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November 2004

Optimizing the Dissemination and Implementation of Research Results

A Summary of Workshop and Midyear Meeting Activities

Workshop,
May 5, 2003

Joint Midyear Meeting Follow-Up,
September 10–11, 2003

TRANSPORTATION RESEARCH BOARD
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Optimizing the Dissemination and Implementation of Research Results

A Summary of Workshop and Midyear Meeting Activities

May 5, 2003, and September 10–11, 2003

Prepared by
Laurie G. McGinnis

Sponsored by

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Preface

This report is the result of a joint initiative by the TRB Committee on the Conduct of Research (COR) and the Committee on Technology Transfer (T^2) to investigate the issues and challenges associated with optimizing the dissemination and implementation of research results. This TRB E-Circular documents the problem exploration process and the potential priority actions from these efforts.

The process was initiated with a workshop in May 2003 that brought together over 60 transportation professionals from federal, state, city, and county agencies, the private sector, and research and educational academia to address the process of research dissemination and implementation. Then, the two sponsoring TRB committees met jointly for a midyear meeting in September 2003 for a follow-up discussion to expand on issues and to develop priority actions for the committees. In January 2004, each committee reviewed and commented on the attached report and the listed priority actions.

When asked to list priority actions, the following were among those mentioned most often by workshop participants and committee members:

1. Conduct a study to document best practices for research implementation, including a benchmarking effort.
2. Develop a guide to support implementation activities, including contract verbiage, implementation plans, reporting mechanisms, and training tools.
3. Develop a framework and strategies for engaging end-users in all steps of the research process. Strategies should promote a dissemination mindset within researchers, sponsors, users, and T^2 agents so that results will be communicated effectively to the various audiences.
4. Encourage the use of incentives to promote implementation activity, including financial, travel, recognition, and others. Promote the use of state planning and research funds to support these activities.

Promote the recognition and use of the National Transportation Library (NTL) as a key resource for research dissemination and implementation. Promote the NTL as the primary contact for national information management services and standards as well as the coordinator of the national transportation library and information provider network.

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Acknowledgments

This document was created with the assistance of several Conduct of Research Committee members: Bill Carr (former chair), Debra Elston, Dave Johnson, Richard Long, Dick McReynolds, Wilf Nixon, and Susan Sillick; and the Committee on Technology Transfer members: Cheri Marti (chair), Barbara Harder, Kathryn Harrington-Hughes, Pat Lees, and Lynn Murray.

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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 TRB 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 (ABG10) (COR) and the Committee on Technology Transfer (ABG30) (T^2)and was held at the National Academies' Keck Center in Washington, D.C. 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 COR Committee, 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 2 years, this 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 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 T^2 Committee in their co-sponsorship of the workshop and their contributions to the program. Mr. Carr also acknowledged the contribution of Dr. Wilfrid 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.

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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 Wilfrid Nixon, University of Iowa;
- Unsuccessful Implementation Efforts: Lessons Learned, by Richard L. McReynolds, Kansas Department of Transportation (DOT); and
- Seal Coat: An Example of Successful Implementation, by David M. 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 five 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 Dos and Don'ts; and
- 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 May 2003 workshop. During the September 2003 Joint Midyear Meeting of the COR Committee and the T^2 Committee, meeting participants again formed small working groups to further explore the above five topics and build upon the May workshop results to refine suggested actions and priorities. Follow-up work from the September midyear meeting is also included in the following summary.

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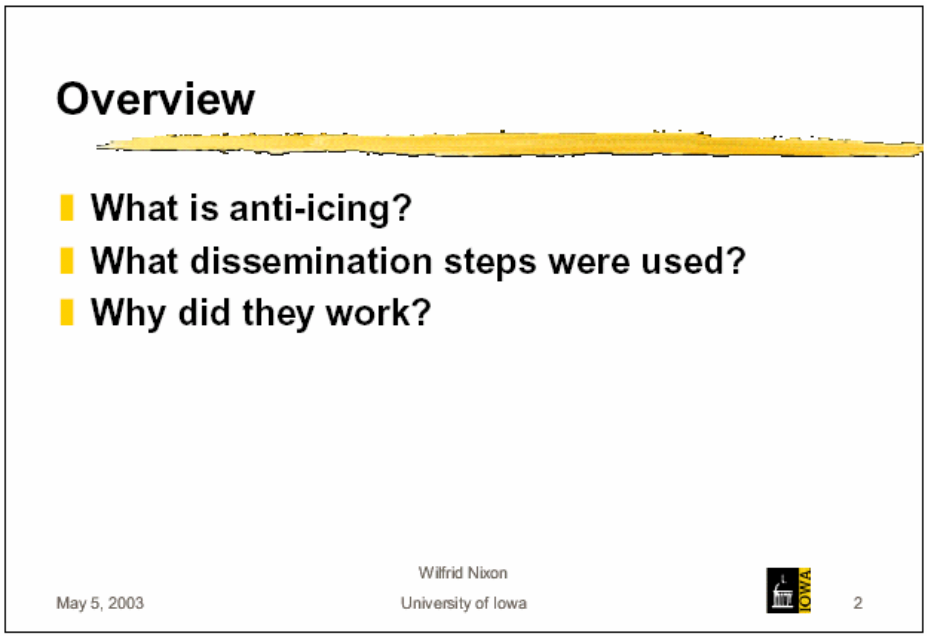
CASE STUDY PRESENTATIONS

Anti-Icing
A Dissemination Success

WILFRID NIXON
University of Iowa



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.

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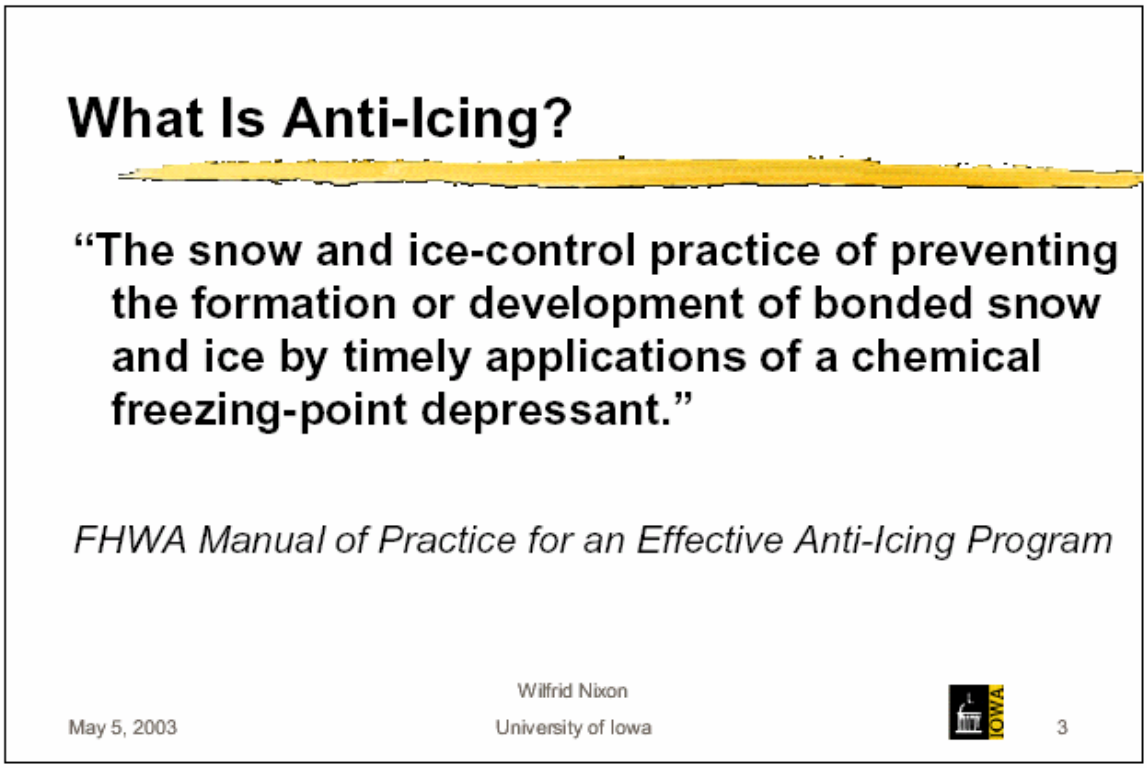

The FHWA Manual of Practice (available on the web at: http://www.fhwa.dot.gov/reports/mopeap/eapcov.htm) defines anti-icing as shown here. The definition is clear and short. This brings what is a fairly complex change in the way of doing business down into a one-sentence description. It' a busy sentence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

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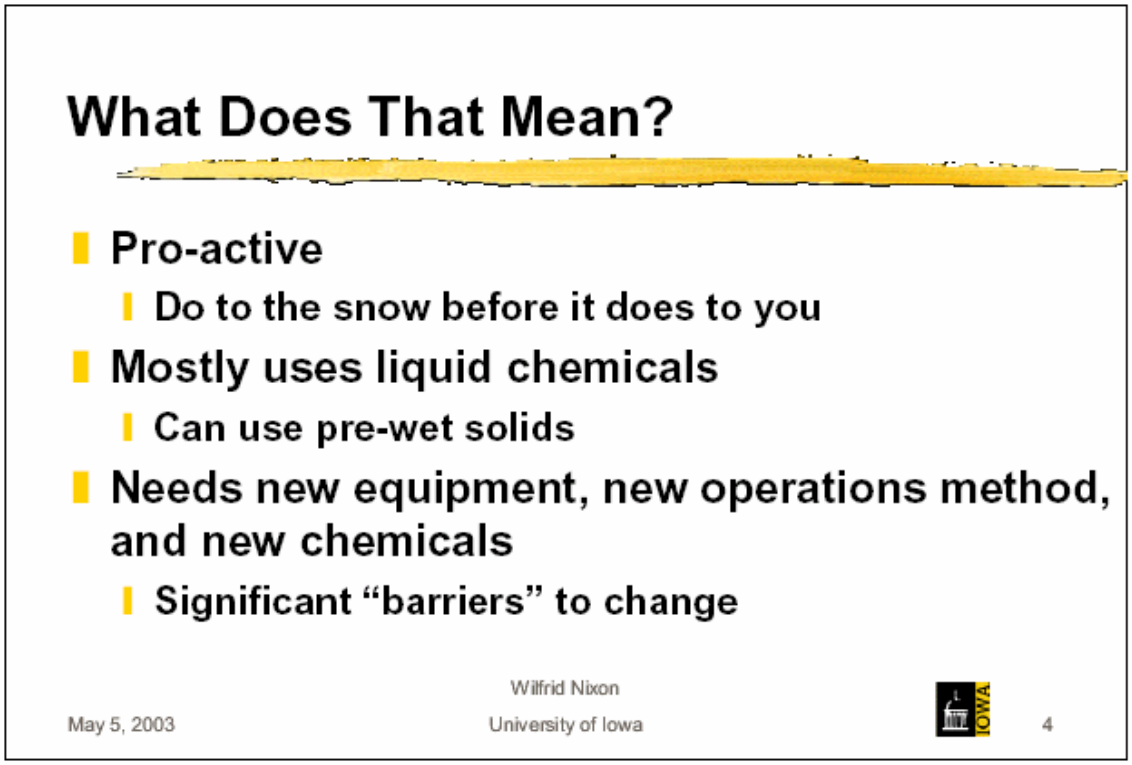

OK, let's expand on the definition. It changes the whole premise of winter maintenance from reactive to proactive. It requires using liquid rather than solid chemicals. And thus it needs new equipment, new chemicals, and a whole new way of doing business. In short, there's every reason why agencies would 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.

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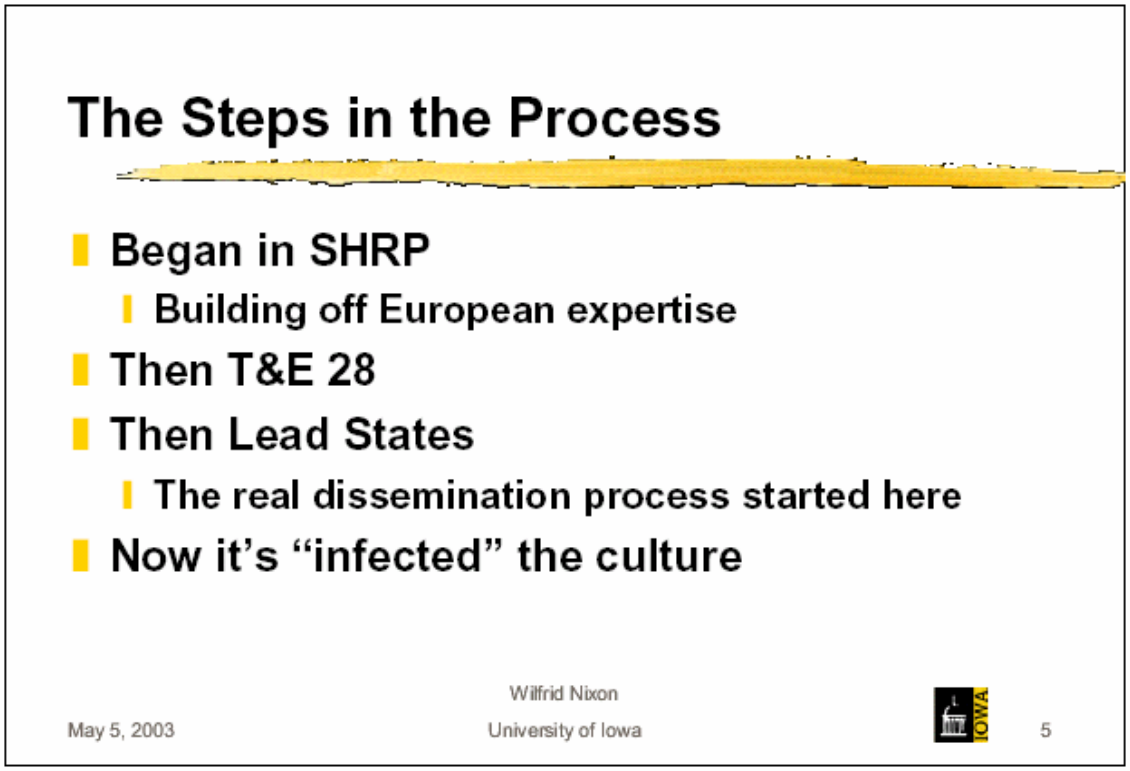

The process began some 15 years ago at the tail end of SHRP. It continued with T&E 28 and the lead states process. Now some states have anti-icing as their standard of practice. So, on one level it's a success. But lots of states still aren't anti-icing and most cities and counties aren't either. So in that regard it's not yet a complete success.

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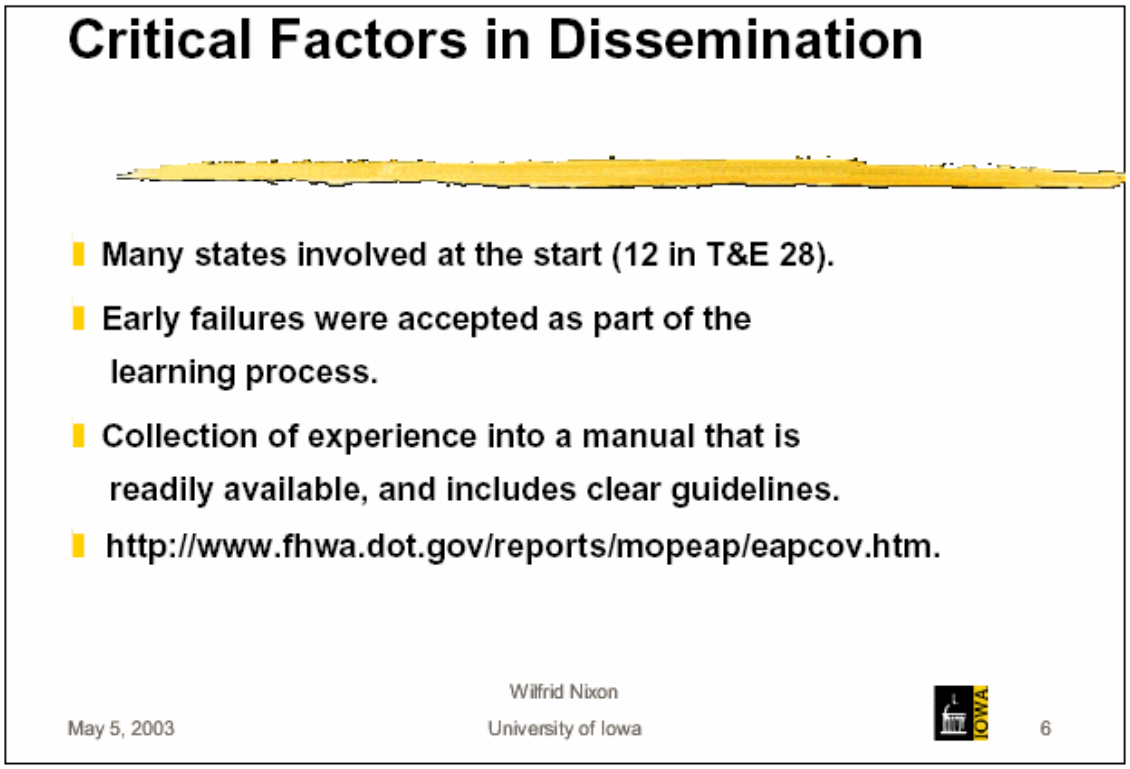

So, what's helped anti-icing spread so well? First, 12 states were involved from the start. This meant that in at least 12 states, there were folk who knew the "language" and had tried the new method.

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 momemnts"—ways to advance the body of knowledge.

Third, the manual, which is readily and freely available online, 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.

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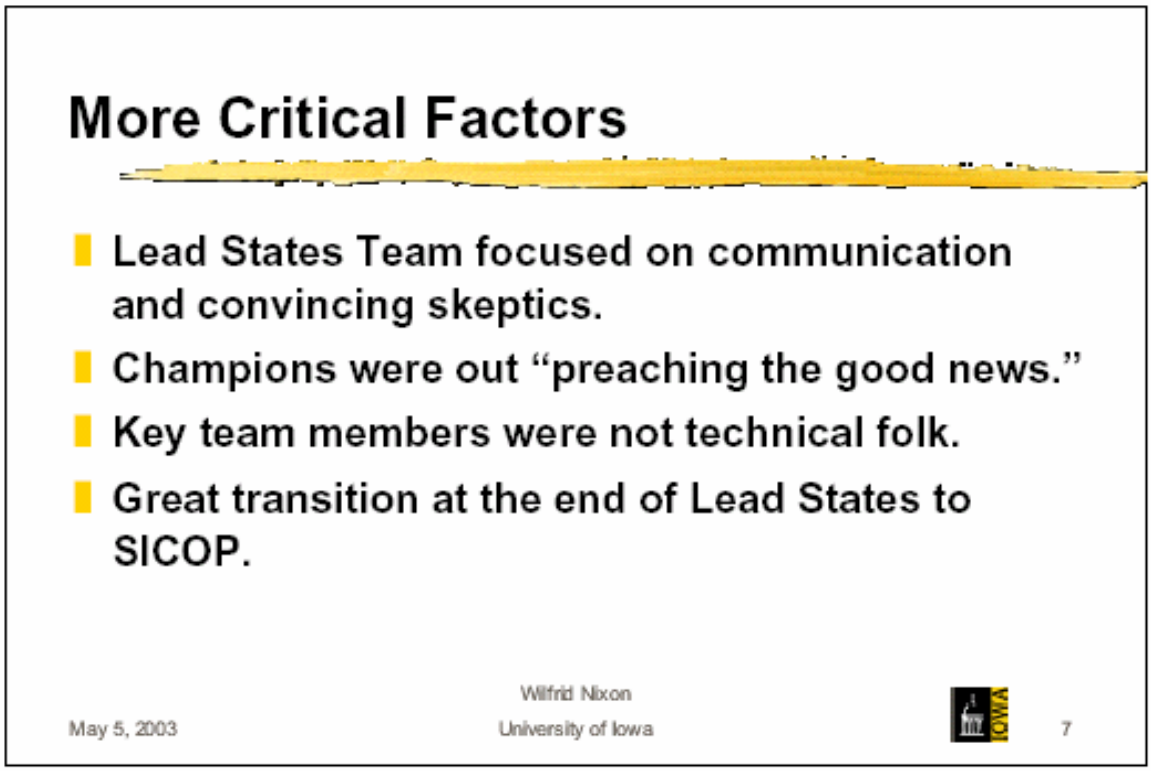

The lead states team figured out their job wasn't to improve the technology but to communicate it. Thus, some of the key folk on the team were nontechnical people. In addition, some of those who cut their teeth on the technology in T&E 28 were out there as champions, preaching the good news to anyone 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.

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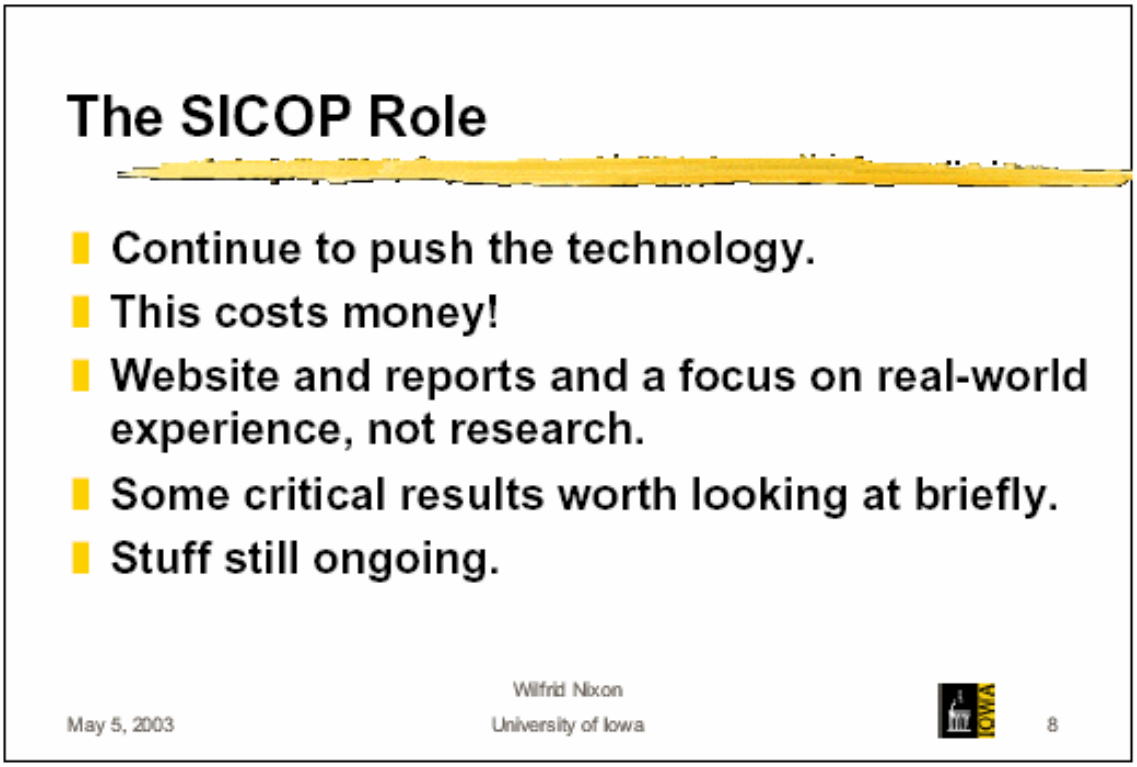

SICOP has the task of demonstrating the effectiveness of the new technology (and other new tech) rather than creating new research. It is a pooled fund study that requests about $2,000 from each state every 2 or 3 years for ongoing expenses, and also solicits additional funds for specific projects (such as the soon-to-be-released computer-based training in RWIS and anti-icing).

SICOP communicates very effectively via their website (www.sicop.net) and the snow and ice list-serve.

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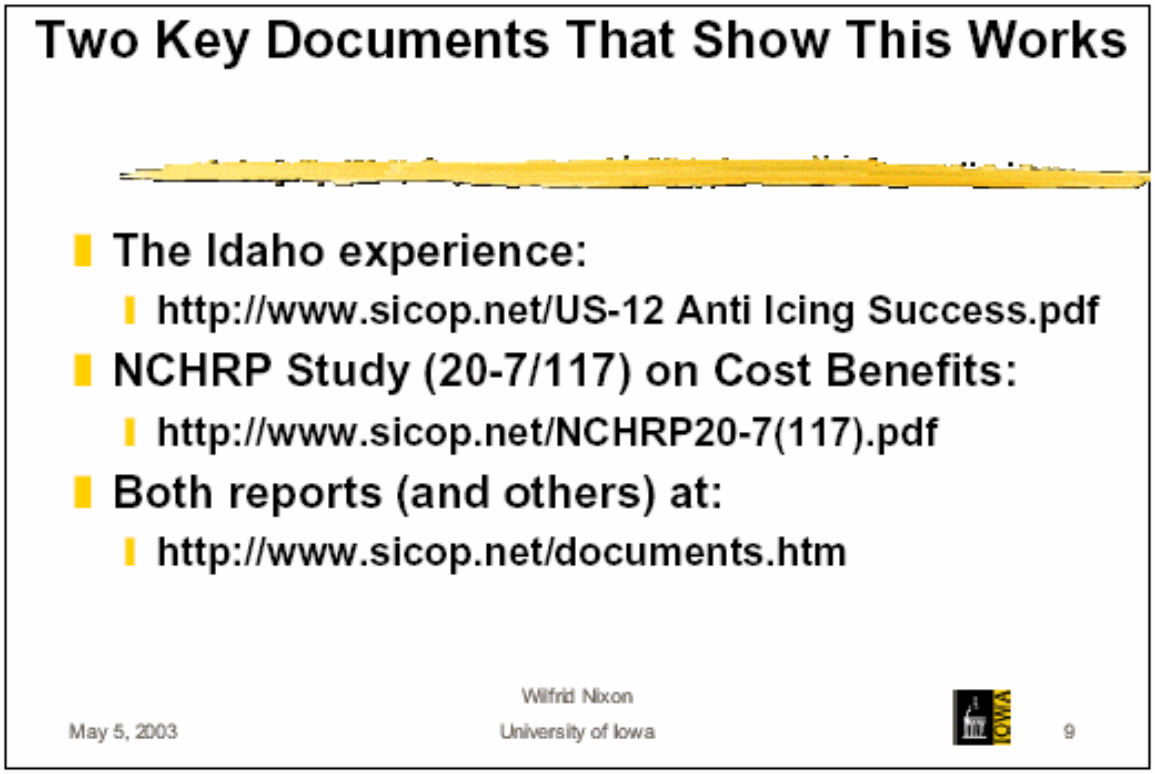

The SICOP website has a number of documents that show how well the new technology works. These case studies are well documented and provide compelling results.

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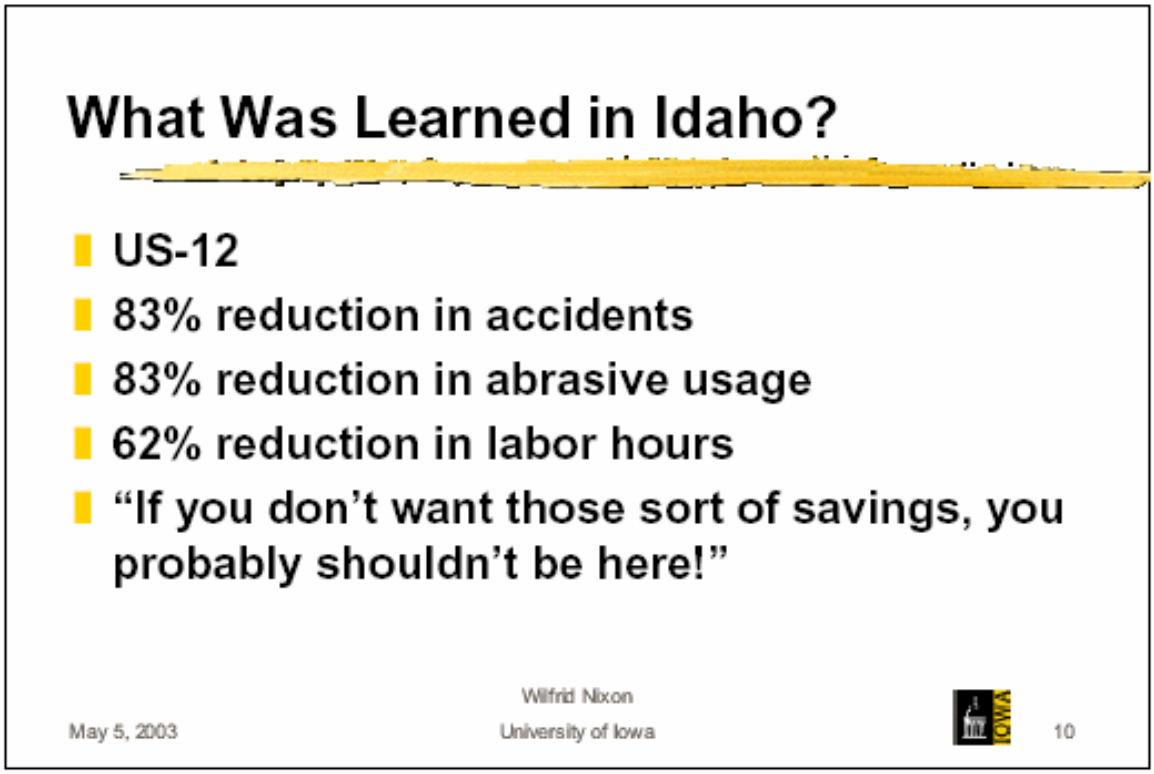

Probably the best case study was done in Idaho on US-12. They had real problems with black ice and frost on that highway and switching over to anti-icing lead to huge savings and an immense reduction in accidents. Such data are strongly compelling!

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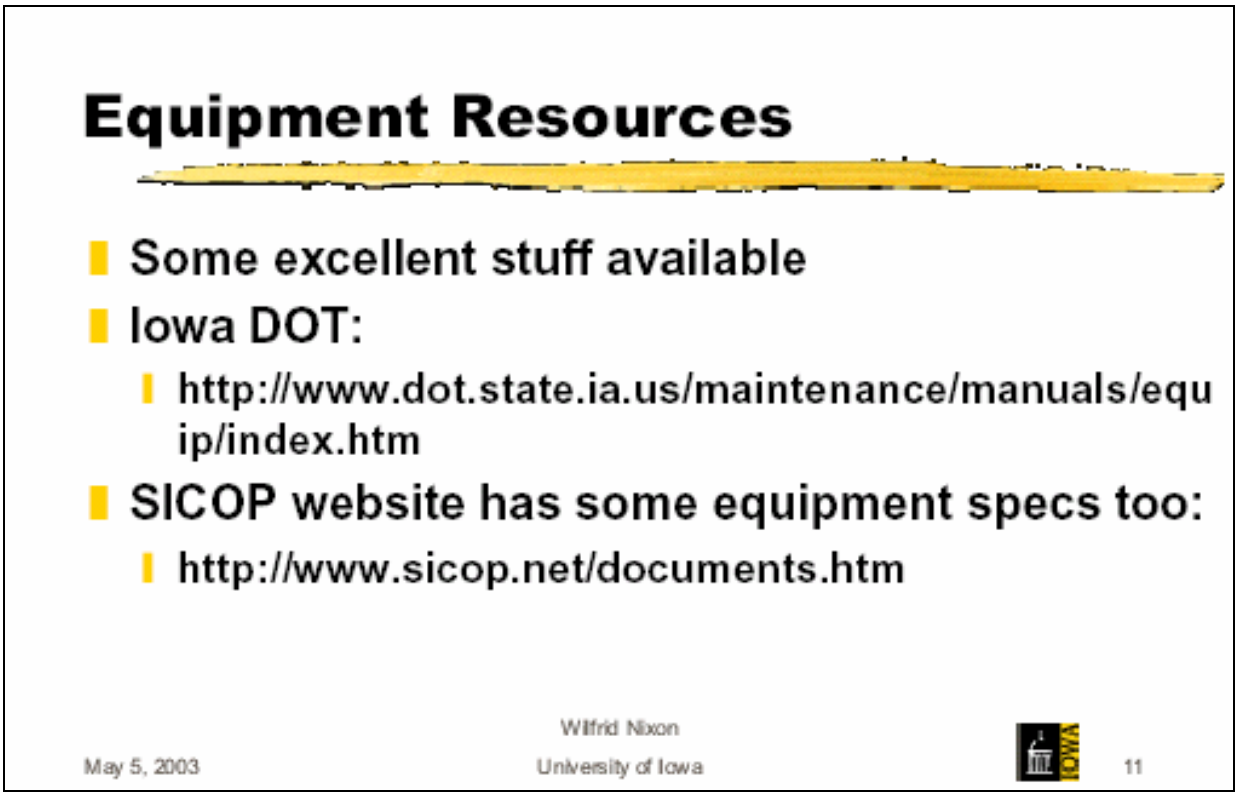

Another challenge for folk who wish to switch to anti-icing is figuring out what equipment is needed and how to specify or build it. There is a great report by the Iowa DOT with this info, and various other spec type documents at the SICOP website.

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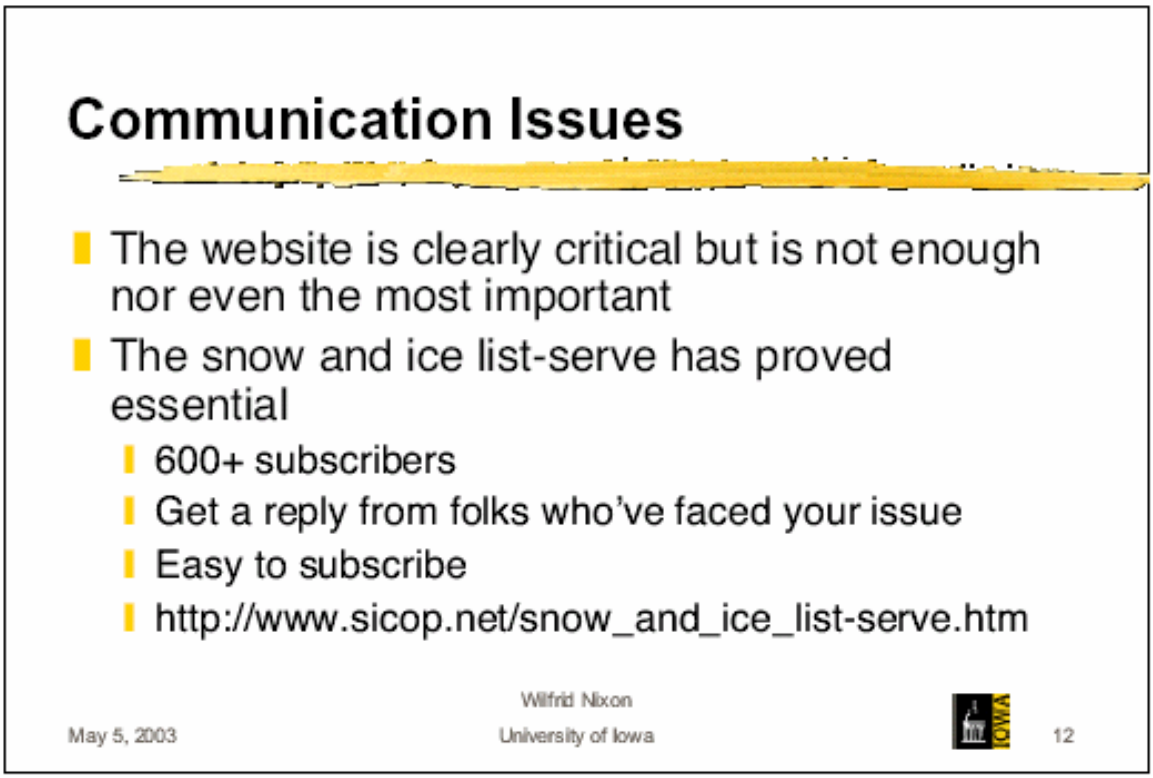

There is often a sense that a website alone is good enough, but that's not true. The website is effective, but is made more effective by the list-serve which allows practitioners to exchange their experiences very rapidly, and more importantly, to get answers very rapidly too.

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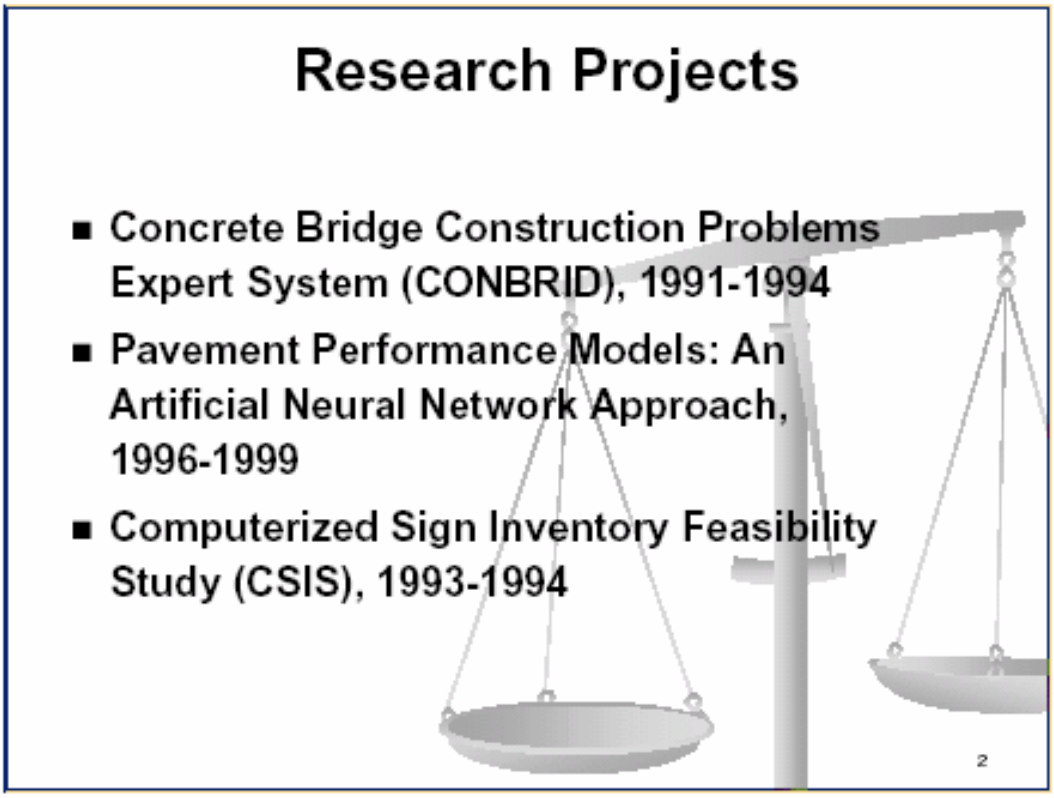
CASE STUDY PRESENTATIONS

Unsuccessful Implementation Efforts
Lessons Learned

RICHARD L. MCREYNOLDS
Kansas Department of Transportation



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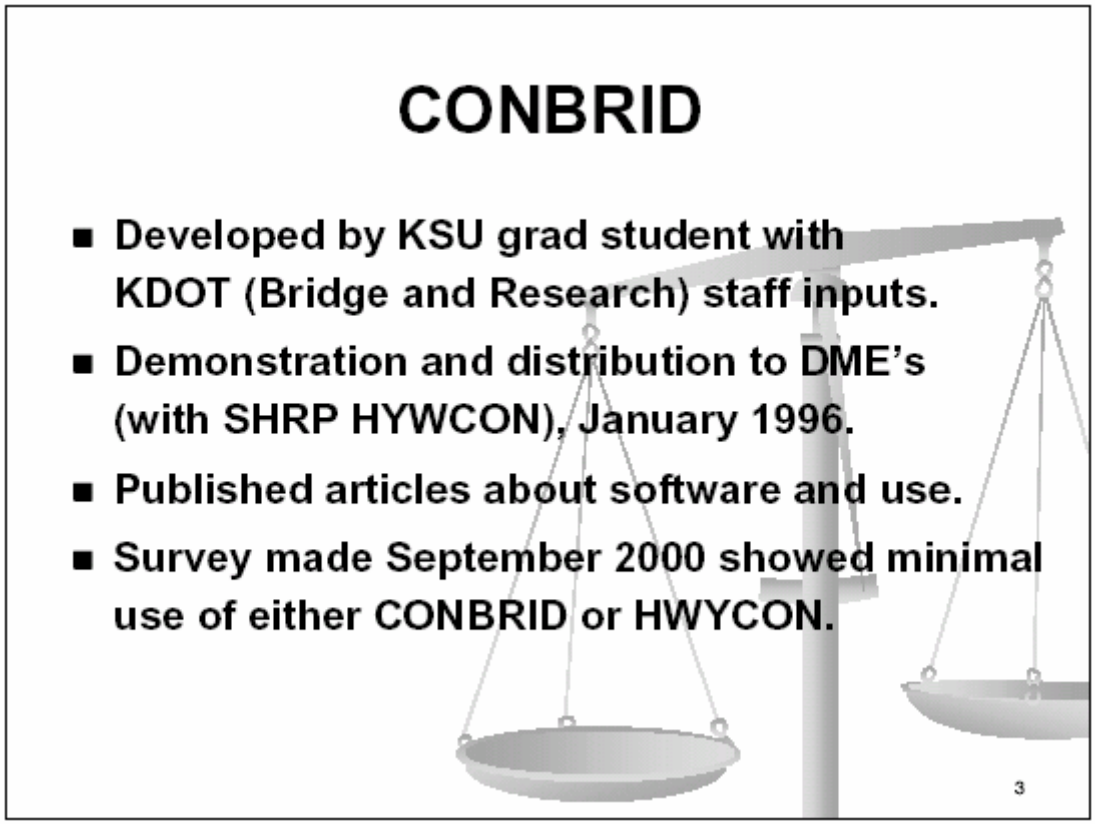

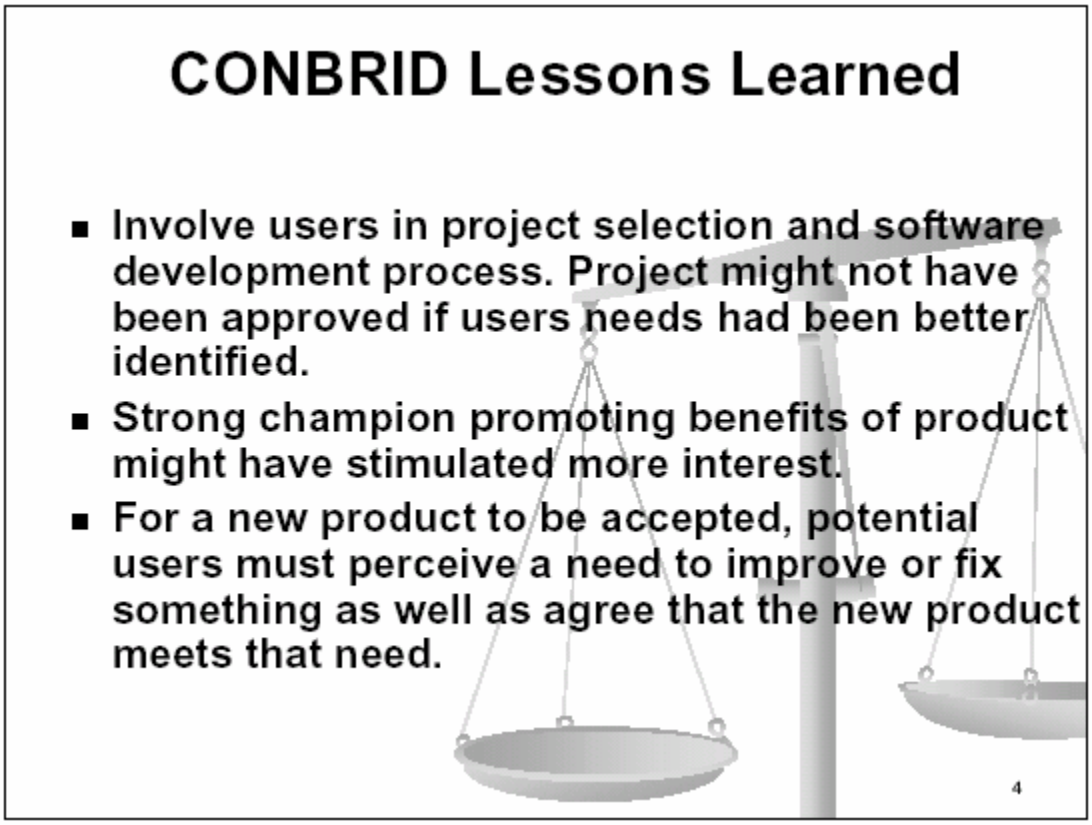

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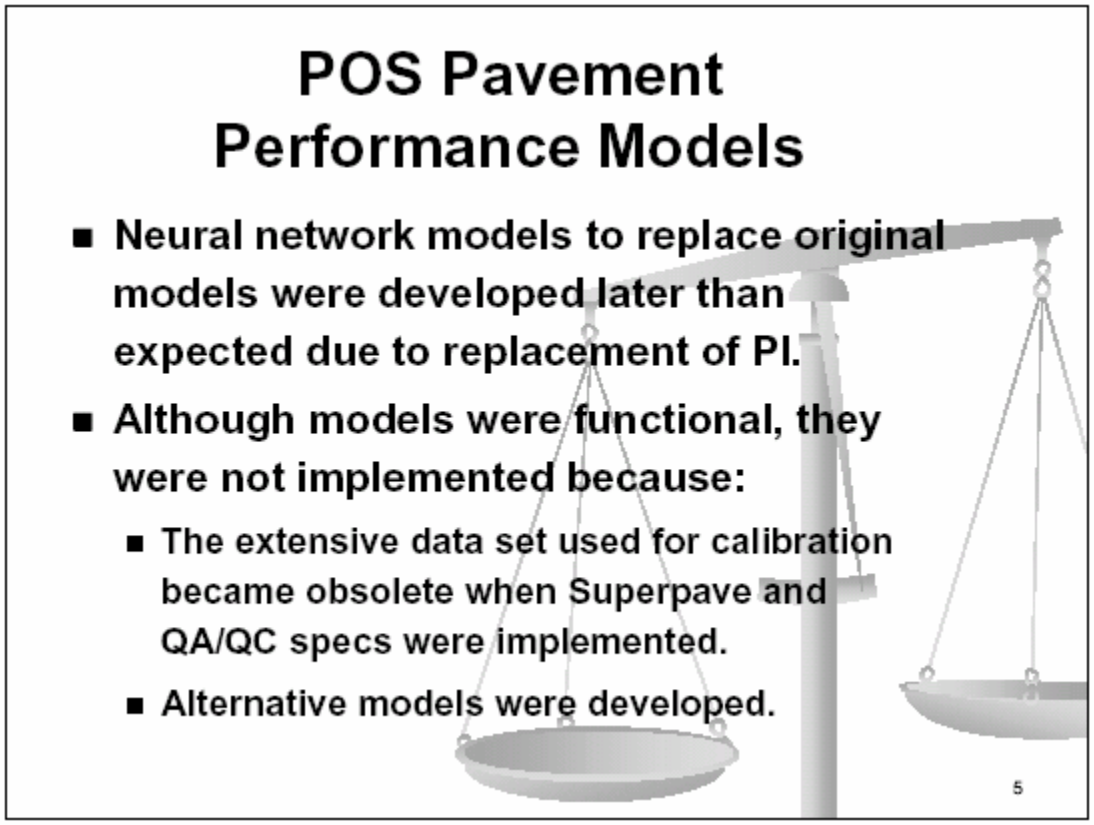

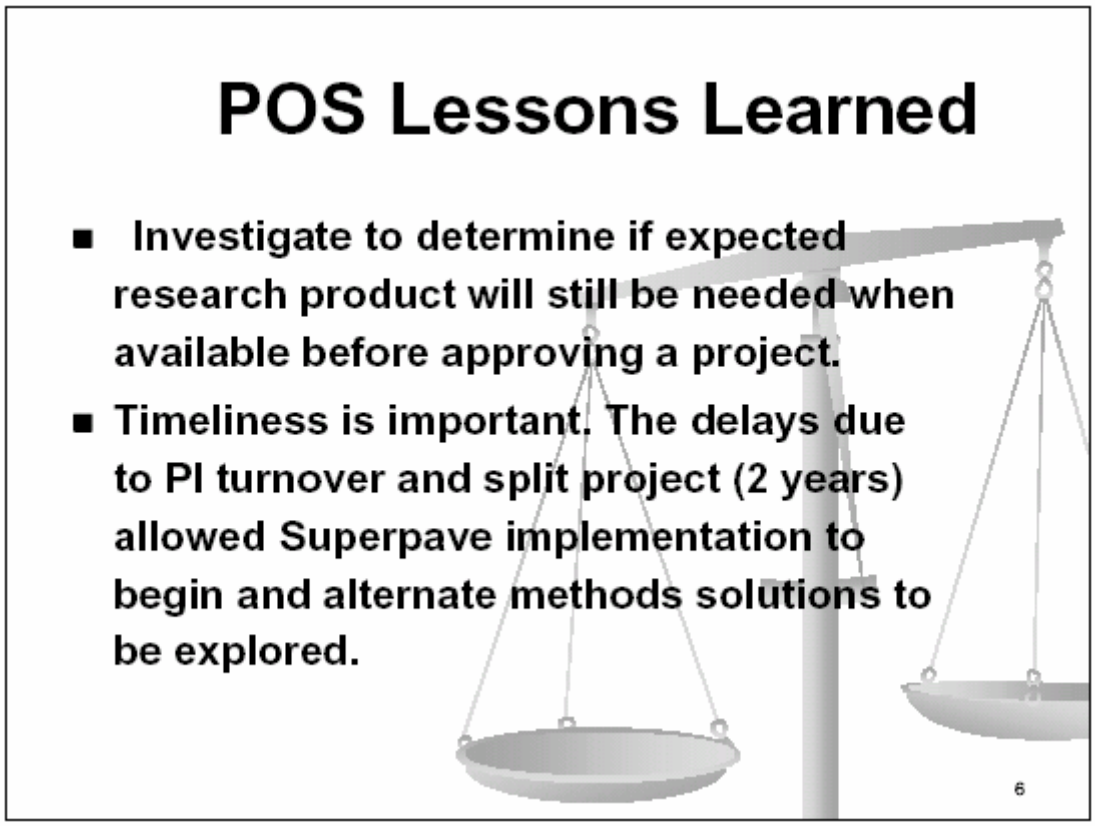

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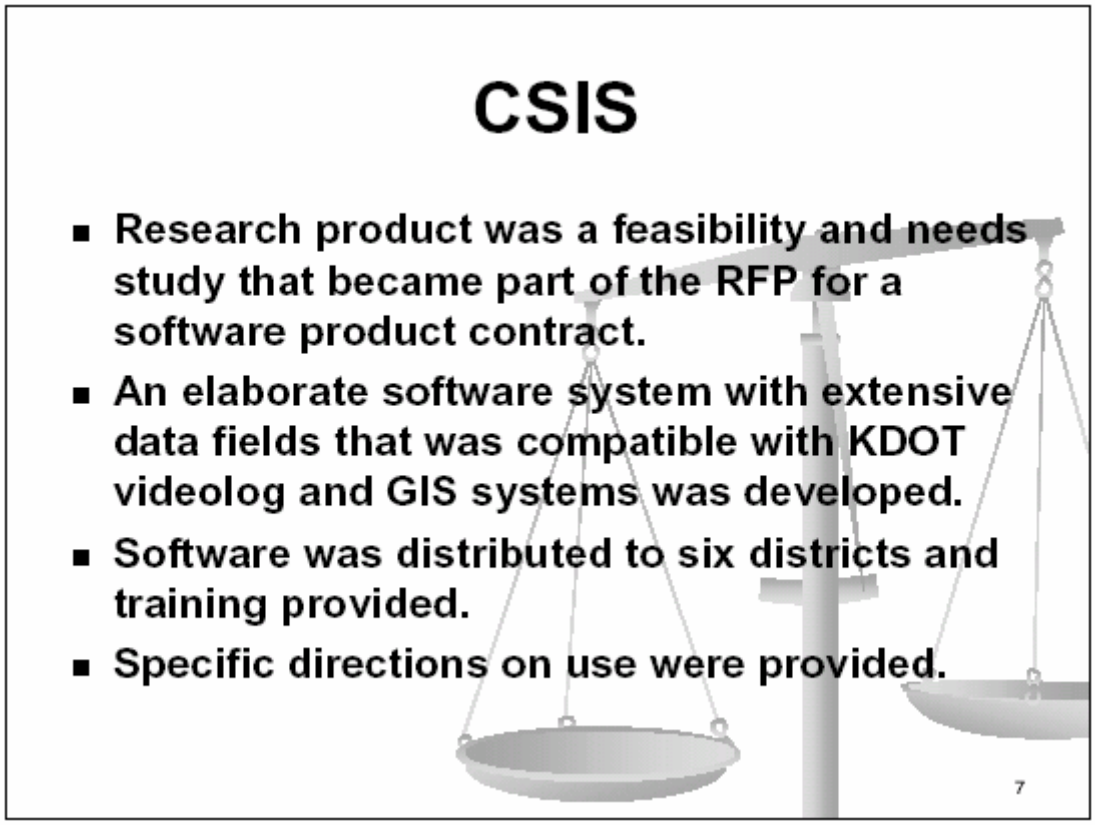

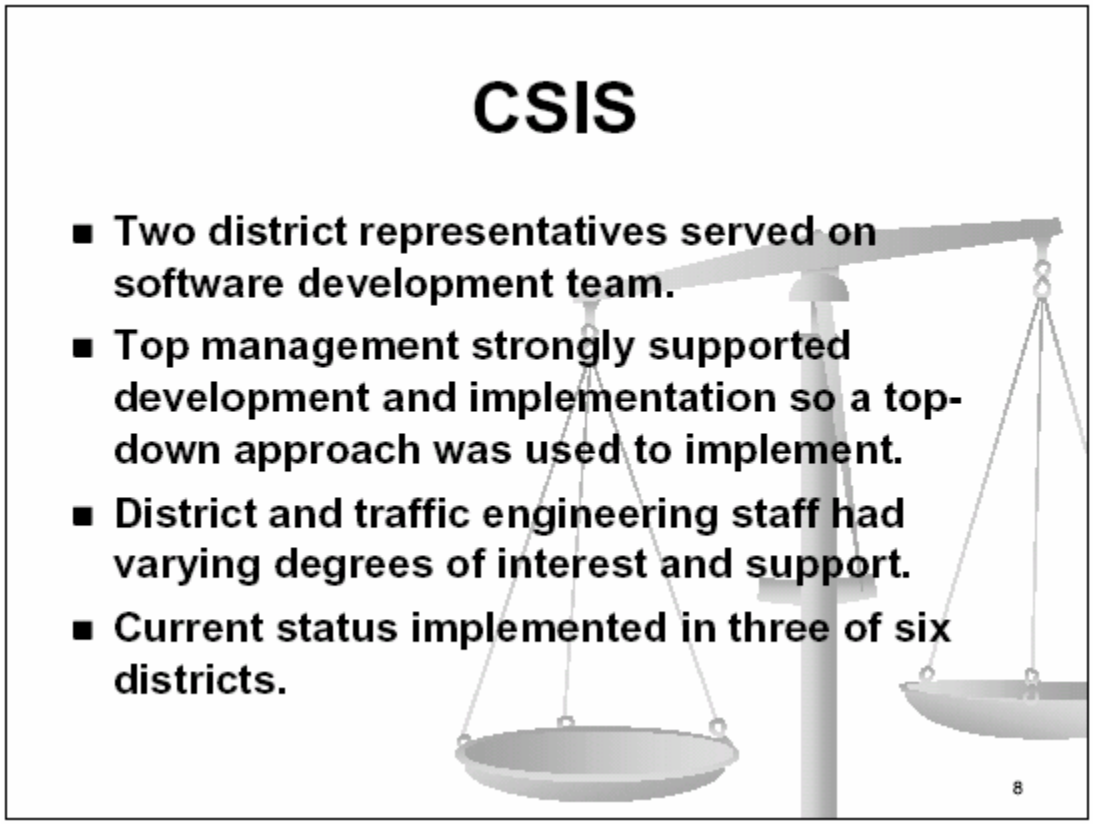

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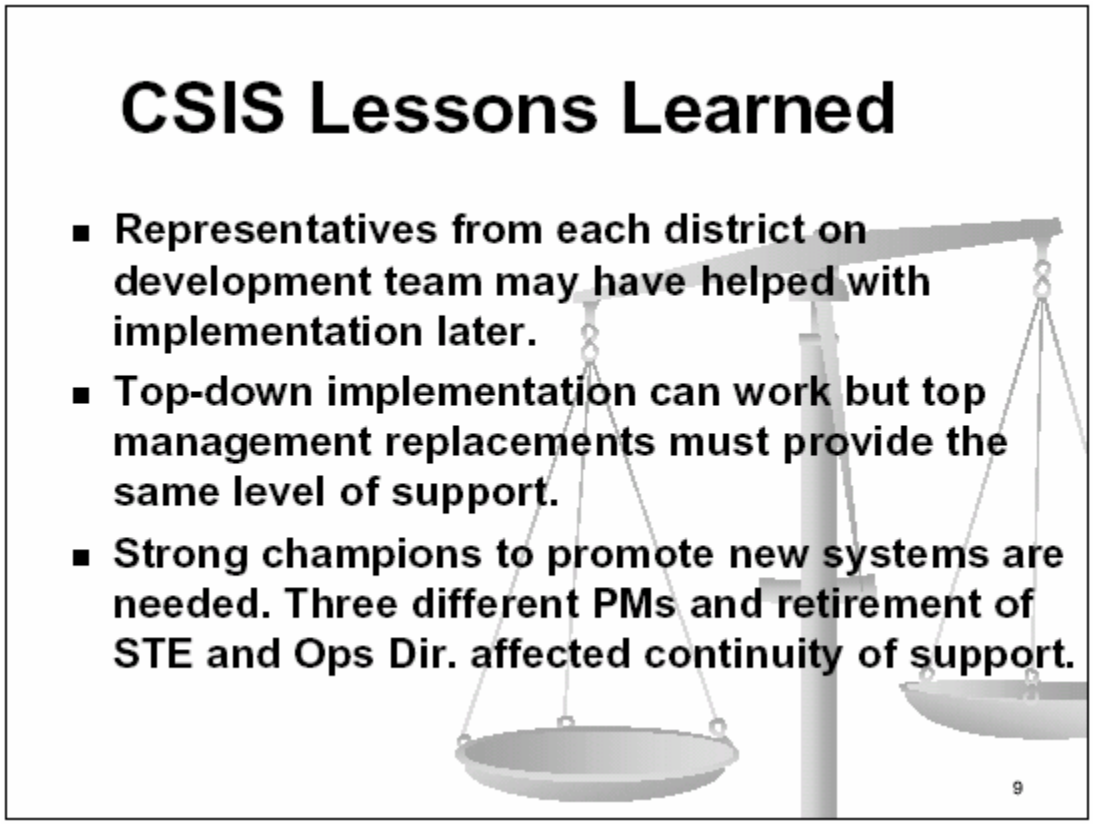

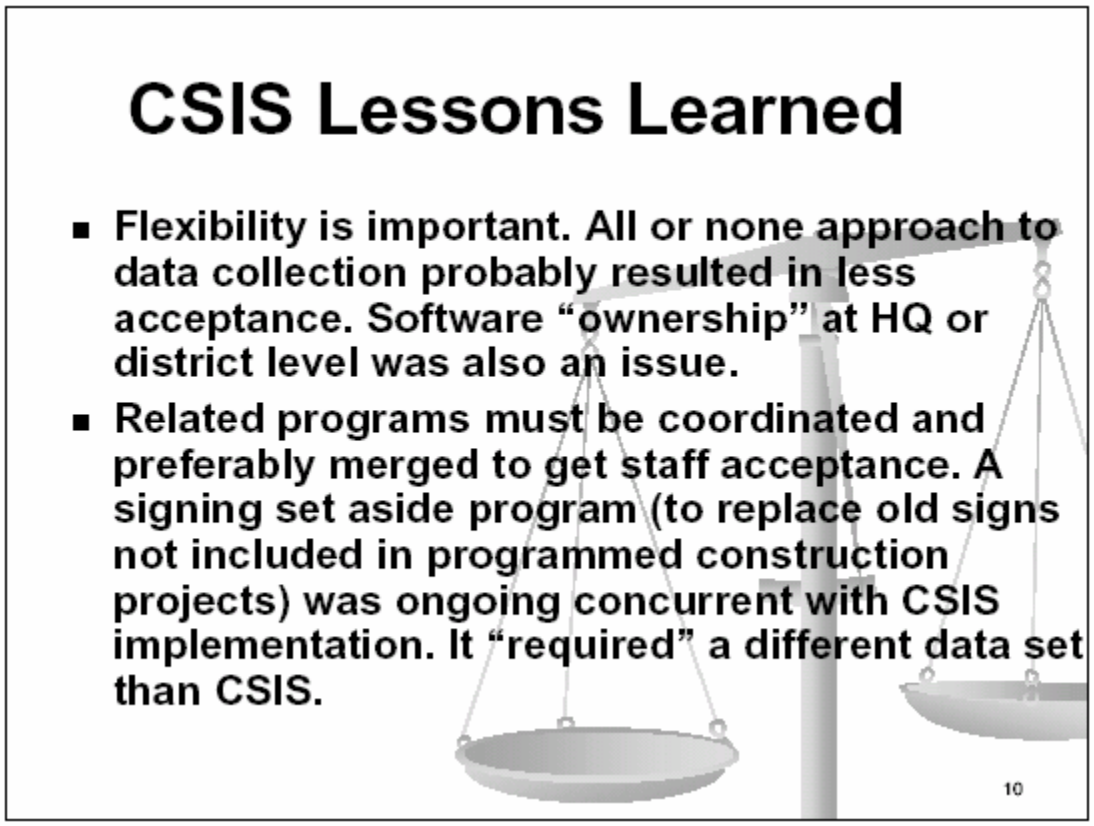

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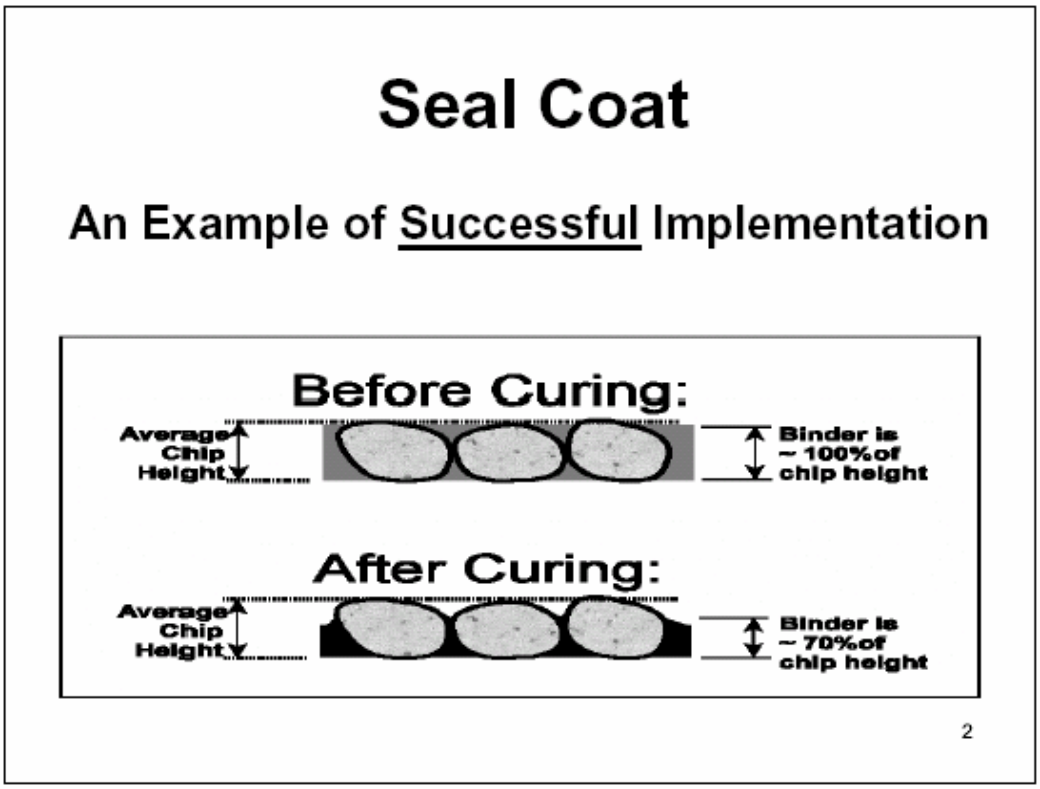
CASE STUDY PRESENTATIONS

Seal Coat

An Example of Successful Implementation

DAVID M. JOHNSON
Minnesota Department of Transportation



Seal coat is 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

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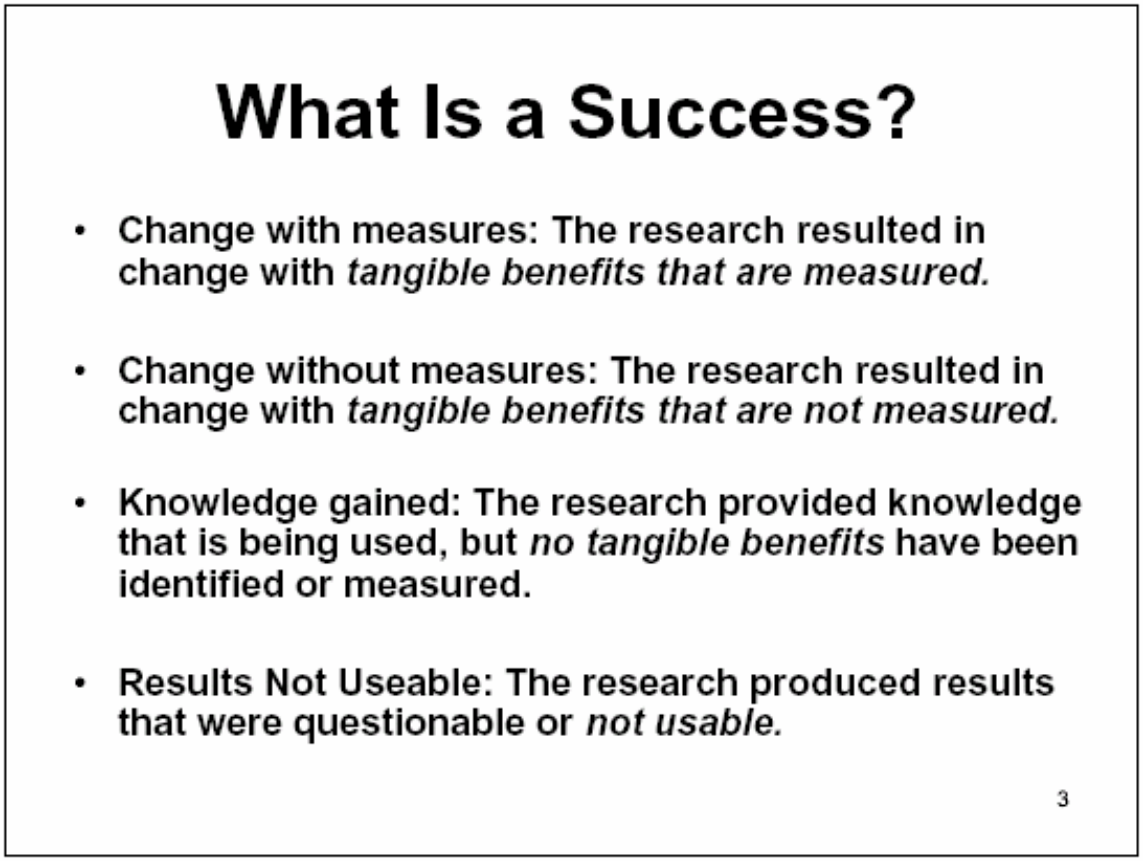
Other seal coat measures of success:

- Number of complaint calls from drivers
- Cost-effective installation

But how is the success of implementation determined in general?



From Mn/DOT close-out memo, after implementation done, check-off, GPA.

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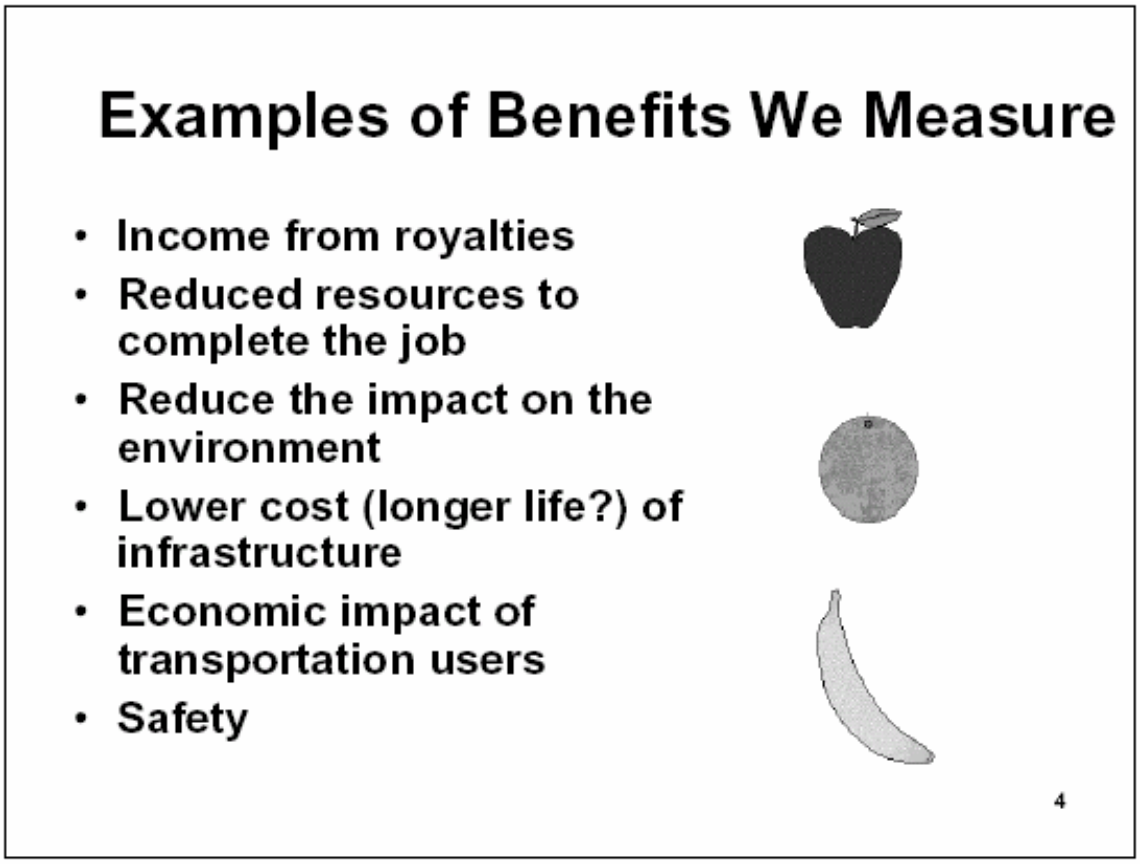

Short list!

- Auto-scope, hundreds of thousand of dollars in UM account—faculty chair
- Salt-tolerant, short-stature native grasses
- Control leafy spurge with beetles, not with maintenance 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)

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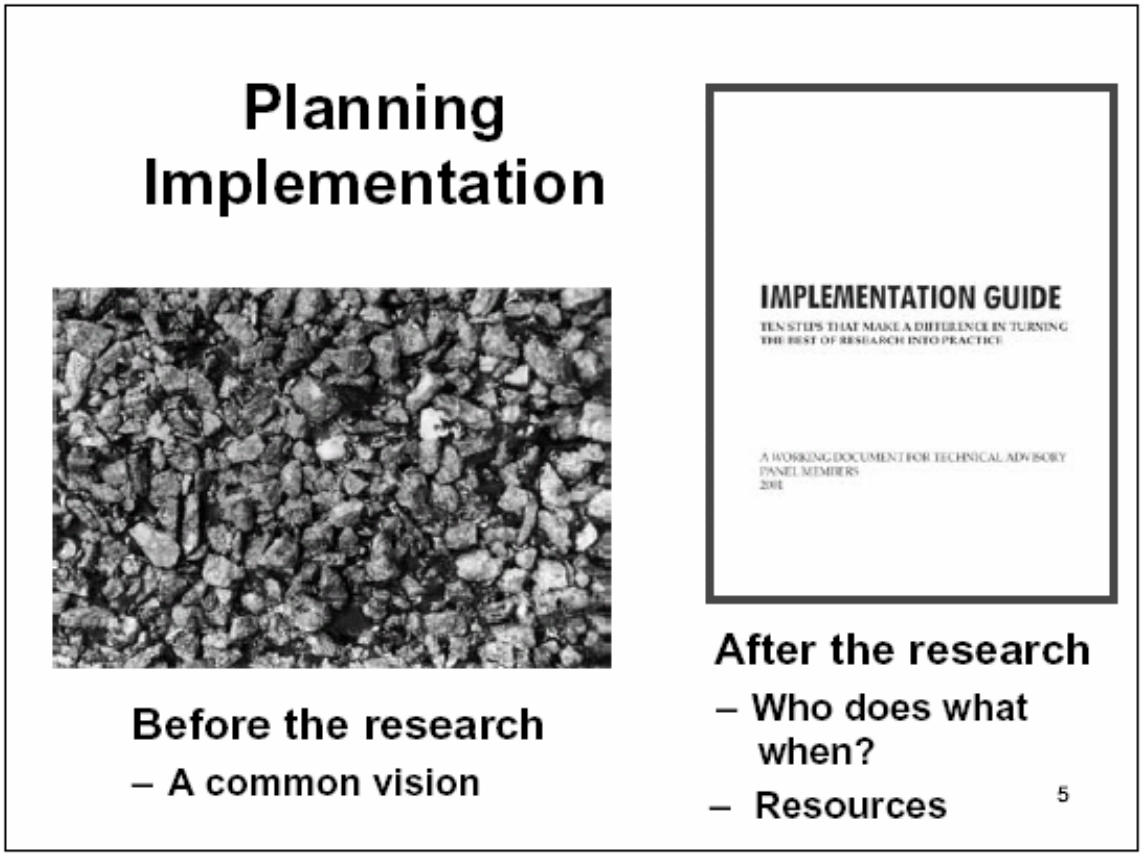

Vision—provide the knowledge to do seal coats right.
The correct amount of binder—it has risen to the top of the aggregate chips:

- They last
- Are cost-effective
- Reduce complaints

After the research

- Manual
- Training
- Evaluation

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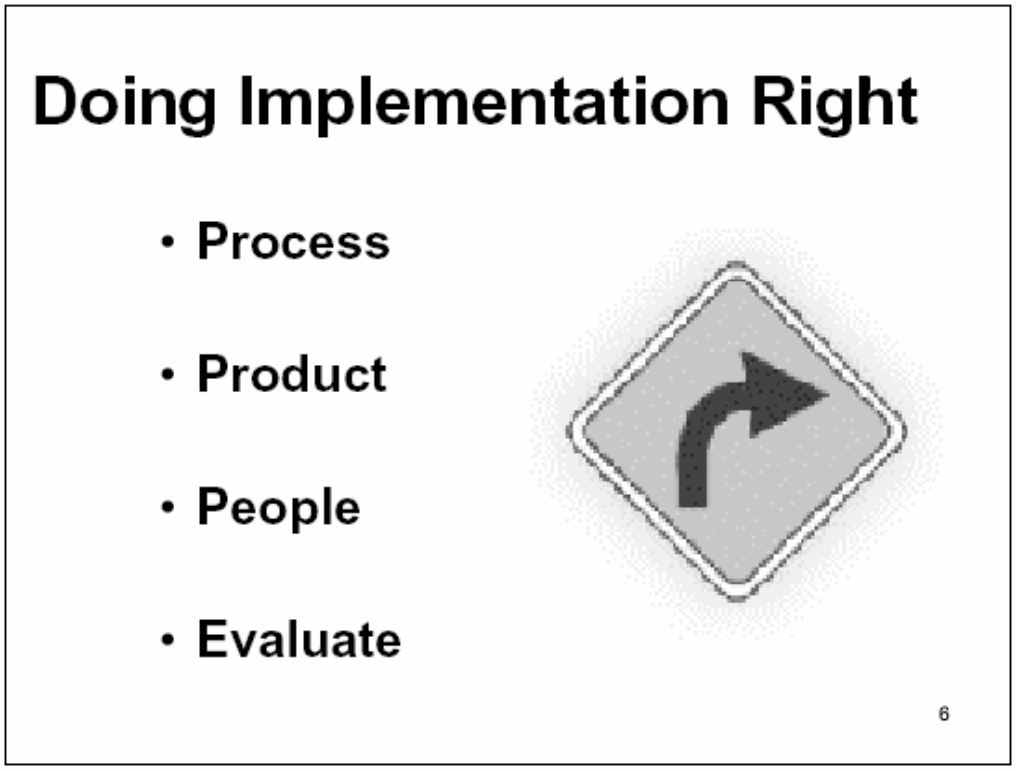

The people are the bigger part of implementation than the technology. Technology does not sell itself. PI not always the expert, maintenance crew chief. Who can benefit? What do they need to learn? How will they learn? Public, private, academic.

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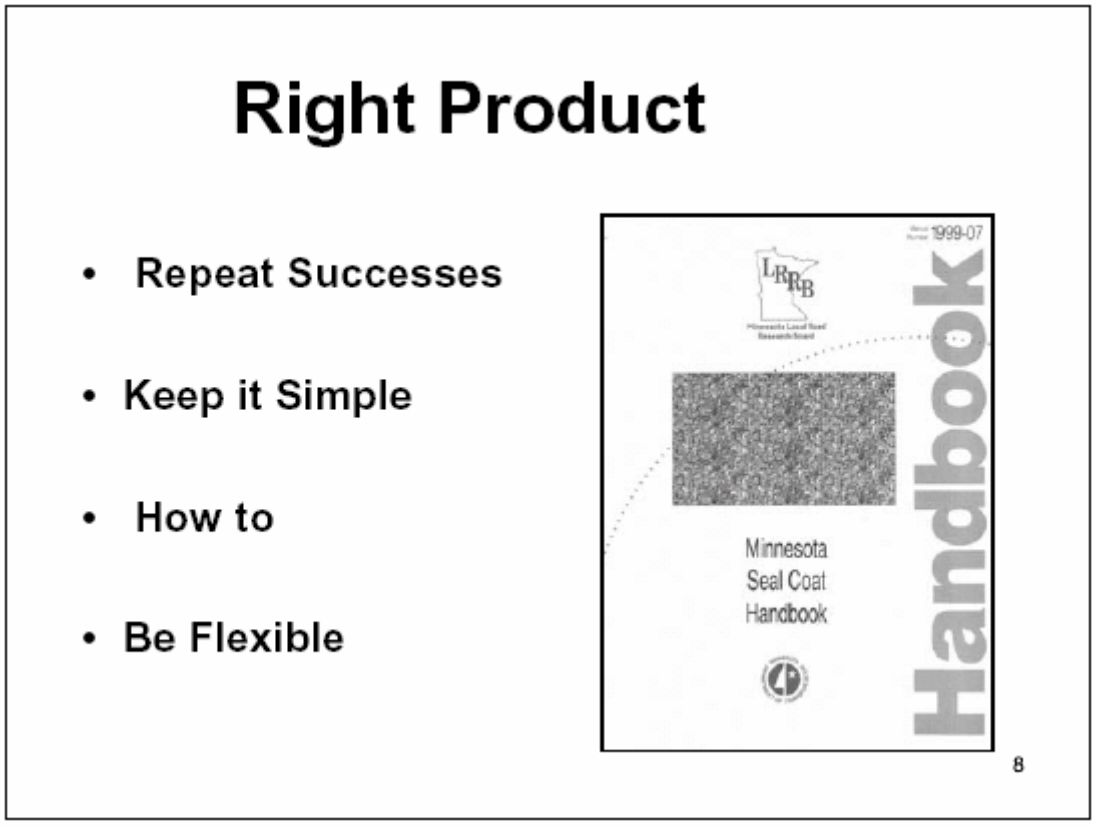

Repeat successes

- 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

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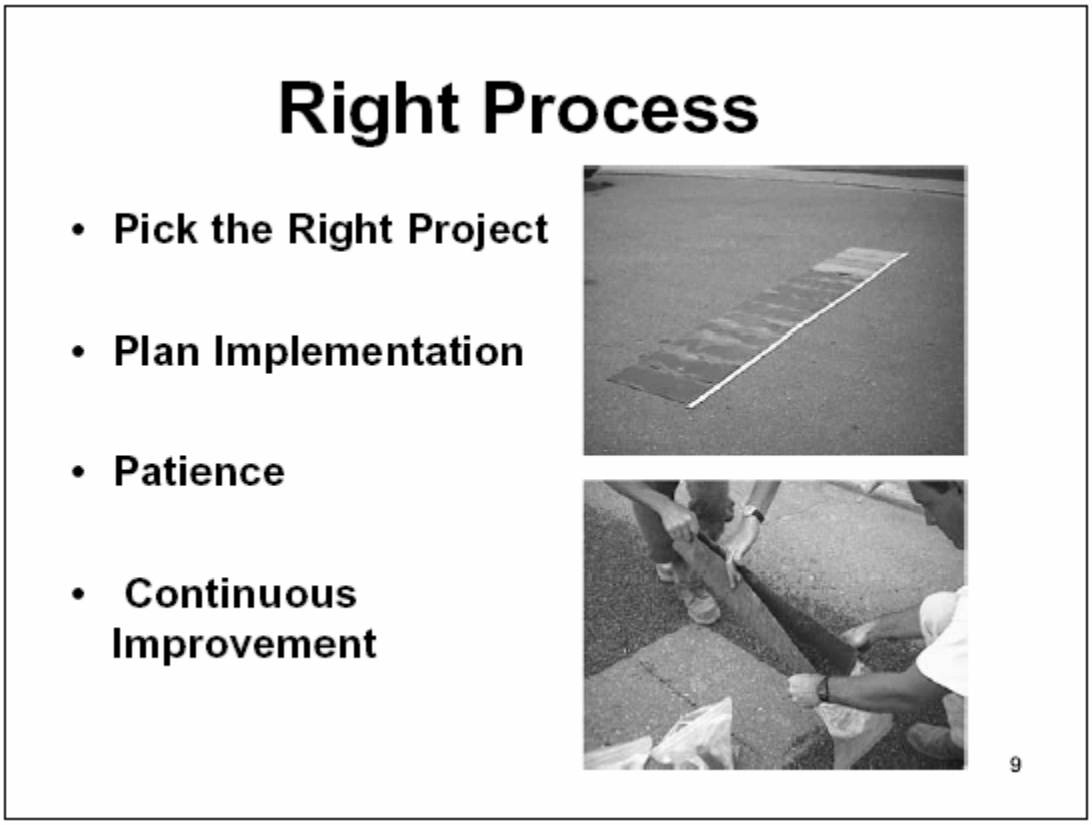

Pick the right project

- 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 1992–1993
- Seal Coat Handbook 1999

Continuous improvement

- Seal coating field evaluations 2000

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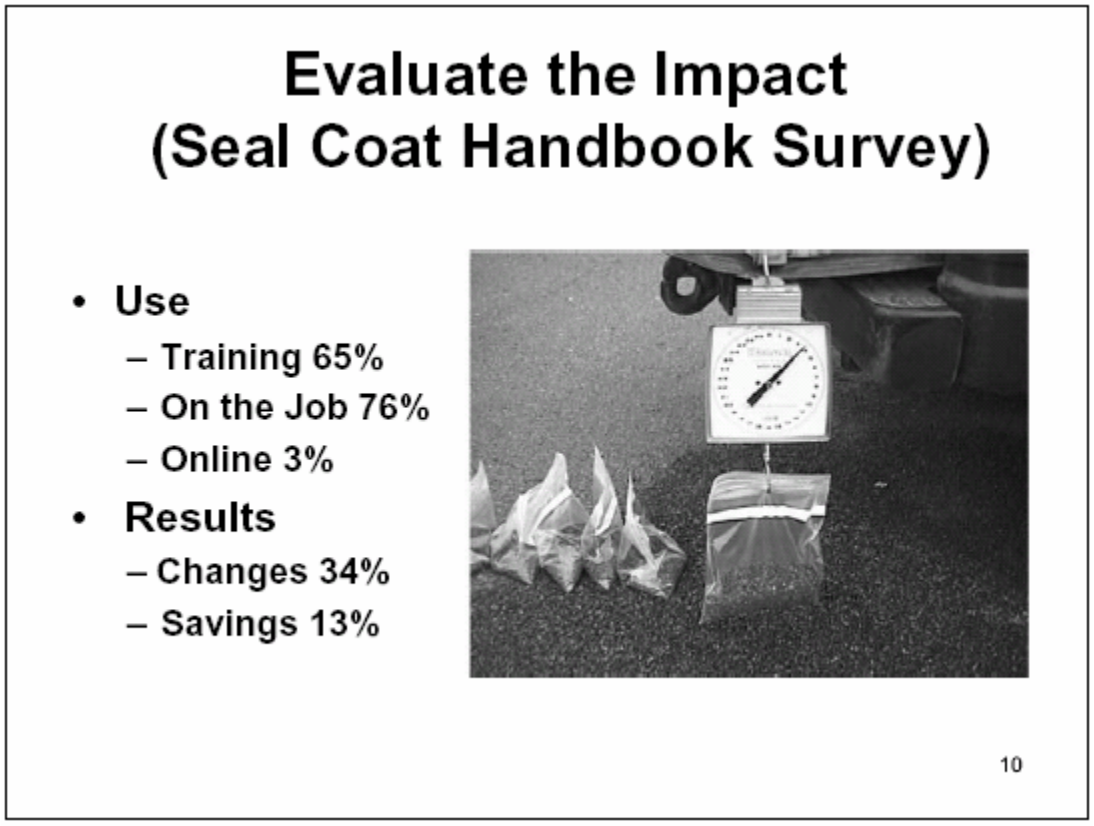

307 surveys sent out, 120 responded (mostly Minnesota cities and counties).

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

$50K/year, $10K/year, $300 per mile, 20%–25%

Tangible benefits that are measured.

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

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FOCUS GROUP SUMMARIES

New Techniques and Methods for Sharing Preliminary Research Findings

Focus Group 1

INITIAL GROUP WORK: MAY 5, 2003, WORKSHOP

Facilitator: Pat Lees
Participants: Jeff Smith, Mike Sanders, Billy Connor, Tie He, Moy Biswas, Randy Battey, Bill Evans, Katie Turnbull, Wilfrid Nixon, Peter Shaw, and Ray Purvis

Step 1: What is the problem?

- Starting too soon.
- Risk avoidance.
- Liability.
- People don't read reports.
- Paperwork—going through 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 issues:
  - User does not know they have a problem, and
  - 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); and
  - Reduced repercussions for failure.

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Optimizing the Dissemination and Implementation of Research Results: A Summary of Workshop and Midyear Meeting Activities

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; and
  - 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"; and
  - 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; and
  - Has to be a perceived benefit to distributor/receiver.
- Equipment:
  - No testing equipment;
  - Restricted use of web; and
  - 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 money for "fringe" projects.
- Set aside money for "quick response" programs.

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- Stop in and talk.
- Personal contact "I hear you have a problem…"
- Money devoted to technical assistance.
- Develop personal relationships.
- Recognition and reward—figure out what works.
- KISS (Keep It Simple, Stupid).
- 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"; and
  - 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 identify dead ends.
- More money for research = rewards.
- Promote research culture.
- Customers take ownership.

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FOLLOW-UP DISCUSSION: SEPTEMBER 11, 2003, JOINT T^2 AND COR MIDYEAR MEETING

Facilitator: Pat Lees
Participants: Patsy Anderson, Susanna Reck, Bill Evans, and Jennell Derrickson

Summary of Discussion

This group discussed developing a process for engaging end-users in all steps of research progress, including work, results, and dissemination. To do so, many members of the group suggested developing a framework or roadmap with a checklist. This process would also include the use of a focus group, a plan for dissemination, use of peer exchange, and a literature review [transportation advisory group (TAG)]. There should also be an advocacy group that includes end-users and technology-transfer specialists. As part of this overall plan, identify customers for this research and how they might utilize it; the customer then becomes the champion. It was suggested that it should take 60 to 90 days to develop this process.

Raw Flip Chart Notes

- Action I: What? Develop a process for engaging end-users in all steps of research: progress/work/results dissemination:
  - Framework (roadmap/flowchart),
  - Checklist = guidance,
  - Plan for dissemination,
  - Focus group,
  - Peer exchange,
  - Literature review (TAG), and
  - Makeup of advocacy group includes end-users and technology transfer specialists.
- Action II: Customer identifies how research will be used and identifies other possible users. Customer becomes the champion. (Imbedded in Action I.)
- Action III: Who?
  - Tech facilitator (i.e., jack) use examples from other modes, University Transportation Centers (UTCs), other organizations, federal labs (FLC), graduate students, Volpe National Transportation Systems Center, Center for Urban Transportation Studies.
  - Schedule: 60 to 90 days starting October 1; Draft by TRB.
  - T^2 manager, integrated product teams, research focus groups.

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FOCUS GROUP SUMMARIES

Efficient Dissemination of Published Materials

Focus Group 2

INITIAL GROUP WORK: MAY 5, 2003, WORKSHOP

Facilitator: Kathy Harrington-Hughes
Participants: James Sime, Ed Harrigan, Debra Hoffmann, Chris Benda, Mark Dunn, Lisa Pogue, Sreenivas Alampalli, Preston Elliott, Tony Giancola, Ilclefonso Burgos, Nelda Bravo, Barbara Post, Mark Norman, and 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.); and
  - Practitioners needs and interests are different from that of researchers.

Step 2: How would we like things to look?

- Promise of NTL 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.

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- 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 Ph.D.s).
- 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 NTL.
- 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 NTL:
  - Fund the NTL, and
  - 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, and
    - Ownership.
  - Get buy-in for the work plan/agree on expectations.

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  - Develop an implementation plan.
  - Disseminate information about the strategy.
  - Keep stakeholders involved throughout.
  - Evaluate existing models (public–private partnerships, etc.).
  - Use case studies.
  - 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 NTL 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:
  - Keep stakeholders involved throughout process, and
  - 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.

FOLLOW-UP DISCUSSION: SEPTEMBER 11, 2003, JOINT T^2 AND COR MIDYEAR MEETING

Facilitator: Cheri Marti
Participants: Bonnie Osif, Mark Norman, Kathy DesRoches, and Jane Watson

Summary of Discussion

Members of this group acknowledged the need for adequate resources and long-term continuity for the NTL. It was noted that the NTL needs to be more broadly recognized as a great resource and a key element of transportation research.

In terms of dissemination of published materials, it is acknowledged that dissemination is a science. There needs to be a systematic use of formats/standards for web, electronic, and print mediums. Users need to be trained in the areas of retrieval and migration. These publications need to be viewed as a real asset and accordingly, their dissemination should be properly funded.

It was emphasized that there is a need to create a mindset of dissemination by researchers, managers and funders. This needs to be embedded in all stages of research, including those funding the research through grant proposals (COE, DOT modes), researchers, practitioners, and T^2 agents. This should also be part of the whole research process utilizing NTL, AAAS, etc.

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Raw Flip Chart Notes

- Secure adequate and predictable funding (long-term) for NTL:
  - Reauthorization (users, NTL)—congress/champion/NTL;
  - NTL as 4th national library (NTL users); and
  - Convey benefits to congress (users):
    - NCHRP report,
    - FHWA 1998 summary, and
    - Usable format.
- Elevate publication dissemination as a science:
  - Systematic use of formats/standards (librarians),
  - Standards: web, electronic, print (train users),
  - Benefits: retrieval, migration, and
  - Asset management philosophy: fund (funders).
- Create mindset of dissemination by researchers, managers, and funders–grant proposals (funders, COE, FAA, DOT modes):
  - Analyze needs of audience A5012 and A5001 (practioners, researchers, T^2 agents), and
  - Consider dissemination throughout research (NTL, AAAS).

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FOCUS GROUP SUMMARIES

Developing Appropriate Materials for the Implementation of Research Results

Focus Group 3

INITIAL GROUP WORK: MAY 5, 2003, WORKSHOP

Facilitator: Susan Sillick
Participants: Georgene Geary, Monique Evans, Matt Mueller, Richard L. McReynolds, Linda Howe-Steegis, S.R. Kulkarni, Marcie Matthews, Casey Abe, Andrew Griffith, Clayton Schumaker, and 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."
- Communication is lacking.
- 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.
- There is no 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% of 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.

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- Every research project results in implementable and 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:
  - TRIS,
  - RIP,
  - Executive Summary (1–4 pp.) 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, and
  - Other media and methods.
- 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:
  - What are the goals/objectives?
  - How will the information be used?
  - How will it best be implemented?
  - 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.

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- 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.
  - Where do we want to be?
  - 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:
  - Increase communication,
  - Use contractual incentives/disincentives,
  - 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.

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Optimizing the Dissemination and Implementation of Research Results: A Summary of Workshop and Midyear Meeting Activities

- When developing project scope, develop an implementation plan for each project:
  - Define implementation and success,
  - Determine necessary products,
  - Determine responsibilities,
  - Determine the how, why, where, what, when, etc., of implementation,
  - Identify barriers and address as soon as possible,
  - Be flexible; adjust as necessary, and
  - 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 and RIP;
  - Executive Summary (1-4 pp.) 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; and
  - Other media and methods.
- 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.
- Track 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.

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FOLLOW-UP DISCUSSION: SEPTEMBER 11, 2003, JOINT T^2 AND COR MIDYEAR MEETING

Facilitator: Barbara Harder
Participants: Lynn Murray, Lisa Pogue, Jack Jernigan, and Claire Felbinger

Summary of Discussion

Implementation of research results can be difficult and time consuming and especially now in the environment where research units are understaffed or do not have the resources or expertise to conduct focused implementation activities for each research product. Having a guide for various aspects of the implementation process would assist research units in their efforts to facilitate the adoption of new products and methods into the operating practices of their agencies. Such a guide would contain model verbiage for regularly accomplished processes. This verbiage would be based on successful or best practices used within the research community. The guide would provide appropriate wording for a research unit to develop a customized process to meet its individual needs. Contracts and memorandums of agreements, project reporting, implementation plans, and other administrative processes could be considered for this study. The *Guide for Developing a State Transportation Research Manual,* prepared for the Research Advisory Committee in April 1997, is an example of what was done to assist the state research units to document the processes and procedures within their programs.

In addition, public-sector research units have been successful in implementation because of the degree of knowledge in the individual research unit, due to effective sharing of successful practices among peers, and to some degree through adapting private-sector best practices to the public-sector arena. A number of very useful studies have been done on the topic of research results implementation, and these studies have described a variety of successful practices. The public-sector research community, specifically the state DOTs, could build on these successful approaches by identifying best practices. A study to identify best practices would involve benchmarking best practices from the public and private-sector research community. This study would use an accepted and rigorous approach for benchmarking and process improvement. It would produce a best-in-class practice description of processes and methods used for implementation of research results for public-sector research units.

As part of this effort, there needs to be an alliance among the T^2 Committee, the COR Committee, and the Committee on Training and Education. This topic could become the basis of a session at the 2005 TRB Annual Meeting.

Another suggestion was to develop executive briefing materials that could be presented at CEO leadership forums detailing the benefits of successful implementation of research. This could become a standard briefing for the transportation community.

It was also recommended that a memo be sent to state DOT research directors to encourage greater involvement on their part with the Accreditation Board for Engineering and Technology (ABET) at the Industrial Board level.

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Raw Flip Chart Notes

- Research study to develop model verbiage for implementation:
  - Contract verbiage,
  - Implementation plans, and
  - Other reporting (NCHRP–AASHTO).
- Training tools for implementation (how-to) including access to what is "out there" already:
  - FAA–RPDs, FLCs.
- Begin with alliance with Training and Education committee and T^2 and COR:
  - Session at TRB Annual Meeting 2005 (T^2 and COR committees).
- Executive briefing materials to present at CEO Leadership Forum regarding successful implementation benefits... could be a standard briefing for transportation community (T^2, COR, and Strategic Management Committees).
- Memo to state DOT Research Directors to encourage more involvement with ABET at the Industrial Board level (State DOT Research/Academic):
  - Joint task force T^2, COR, and private industry.
- Research study to develop best practices for implementation (true benchmark effort in context of quality):
  - FHWA/NCHRP study/ACP, and
  - Management services consultants.

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FOCUS GROUP SUMMARIES

Case Study Guidelines for Dos and Don'ts

Focus Group 4

INITIAL GROUP WORK: MAY 5, 2003, WORKSHOP

Facilitator: Debra Elston
Participants: Rodger Rochelle, Joe Conway, Larry Klepner, Dave Johnson, Richard Long, Elizabeth Deakin, Stephen Maher, Bill Carr, Amy O'Leary, and 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 predefined 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.

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- 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.
- Identify 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:
  - Qualitative and/or quantitative,
  - Direct and indirect (developed relationship),
  - Long term versus short term (time), and
  - 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.

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- 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":
  - 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:"
  - Specific processes:
    - Management and administration, and
    - 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.

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Optimizing the Dissemination and Implementation of Research Results: A Summary of Workshop and Midyear Meeting Activities

- 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?

FOLLOW-UP DISCUSSION: SEPTEMBER 11, 2003, JOINT T^2 AND COR MIDYEAR MEETING

Facilitator: Richard Long
Participants: Jason Bittner, Deb Elston, and Tim Barkley

Summary of Discussion

This group discussed the development of a primer to conduct a workshop on implementation and the development of guidelines on case studies. The group posed the question of how to define what makes a good case study. There was a reference to a Harvard University report on how to do a case study. The Office of Management and Budget mandate to develop metrics for research was brought up, which set off discussion about the lack of metrics in technology transfer. The reasons for conducting case studies were also explored. Further questions included the timing of the case study, who should be involved, and how case studies should be funded.

Raw Flip Chart Notes

- Our role in the dissemination of research results.
- Definition of a case study.
- Why do a case study?
- What, when, who, how:
  - "Choose your own adventure," and
  - What: Case study action plan.
- Synthesis to- develop primer:
  - When,
  - Who, and
  - How—money.
- Primer to develop workshops:
  - When,
  - Who, and
  - How—money.
- Workshops to implement guidelines:
  - When,
  - Who, and
  - How.
- Marketing communication plan for Case Study Action Plan (DOE FLC individual).

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FOCUS GROUP SUMMARIES

Identifying Barriers to Dissemination and Implementation

Focus Group 5

INITIAL GROUP WORK: MAY 5, 2003, WORKSHOP

Facilitator: Laurie McGinnis
Participants: Richard Woo, Alan Rawson, Daris Ormesher, Marci Kenney, Ian Friedland, Ahmad Ardani, Dan LaCombe, Nina McLawhorn, Joel Washington, Timothy McDowell, Leni Oman, and 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.

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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 versus transit).

Step 4: What are the choices for getting there?

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

Step 5: Which are the most likely choices?

- Marketing/Management,
- Timelines, and
- 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.

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FOLLOW-UP DISCUSSION: SEPTEMBER 11, 2003, JOINT T^2 AND COR MIDYEAR MEETING

Facilitator: Laurie McGinnis
Participants: Michael Bonini, Ian Friedland, and Bill Carr

Summary of Discussion

In order for research to be more widely disseminated and implemented, agencies need to be encouraged to tie their research goals to the agencies' strategic goals. This will help document and validate the value of research and justify the case for more research. It also gives us the language to communicate the value of research. Members of the group recommended writing a position statement reflecting the above to be shared with the Standing Committee on Research (SCOR), the Standing Committee on Highways (SCOH), and the Research Advisory Committee (RAC).

They also suggested the development of a TRB workshop with the Education and Training (E&T) Committee to better understand the benefits of marketing and the appropriate strategies for communicating to the different audiences, e.g., public, decision makers, managers, field personnel—in a timely manner.

Raw Flip Chart Notes

- Utilize transportation research community: work together to convey importance of research.
- Encourage agencies to tie their research goals to the agency's strategic goals. This will help us document and validate the value of research and justify the case for more research. Also gives us the language to communicate the value of research:
  - Write a position statement to be shared with SCOR, SCOH, and RAC.
- Marketing management:
  - Develop a TRB workshop with the E&T committee to better understand the benefits of marketing and the appropriate strategies for communicating to different audiences—public, decision makers, managers, and field personnel in a timely manner (FLC, T^2 society, Association of University Technology Managers, UTCs, DOT T^2 committees).
- Implementation incentives:
  - Explore with RAC to get funds, and
  - Include in original research proposal.
- Our committees (COR lead) will develop a proposal that will be presented to TRB to reach AASHTO, RAC, and National Association of County Engineers:
  - Have proposal ready for AASHTO's midyear meeting in April.

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ABG10 (A5001)
Conduct of Research

View Annual Meeting events for this committee.

Website: http://www.mrutc.org/COR/

Scope: To increase the quality and effectiveness of research through encouragement of better planning, management, and operational practices by organizations engaged in transportation research programs and to assist the Transportation Research Board in its role of stimulating research and serving as a national clearinghouse for research activities.

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ABG30 (A5012)
Technology Transfer

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Website: http://webboard.trb.org/~ABG30

Scope: This committee is concerned with information exchange and research on the processes and methods for technology transfer, and assisting the Transportation Research Board and other TRB committees in their role as an agent for technology transfer.

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