The snow and ice list-serve has proved essential
  - 600+ subscribers
  - Get a reply from folks who’ve faced your issue
  - Easy to subscribe
  - http://www.sicop.net/snow_and_ice_list-serve.htm

There is often a sense that a web site alone is good enough, but that’s not true. The web site is effective, but is made more effective by the list-serve which allows practitioners to exchange their experiences very rapidly, and more importantly, to get answers very rapidly too.
Conclusions

- A lengthy multi-stage effort
- Champions every step of the way
- Funding is a critical need
- Well documented experience is critical
- Easily available resources also a key component
Unsuccessful Implementation Efforts Lessons Learned

Richard L. McReynolds
Kansas DOT
Research Projects

- Concrete Bridge Construction Problems Expert System (CONBRID); 1991-94
- Pavement Performance Models: An Artificial Neural Network Approach; 1996-99
- Computerized Sign Inventory Feasibility Study (CSIS); 1993-94
CONBRID

- Developed by KSU grad student with KDOT (Bridge and Research) staff inputs.
- Demonstration and distribution to DME’s (with SHRP HYWCON) - Jan 1996.
- Published articles about software and use.
- Survey made Sept. 2000 showed minimal use of either CONBRID or HWYCON.
CONBRID Lessons Learned

- Involve users in project selection and software development process. Project might not have been approved if users needs had been better identified.
- Strong champion promoting benefits of product might have stimulated more interest.
- For a new product to be accepted, potential users must perceive a need to improve or fix something as well as agree that the new product meets that need.
POS Pavement Performance Models

- Neural network models to replace original models were developed later than expected due to replacement of PI.
- Although models were functional, they were not implemented because:
  - The extensive data set used for calibration became obsolete when Superpave and QA/QC specs were implemented.
  - Alternative models were developed.
POS Lessons Learned

- Investigate to determine if expected research product will still be needed when available before approving a project.
- Timeliness is important. The delays due to PI turnover and split project (2 yrs.) allowed Superpave implementation to begin and alternate methods solutions to be explored.
CSIS

- Research product was a feasibility and needs study that became part of the RFP for a software product contract.
- An elaborate software system with extensive data fields that was compatible with KDOT videolog and GIS systems was developed.
- Software was distributed to six Districts and training provided.
- Specific directions on use were provided.
CSIS

- Two district representatives served on software development team.
- Top management strongly supported development and implementation so a top down approach was used to implement.
- District and Traffic Engineering staff had varying degrees of interest and support.
- Current status-implemented in 3 of 6 districts.
CSIS Lessons Learned

■ Representatives from each district on development team may have helped with implementation later.

■ Top down implementation can work but top management replacements must provide the same level of support.

■ Strong champions to promote new systems are needed. 3 different PM’s & retirement of STE & Ops Dir. affected continuity of support.
CSIS Lessons Learned

- Flexibility is important. All or none approach to data collection probably resulted in less acceptance. Software “ownership” at HQ or District level was also an issue.
- Related programs must be coordinated and preferably merged to get staff acceptance. A signing set aside program (to replace old signs not included in programmed construction projects) was ongoing concurrent with CSIS implementation. It “required” a different data set than CSIS.
Seal coat - A thin treatment consisting of asphalt material, usually with cover aggregate, applied to a surface course. The term includes but is not limited to sand-seal, chip seal, slurry seal, contrast seal, fog seal, and blot seal.
What do you mean successful?

Successful Seal Coat:
  Restoring friction
  Seal cracks and other distress

Other Seal Coat measures of success
  Number of complaint calls from drivers
  Cost effective installation

But how is the success of implementation determined in general?
What is a Success?

- **Change with measures:** The research resulted in change with tangible benefits that are measured.

- **Change without measures:** The research resulted in change with tangible benefits that are not measured.

- **Knowledge gained:** The research provided knowledge that is being used, but no tangible benefits have been identified or measured.

- **Results Not Useable:** The research produced results that were questionable or not usable.

From Mn/DOT close-out memo,
after implementation done,
check-off,
GPA
Examples of Benefits we Measure

- Income from royalties
- Reduced resources to complete the job
- Reduce the impact on the environment
- Lower cost (longer life?) of infrastructure
- Economic impact of transportation users
- Safety

Short List!

Auto-scope, hundreds of thousand of $ in UM account – faculty chair

Salt tolerant short stature native grasses

Control Leafy Spurge with _____ beetles, not with maint crew or chemicals, recycled shingles

Segmental concrete block retaining walls, Effects of distortional fatigue on I-beams

B/C SLR

Tramlab & TMC, Crash testing plus workshops

IR sensors, more salt where needed, less where not (Safety & Environment)
Vision—provide the knowledge to do seal coats right.
The correct amount of binder—it has risen to the top of the agg. chips
  they last
  cost effective
  reduce complaints

After the research
  Manual
  Training
  Evaluation
Doing Implementation Right!

- Process
- Product
- People
- Evaluate
Right People

- Involve Experts
- Define Audience
- Partnerships

The people are the bigger part of implementation than the technology. Technology does not sell itself.

PI not always the expert, maintenance crew chief

Who can benefit? What do they need to learn? How will they learn?

Public, Private, Academic
Right Product

- Repeat Successes
- Keep it Simple
- How to
- Be Flexible

Repeat Successes
  Field Handbook
  Durable

Keep it Simple
  checklist
diagrams
photos

How to
  step by step

Be Flexible
  changed from field to field/design handbook
  info incorporated into related training
Right Process

- Pick the Right Project
- Plan Implementation
- Patience
- Continuous Improvement

Pick the Right Project
  - widespread
  - costly
  - public relations issues
  - timing

Plan Implementation
  - Guide, outline, discussion points

Patience
  - criteria for selecting/programming seal coat projects 1969-1974
  - Design and construction of seal coats, 1991
  - Seal Coat Procedures and problems Summary, Video 1992-93
  - Seal Coat Handbook 1999

Continuous Improvement
  - Seal coating field evaluations 2000
Evaluate the Impact
(Seal Coat Handbook Survey)

- Use
  - Training 65%
  - On the Job 76%
  - On line 3%
- Results
  - Changes 34%
  - Savings 13%

307 surveys sent out, 120 responded (mostly Minnesota cities and counties)

Was any Monetary or Material savings realized as a result of using this handbook? If yes, what was the estimated amount?

$50K/yr, $10K/yr, $300 per mile, 20-25%

tangible benefits that are measured

Not B/C for entire research program, but easier to explain and more believable.
The End/Questions

Acknowledge Mn/DOT Lab, SRF Consulting, University of Minnesota, and my staff.
Focus Group Summaries
Focus Group 1

New Techniques and Methods for Sharing Preliminary Research Findings

Facilitator: Pat Lees
Participants:
1. Jeff Smith
2. Mike Sanders
3. Billy Connor
4. Tie He
5. Moy Biswas
6. Randy Battey
7. Bill Evans
8. Katie Turnbull
9. Wilf Nixon
10. Peter S.
11. Ray Purvis

Step 1 – What is the problem?
• Starting too soon
• Risk avoidance
• Liability
• People don’t read reports
• Paperwork – going thru the steps
• Writing reports takes time from research
• Reports don’t fit the target audience
• Safety issues
• Needs resources
• Not starting soon enough with customer involvement
• Can’t find out about on-going research in neighboring states
• Politics (large and small “P”); also policy issue
• User does not know they have a problem
• Not using a spectrum of techniques to reach user

Step 2 – How would we like things to look?
• Communicate through all forms of media
• Effectively listen to customers
• Repeat customers
• Go seek input
• Users are involved and engaged throughout the process
• Those who have the need are able to find an answer to their problem easily
• Involvement across jurisdictions
• Customer (user) takes ownership of new research
• Promote a research culture that everyone does and uses research
• Early benefits are realized - help identify dead ends
• Training is supplied for innovative approaches (learning)
- Reduced repercussions for failure

**Step 3 – Why haven’t we reached this goal?**

We used the FISHBONE diagram to analyze this problem:

**Target:** users formulate research topics and are engaged throughout the process

- **Policies**
  - need change in policy for research
  - contracts don’t stress implementation
  - funding
  - not in anyone’s job description
  - not invented here

- **People**
  - champion retires
  - not invented here
  - user too busy to participate
  - no link to customer
  - lack of trust to deliver
  - researchers didn’t recognize value
  - no “WIIFM”
  - don’t perceive a problem

- **Procedure**
  - no meetings to keep people engaged
  - process hijacked by university
  - missing procedures
  - culture of change
  - wrong person/wrong level
  - don’t get asked
  - appropriate training
  - minimize number and length of meetings
  - not using a spectrum of techniques – redundancy
  - people don’t know they have a problem
  - results are not distributed
  - politics
  - has to be a perceived benefit to distributor/receiver

- **Equipment**
  - no testing equipment
  - restricted use of web
  - software licensing
Step 4 – What are the choices for getting there?

- Kick-off meetings/progress meetings
- Get research ideas from focus groups
- Set aside some $$$ for “fringe” projects
- Set aside $$$ for “quick response” programs
- Stop in and talk
- Personal contact “I hear you have a problem…”
- $$ devoted to technical assistance
- Develop personal relationships
- Recognition and reward – figure out what works
- KISS
- Change procedure – require team decisions
- Keep idea owner engages
- Require implementation (define what that means) and then evaluate
- Requirement for interim findings
- Manage how you present info to the user – how much there is to read
- Require tech expert and supervisors approval to participate
- Link to business plan
- University responds to agency problem statement
- Problem formulation workshop
- Research ideas require “volunteer” chair
- Ask for ideas from non-traditional folks

Step 5 – Which are the most likely choices?

- Users help formulate problems and stay engaged
  - Problem identification workshop, casting the net widely
  - Use of focus group to “bubble ideas up”
  - Shut up and listen
- Customers take ownership
  - Require implementation plans for each research proposals

Step 6 – How will we know if it works?

- Training increasing
- WIIFM is answered
- Users help formulate problems and stay engaged *****
- Reduce repercussions of failure
- People who need to know wouldn’t call Jeff (what’s going on?)
- More requests for help
- Earlier benefits are realized
- Involvement across jurisdiction
- Help ID dead ends
- More $$ for research = rewards
- Promote research culture
- Customers take ownership *****
Focus Group 2

Efficient Dissemination of Published Materials

Facilitator: Kathy Harrington-Hughes

Participants:
1. James Sime
2. Ed Harrigan
3. Debra Hoffmann
4. Chris Benda
5. Mark Dunn
6. Lisa Pogue
7. Sreenivas Alampalli
8. Preston Elliott
9. Tony Giancola
10. Ilclefonso Burgos
11. Nelda Bravo
12. Barbara Post
13. Mark Norman
14. Elaine King

Step 1-What is the problem?
- No standards for formats (electronic, print), cataloging, or archiving being used. What is needed?
- Lack of a dissemination plan (Who should receive copies? What should agencies do with materials received?)
- Research reports don’t meet needs of practitioners
  - too much detail
  - succinct summaries needed (who should care about the research, what are potential benefits, how do you implement research results, etc.)
  - practitioners needs and interests are different from that of researchers

Step 2-How would we like things to look?
- Promise of National Transportation Library realized
- Information (research results) should be readily available. Want it, get it—fast, cheap, easy, transparent.
- Research dissemination should be planned, funded, and scheduled, just like any successful project

Step 3-Why haven’t we achieved this goal?
- Lack of resources (time, money, people)
- Lack of standards/technology issues
- Lack of priority attention
- No sense of ownership (no one is responsible)
- Decentralized industry

**Step 4-What are the choices for getting there?**
- Enlist congressional support.
- Make information dissemination a private-sector operation (fee based).
- Develop and implement a strategy to coordinate a network of libraries (to include NTL).
- Review and revise distribution lists for research reports—ensure DOT and university libraries are receiving them.
- Develop a strategic plan (who, how, format, funding, identify champion, etc.).
- Develop consensus-based standards for disseminating, publicizing, and archiving information.
- Identify the needs of all users, at all levels.
- Integrate users throughout the development/dissemination process.
- Educate transportation leaders about the importance of transportation research and implementation (savings/benefits); get their buy-in.
- Evaluate existing non-transportation models for research dissemination, paying particular attention to long-term funding and support issues.
- Develop a college course in research implementation (for PhDs).
- Educate transportation professionals about the important role of information dissemination.
- Develop/produce a journal of research implementation (written by and for researchers).
- Make use of case studies.
- Emphasize the importance of documentation (liability issues).
- Build information dissemination plans into research projects.
- Catalog reports.
- Provide all documents electronically (capture all previously published reports), but ensure paper copies are always available (central depository).
- Publish summaries of all research reports, with links to electronic documents for full report/more information.
- Fund the National Transportation Library.
- Meet needs for archiving information as well as disseminating information.
- Hire an “information scout”—to track research and implementation efforts.

**Step 5-Which are the most likely choices?**
- Develop and implement a strategy to coordinate a network of libraries with the National Transportation Library.
  - Fund the NTL
  - Create an organization of libraries, with common goals
- Develop a long term strategy involving stakeholders/knowledge managers.
  - Bring stakeholders together at a forum/summit to discuss
    - Standards
    - Formats
    - Funding
    - audiences
    - champions
• ownership
  o Get buy-in for the work plan/agree on expectations.
  o Develop an implementation plan.
  o Disseminate information about the strategy.
  o Keep stakeholders involved throughout.
  o Evaluate existing models (public-private partnerships, etc.).
  o Use case studies.
  o Measure user satisfaction.
• Educate transportation leaders and congress.
• Review and revise distribution lists for reports (paper and electronic versions); share information with transportation agencies and update lists regularly.
• Catalog reports (TRIS).
• Publish summaries of all research reports, with links to e-docs for full text and more information.

**Step 6-How will we know if this works?**
• The National Transportation Library is funded.
• A network of libraries with common goals is organized and funded, and is linked to information providers.
• A stakeholders forum is held, with appropriate follow-up
  o Keep stakeholders involved throughout process
  o Work plan assigned and scheduled
• Research results and implementation plans are readily information (want it, get it). Fast, easy, cheap.
• A survey of users shows high levels of satisfaction.
Focus Group 3

Developing Appropriate Materials for the Implementation of Research Results

Facilitator: Susan Sillick

Participants:
1. Georgene Geary
2. Monique Evans
3. Matt Mueller
4. Dick McReynolds
5. Linda Howe-Steegis
6. SR Kulkarni
7. Marcie Matthews
8. Casey Abe
9. Andrew Griffith
10. Clayton Schumaker
11. Frank Lisle

Step 1 - What is the problem?
- Reports are the typical products of research projects. Yet, other products are usually required to bridge the gap between research project and implementation. Research doesn’t bridge the gap. Systematic processes are not in place for this to occur. Research doesn’t always consider the user. This is especially important for entities that conduct research, but do not implement the results.
- Finding implementable results from others’ research is difficult. Research results are not readily available to potential users. Lack of promotion of current systems, as well as acknowledgement that many users want to “call someone” (an expert). Prevent “reinventing the wheel”.
- Lack of communication
- Implementation can be hard to define. What is implementation? Used once in one area across the state? Implementation can mean many things to many people.
- Lack of tracking and measurement. Don’t know what we have implemented and how successful we have been.

Step 2 - How would we like things to look?
- 100% of projects consider implementation from the beginning, with a panel of users for project oversight. Involve all who may be impacted by the research from the beginning.
- Written implementation plan for 100% projects before research is started, including products necessary for implementation and responsibilities. This document must be as detailed as possible. It must be a living document and must be changed as appropriate throughout the project and implementation.
- 100% of research proposals address implementation based on implementation plan.
- 100% progress/final reports address implementation based on implementation plan. Progress reports must be compiled on a regular basis.
• 100% of research implemented, with an implementation plan, policy, and performance measures.
• Every research project results in implementable results, measurable results.
• Every project results in products necessary for successful implementation.
• All research results and their potential implementation are communicated to all potential users via:
  o TRIS.
  o RIP.
  o Executive Summary (1-4 page) for 100% of projects, including what we did, what we found, what we recommend, what are the benefits, and how are we going to implement. (Target decision makers and no geek speak). The breakout group wants this for every research project.
  o Etc.
• Institutionalized systematic processes to ensure implementation.
• Evaluate research/implementation programs on a regular basis.
• Implementation is seamless from research to operations.
• Presence of a mindset toward implementation at all levels.
• Awareness among user community of benefits of implementing research. Use of innovation/technology is the key to success. Innovation should be a job requirement.
• Implementation item in budget.
• Performance measures toolbox is available.
• Toolbox of possible products is available.
• Toolbox of technology transfer good practices is available.
• Syntheses of practice for new technologies/products/results are available.
• The best research is the research that provides the answer when the question is asked.

Step 3-Why haven’t we achieved this goal?
• Lack of communication among researchers, research management, and end-users
• Research is removed from end-users, researchers typically are not the end-users. This creates a disconnect if users are not involved from the beginning of each project.
  Consider:
  o What are the goals/objectives?
  o How will the information be used?
  o How will it best be implemented?
  o What products are needed for implementation or to facilitate implementation?
• Implementation is often an afterthought. Don’t typically plan for implementation at the beginning of each project.
• Lack of support.
• Lack of resources (Time, staff, funding, expertise, etc).
• Resistance to change.
• Haven’t made implementation a priority. It is not required; not a part of the job description. Strategic plan doesn’t require use/evaluation of new technology. It is not a part of the agency culture.
• Implementation is not a part of culture-complicates the process
• Implementation may be difficult to measure. Don’t measure benefits.
• Discontinuity (people leave-turnover)
• Poorly defined problems and research projects.
• Implementation is not seriously considered in research proposal.
• Lack of systematic processes to foster implementation.

Step 4—What are the choices for getting there?
• Involve end-users, not just any old end-users, but the right end-users in research panels and project management. Involve the users who are passionate about the research and implementing the results.
• Management at all levels plays a role in the research process (selection of projects, selection of champions, participation in project oversight, etc).
• Consider implementation from beginning and throughout project.
  o Where do we want to be and how will we get there? What products are needed?
• Develop implementation plan for each project and implementation policy.
• Research may need to fund implementation, including products necessary for implementation, or at least provide the spark for implementation. Whatever the source of funding, make sure it is adequate to ensure implementation.
• Phase projects as appropriate: research, implementation, etc.
• Market research results and potential implementation.
• Need a vision.
• Produce a synthesis of practice for new technologies/products/results.
• Work closer with researchers to match the expectations of the users, researchers, and project managers.
  o Increase communication.
  o Use contractual incentives/disincentives.
  o Use recognition/awards – Also for those who are involved and implement the results of research.
• Develop a communication plan for each project that maximizes chances of implementation.
• Host an implementation workshop at user agencies.
• Add to strategic plan; what gets measured gets done.
• Use performance measures; develop a toolbox of good performance measure practices.
• Develop a toolbox of implementation products – NCHRP.
• Develop a toolbox of good technology transfer practices.
• Make implementation a priority—devote staff.
• Institutionalize systematic processes to facilitate implementation.
• Evaluate research/implementation programs on a regular basis.

Step 5—What are the most likely choices?
• Develop an implementation policy; identify responsible parties (in general).
• Involve passionate end users in decision-making for each project. Also need multiple levels of support for each project.
• When developing project scope, develop an implementation plan for each project.
  o Define implementation and success.
  o Determine necessary products.
  o Determine responsibilities.
  o Determine the how, why, where, what, when, etc of implementation.
- Identify barriers and address as soon as possible.
- Be flexible; adjust as necessary.
- Make it as detailed as possible.
- Researcher addresses implementation in proposal, based on implementation plan.
- Researcher addresses implementation in all reports; reports must be compiled on a regular basis.
- Oversee research to ensure it stays on track with regard to implementation and implementation products.
- Evaluate implementation products- will they take us where we want to be?
- Evaluate implementation through performance measures.
- Evaluate research/implementation programs on a regular basis.
- Develop a toolbox of implementation products/strategies – NCHRP.
- Develop a toolbox of good technology transfer practices – NCHRP.
- Develop a toolbox of performance measures.
- All research results and their potential implementation are communicated to all potential users via:
  - TRIS.
  - RIP.
  - Executive Summary (1-4 page) for 100% of projects, including what we did, what we found, what we recommend, what are the benefits, and how are we going to implement. (Target decision makers and no geek speak). The breakout group wants this for every research project.
  - Produce a synthesis of practice for new technologies/products/results.
  - Etc.
- Increase communication at all levels among all participants (users, management, researchers, research management, etc).
- Institutionalize systematic processes to facilitate implementation.

**Step 6-How will we know if this works?**
- Performance measures and customer satisfaction surveys show improvement in implementation and customers/users are satisfied. Performance measures toolbox will be helpful. Strive for continuous improvement.
- Tracking of implementation.
- Others easily implement research results. Technology transfer toolbox will help.
- Widespread implementation of more research results. Technology transfer toolbox will help.
- Easily report summary findings and benefits to decision-makers. Upper management realizes the benefits of research and implementation of research results. Technology transfer toolbox will help.
- If we quit asking these questions, we know we are there.
Focus Group 4

Case Studies – Guidelines for Do’s and Don’ts

Facilitator: Debra Elston
Participants:
1) Rodger Rochelle
2) Joe Conway
3) Larry Klepner
4) Dave Johnson
5) Richard Long
6) Elizabeth Deakin
7) Stephen Maher
8) Bill Carr
9) Amy O’Leary
10) Russell Houston

Define “Case Study”
A “Case Study” is an in-depth review of a specific application in a specific location, specific individuals or cross section of institutions, policies and programs. This review may have pre-defined parameters. The purpose is to gain knowledge from basic and applied projects.

Why do a case study?
- Determine best practices
- Determine best processes
- Indicates performance measures-develops and validates
- Has research been implemented
- Determine institutional factors affecting implementation
- Promote more implementation
- Expand knowledge base
- Justify budget/program/job security
- Technology transfer
- Depth of understanding-drilling down
- Don’t have resources to do other evaluations
- Supplement more quantitative reporting of information to give a representation of variation of styles, without being statistically significant
- Identify additional research

How do you decide to do a Case Study?
- When there is a big problem
- When there is a big success or want more success
- There is good info available
- When you want to identify best practices
- When you want to identify state of the practice
- When the audience is not technical but interested in experiences
- To understand the statistical results-why did things turn out the way they did-drill down
• “7 keys to developing a Robust Research Program—How did/do they do it”
• Study outcomes
• Study practices
• To establish or expand the market

Step 1-What is the problem?
• Clearly define objective/why
• ID audience
• Resources (lack of)
• Willing participants
• Reliable data/information
• Funding unbiased/objective information
• Poor design/limited applicability
• How do you summarize effectively
• How do you communicate to others
• Trust creditable information/candid responses
• Concern with retribution
• Acceptance of failure/burden of responsibility

Step 2-How would we like things to look?
• Thorough
• Balanced
• Understandable
• Insightful
• Opposite of step 1
• Concise and visually appealing
• Accurate
• Knowledge obtained that you wouldn’t have gotten using another approach
• Use of anecdotal evidence/personal touch
• Return on investment/benefits
  o Qualitative and/or quantitative
  o Direct and indirect (developed relationship)
  o Long term versus short term (time)
  o At the right time (spatial)

Step 3-Why haven’t we achieved this goal?
• Priorities-lack of emphasis
• Don’t know what the case study is
• No unilateral agreement on what constitutes a premier case study
• Need to design protocol
• More resources
• Lack of inertia
• Don’t get to the right people
• Focus on only a single aspect-while characterizing the “case” as evaluative
• Preconceived notions-interpretation of results
• Primary responsibility for creation
Culture is not geared to produce “desirable reports”
  o not trained to perform one correctly
- Didn’t ask the right questions/lack of planning
- It’s no one’s job!
- Don’t deliver concise/appealing reports
- Wrong researcher
- Wasn’t a suitable project to study and was pushed forward
- Lack of integration between the researcher and the end user

Step 4-What are the choices for getting there?
- Provide education/training on how to do a proper case study
- Make it one of the desired outcomes of the research. PLAN FOR IT! (as appropriate)
- Expert staffing and assignment
- Provide resources
- Envision how you are going to present the results
- Collaboration and coordination
- Proper data collection techniques

Step 5-What are the probable choices?
- Develop training that would eliminate defined “problems and support desirable outcomes”
  o Specific processes
    ▪ Management and administration
    ▪ How to do a good case study
- Identify projects
- Check list for desired data
- Provide funding
- Collaboration and communication
- Tech transfer
- Find commercially available training/information
- Synthesis/primer
- Case study on case studies
- Peer Exchanges

Step 6-How will we know if this works?
- Questionnaires to customers
- Knowledge gained-immediate feedback from training course
- Have we accomplished what we expected?
- If the characteristics of an “effective” case study has been implemented
- Does it look like what we wanted it to look like
Focus Group 5

Identifying Barriers to Dissemination and Implementation

Facilitator: Laurie McGinnis
Participants:
1) Richard Woo
2) Alan Rawson
3) Daris Ormesher
4) Marci Kenney
5) Ian Friedland
6) Ahmad Ardani
7) Dan LaCombe
8) Nina McLawhorn
9) Joel Washington
10) Timothy McDowell
11) Leni Oman
12) Barbara Harder

Step 1-What is the problem?
- More pressure to describe implementation and document benefits
- Information is not timely enough
- Roles are not clear enough
- Information overload
- Need customer-focused, useful products
- People don’t like change
- Many formats are needed
- Gaps between researchers and users
- Are we doing the right research in the first place?
- Not specifically tied to organizational strategic goal/objectives
- Not the right reward system
- Target/reach the right person so implementation is institutionalized
- Dissemination and implementation are two different issues
- 508 complete issues-can’t get anything published
- Not ready for prime time research
- Data issue (not enough or unwilling to use)

Step 2-How would we like things to look?
- Adequate resources
- Well thought out, complete, periodically revisited implementation plans
- Partnerships that put the right team in place from the beginning
- Organizations will recognize that research is a critical asset, necessary to get the job done
- Effective marketing plans for research programs and projects, including benefits, that are presented in the terms the public can understand
- Utilize implementation committees to raise the visibility and focus on implementation
• Strong champions

Step 3-Why haven’t we achieved this goal?
• Under resourced
• Organizational cultural differences
• Changing leadership
• Hard to obtain upper management support
• Turf issues (not invented here)
• Success is personality dependent and should be program dependent
• Inadequate communication strategies
• Difficult to collect, share and utilize data
• Inconsistent interpretation of funding/match rules
• Limited in the way funds can be used (highway vs. transit)

Step 4-What are the choices for getting there?
• Timelines
  o Procurement issues
  o Best practices (toolkit) for procurement
  o Guidelines for streamlining process
• Champions
  o Empower
  o Find
• Marketing/Management
  o Training/education to be more effective
  o Tap into the right resources/disciplines to maximize effectiveness
• Utilize Transportation Research Community
  o Work together to convey importance of research
  o Overcome not invented here
  o Share/disseminate results
  o Best use of NCHRP, IDEA programs, pooled funds, sharing best practices
• Implementation incentives
  o Document/share ideas for incentives/rewards

Step 5-Which are the most likely choices?
• Marketing/Management
• Timelines
• Utilize Transportation Research Community

Step 6-How will we know if this works?
• Research is seen as an asset within organizations
• More resources are available for research, implementation and dissemination
• We have more work to do because we are seen as a resource