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16. ABSTRACT

This research began as a way to increase information exchange between different State DOTs and expand networking between experts in different states. Videoconferencing lowers the cost of this higher level of interaction relative to the traditional conference. Typically, only higher-level managers would travel to a conference location because of the expense. This old format places a limit on the amount of information shared between administrators in the different states. While there is an increasing amount of information available among specialists, there is a decreasing amount of resources at the state level to pay for conference travel. The WASHTO-X project sought to prove that videoconferencing technology could effectively replace this level of information exchange. The success of phase one (2002 to 2004) led to an extension of the project through June 2008. The project is evaluated on its ability to expand the number of people involved in exchange of information and the cost of delivering this higher level of service.

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WASHTO-X Program

Videoconferencing Information Exchange

Final Report

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November 2009

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Executive Summary

Videoconferencing has been used over the last several years to disseminate valuable information to State DOTs in the western states. This report summarizes phase two of the WASHTO-X program continued from January 2005 to June 2008. We continued to focus on peer exchange through the videoconferencing format. The Pooled Fund Study findings detailed here, show how this communication device can bring DOT and FHWA people together in a way that is mutually beneficial and low in cost.

Professionals from State agencies face similar problems. One of the most powerful sources of help, support, and guidance is the peer network. Senior personnel have to travel and maintain their support networks through their participation in multi-state panels, working groups, and professional organizations. Travel opportunities for middle management are limited, and yet they represent the core of technical expertise within state and federal government. This report shows how an experiment in information exchange has revealed surprising results. DOT and FHWA personnel from the Pacific North West to the Heartlands were quizzed on their impressions of the medium. When asked, *"Do you plan to change the way you do business?"* a remarkable 40.09% responded "yes" with another 30.91% answering "maybe". The question *"Has the videoconference network expanded your network of contacts, resources, or sources of information?"* yielded a huge 78% response.

Many of the "teething troubles," discussed in the phase one report, were minimized as the technology became more familiar. There has been improvement but some of the problems remain. Many of the phase two presentations began to be structured to better fit the webinar format.

The report begins with an introduction explaining the origin of the study, its goals and objectives. The event report provides detailed information about what was covered in the sessions, and how participants perceived them. The tangible and intangible benefits of the experiment are followed by an elementary cost benefit analysis that indicates a strong case for continued investment in the videoconferencing method. A discussion of the technical aspects of videoconferencing is supplemented with an explanation of how Internet Protocol (IP) offers exciting new opportunities for public transportation agencies.

The report provides an evaluation of the data collected from the quarterly reports, and a summary of the personnel involved in the various conferences. The report concludes that while many of the problems encountered by videoconferencing remain; a consistent use of the technology helps to disseminates information and improves networking among the western State DOTs.

Introduction

The WASHTO-X Program continued from January 2005 to June of 2008 as an extension of the original two-year pooled fund research study. The program provides WASHTO State DOTs and the associated field offices of the Federal Highway Administration the opportunity to conduct informal peer information exchanges among transportation personnel through videoconferencing. The study is patterned after the information exchange program of the TEL-8 Transportation Communication Network and is currently being sponsored and funded by seven core WASHTO State DOTs. The principal goal of this study is to provide low-cost opportunities for WASHTO State DOTs and FHWA field offices to participate in an expanded video-conferencing program featuring:

- Information exchanges among transportation professionals, officials, universities, LTAP Centers, and associates.
- Peer exchanges on a variety of technical topics.
- Transportation information exchanges on policy, program, and procedural topics and issues.

The WASHTO-X Program objectives are to:

- Create a blue print that will guide the technical and organizational details required for future expansion of videoconferencing programs and informational exchanges among transportation professionals representing local, State and Federal agencies, universities, and transportation associations.
- Measure the benefits and costs associated with technology transfer and information exchange through videoconferencing.

This report provides an overview of the WASHTO-X Pooled Fund Study organization, procedures, participants' evaluations of events, and accomplishments to date. The program was initiated by Mr. Doug Anderson with the UDOT Research Division. An Advisory Committee of selected representatives from participating State DOTs and FHWA provides oversight and guidance to the study. Figure 1.1 shows the participating State DOTs along with the original six State DOTs of Tel-8. The study is being conducted through the Utah Local Technical Assistance Program (LTAP) Center with Mr. Doyt Bolling serving as Program Director/Co-Principal Investigator. He is responsible for WASHTO-X Program administration, coordination, scheduling, hosting, and for reporting each event. Professor Peter Martin, Co-Principal Investigator, representing the Mountain Plains Consortium, is responsible for coordinating the efforts with TEL-8 and other study participants, hosting the focus groups, collecting and collating quantitative and qualitative data, and interpreting and preparing the interim and final reports.

Site Coordinators

Representatives from each participating agency were selected and are responsible for assisting the Project Director in advertising events, soliciting topics, scheduling, and conducting program sessions within their respective agency. These persons are key to the success of the study in assuring that the appropriate persons are invited to participate in scheduled events and to provide event topics that are germane to their agency's interest and benefit.

Project Resources & Technical Support

Initially, TEL-8 staff provided valuable guidance and technical assistance in the first stages of the program. The TEL-8 communications bridge and technical support was used initially to launch the WASHTO-X program. Some connectivity problems with a few sites were encountered using the TEL-8 bridge system. As a result, Mrs. Betty Warren of FHWA's Tele-conferencing division offered the use of their updated communications bridge and the technical support of their staff. This has enabled the study to expand its outreach to allow State DOTs to cascade events to their field offices. Mr. Jeffrey Smith, a contract employee to FHWA, is currently providing principal technical support. Each participating agency uses their respective technical staff to set up videoconferencing equipment and provide technical support at each site. Once an event is scheduled, the Program Director contacts FHWA technical staff and advises them of the participating agencies. FHWA technical staff then establishes connectivity to each site and operates the communication bridge during each event.

Figure 1.1 Participating State DOTs and TEL-8 States

Operating Procedures

Semi-annually, the Program Director issues a "Request for Topics" to each participating agency's Site Coordinator. Each Site Coordinator surveys his/her respective agency for potential topics staff personnel would like to have incorporated into the WASHTO-X Program and then sends the survey back to the Program Director. The Program Director compiles and posts the combined results of the individual surveys on the WASHTO-X website. Along with this posting, each agency is requested to indicate their level of interest in each topic and to designate the topics for which they would be willing to serve as discussion leader and host. Appendix A contains the results of the initial solicitation and ratings of topics along with each semi-annual "Request for Topics".

The Program Director compiles these responses, and identifies the topics of most interest and highest priority. He then contacts the agencies that have volunteered to be discussion leaders/hosts and works with each one to develop a preliminary scope and schedule for each topic session. Once this is done, the Program Director prepares and posts a six-month schedule of proposed events including a brief scope of discussion activities. The Program Director then notifies the Site Coordinators of each agency to distribute this information to potential participants and requests that they submit any issues, questions, and presentations they would like to make during the event.

The Site Coordinators in each agency compile the responses of potential participants prior to a scheduled event and forwards them to the Program Director. The Program Director works with the host agency to develop a final agenda for each event. Figure 1.2 shows the typical format for each event. A typical WASHTO-X agenda is divided into three parts. The first few agenda items are short presentations on the topic. The middle part of the session covers questions or issues that were submitted by participants during the registration process. The best part of the session is reserved for open discussion. Prior to a scheduled event, the Program Director notifies each Site Coordinator of the final agenda and the timing of the event. Prior to an event, Site Coordinators notify the Program Director whether or not their respective agency will be participating in the scheduled event and submits the names of the persons who will be participating. Site Coordinators make all necessary arrangements and preparations for the event at their respective site.

WASHTO-X
Videoconference
Agenda
Event Times

10:00 A.M. – 12:00 Central Standard Time
9:00 A.M. – 11:00 A.M. Mountain Standard Time
8:00 A.M. – 10:00 A.M. Pacific Standard Time
(Please be ready to receive videoconference calls 1 hour in advance of the meeting.)
Topic: Environmental Streamlining
Host Site:
5 min **Welcome and House Keeping** .....Doyt Bolling, WASHTO-X Director
Roll Call.....(videoconference guy in D.C.)
Moderator .....Host Agency

Presentations

10 min Topic description.....speaker
10 min Topic description.....speaker
10 min Topic description.....speaker
80 min Round Table Discussions

(Each participating site is asked to introduce participants at its site and be prepared to briefly discuss their activities related to the topic as appropriate, and submit questions and issues for discussion.)

5 min **Closing Issues**.....Doyt Bolling, WASHTO-X Director
Closing Comments
Adjournment

Figure 1.2 Typical Videoconference Format

Initially, minutes were taken of each event and posted on the website along with any presentations that were made. Now each event is being videotaped and subsequently digitized and posted on the website. This has expanded the outreach of the WASHTO-X program and provides better documentation of each event. Participants are asked to complete an evaluation form for each event. The evaluation form is designed to provide candid and objective information that correlates with the study objectives. This form is shown in Figure 1.3. The majority of the procedures are conducted electronically and are communicated through the WASHTO-X website (http://www.washto-x.org).

Event Attended: 5-20-2003 Work Zone Traffic Control & Safety

What is the name of the Agency/Organization You Represent.
ADOT

Was the event worth the time you spent?
YES

Enter The Video-conference site Location at which you participated.

Do you plan to make changes and/or modify the way you do business?
YES

Have You Attended a WASHTO -X Event Before?
YES

If so Indicate the areas:

- ☐ Plan/Spec
- ☐ Procedures
- ☐ Policies
- ☐ Training/T2
- ☐ Manual
- ☐ Other

Comments:

List the most important lessons your gained/learned from this event.

Were there any technical problems with the video-conference system?
YES

Has this video conference expanded your network of contacts, resources or sources of information?
YES

Did The Event Start On Time?
YES, Promptly

Have you requested any additional information as a result of this event?
SOME WHAT

Did You Have All the Informational Materials?
YES (or none needed)

If so Indicate the areas:

- ☐ Conference Vide/CD
- ☐ Notes/Synopsis
- ☐ Research Reports
- ☐ Plans/Spec's
- ☐ Policy/Procedures Manual
- ☐ Other

Would You Attend More Events Like This?
YES

Comments:

Would You Recommend This Event To Others?
YES

Overall, How Would You Rate This Event?
Excellent

General Comments:

Submit Reset

Figure 1.3 Participant Evaluation Form

Event Report

Status of Progress

The successes of the first phase of the Peer-X project continued in the second phase renewal. While some technical difficulties involving connectivity to some of the participating sites continued, familiarity with the technology increased. The average number of different sites involved in the videoconference was between ten and eleven allowing for a range of input from different areas. On average there were more than thirty-three attendees at each live video-conference, indicating a broad interest in the topics discussed. One of the major complaints during phase one was the timely distribution of information about the topics to be covered during the upcoming videoconference. These concerns were addressed by continuing to improve the project website.

By June of 2008, 46 additional events were added to the WASHTO-X project for a total of 67 events since 2002. Participants' evaluation responses remained positive and rose in a couple of cases. The videoconference format continued to attract quality presenters and attendees. Table 2.1 provides a list of the events and a summary of participation. In addition to live participation, the WASHTO-X conferences were disseminated through CD-ROM reaching a broader audience.

A variety of technical experts and managers attended the 46 sessions. Table 2.2 gives a breakdown of the number of attendees by major category. Figures 2.1-2.6 further summarize the information collected in the quarterly reports. A discussion of these results follows.

Table 2.1 Summary of WASHTO-X Events by Topic[1]

DATE	TOPIC	NUMBER OF SITES PARTICIPATING	NUMBER OF PARTICIPANTS
1/25/2005	Innovative Financing	8	36
2/8/2005	Long Term Pavement Performance Monitoring & Validation of New Pavement Design	8	32
3/8/2005	New Product Evaluation	7	24
5/10/2005	Rapid Bridge Construction & Rehabilitation Techniques & Methods	5	18
5/11/2005	Quiet Pavements: Measures for Reducing Pavement Noise	19	71

[1] Most information reported was collected from quarterly reports. An asterisk denotes information taken from the website reports.

Table 2.1 Continued: Summary of WASHTO-X Events by Topic

Date	Topic	Number of Sites Participating	Number of Participants
6/14/2005	TRAFFIC & SAFETY: PEDESTRIAN CROSSINGS	7	26
7/12/2005	WASHTO-X PEER-X MEETING	3	9
8/9/2005	Roundabouts: State-of Practice, Design & Operations Updates	3	42
9/13/2005	Transportation Work Force Development	4	34
10/12/2005	Implementing Research Effectively	10*	29*
11/8/2005	NEW HIGHWAYS FOR LIFE PROGRAM	11*	22*
12/12/2005	IT Department Consolidations	6*	17*
12/13/2005	Construction Issues	11*	34*
1/17/2006	New Contract to Continue WASHTO-X Peer Exchange Video Conference Program	4	5
2/14/2006	Strategic Highway Safety Plans (SHSP)	7	36
3/14/2006	Experiences in Implementation of Calculated Score Results	5	25
4/11/2006	Incorporating Safety Improvements into Resurfacing & Restoration Projects	9	54
5/9/2006	Safety Measures in School Zones: Speed Limits, Access Points, & School Routing Plans	7	33
6/13/2006	Product Evaluation Procedures & Systems	13	22

Table 2.1 Continued: Summary of WASHTO-X Events by Topic

Date	Topic	Number of Sites Participating	Number of Participants
7/11/2006	CORRIDOR PLANNING STRATEGIES	6	39
8/9/2006	ITS Experiences and Applications: Vehicle Braking, Work Zone Safety, & Capacity Improvements	9	16
9/12/2006	Landslide & Rock Fall Mitigation Systems	9	29
10/17/2006	Bridge Maintenance & Inspection Issues: Painting, Cleaning, Deck Repair & Patching, & Inspection Problem Areas	10	42
11/16/2006	Operations Performance Measures: Traffic Safety, Maintenance Activities, &Incident Response	10	42
12/8/2006	Construction Analysis for Pavement Rehabilitation	11	19
12/19/2006	Technology Transfer & Implementing Research	14	36
1/9/2007	Pavement Marking Reflectivity Measurement, Specifications and Performance Measures	10	36
2/13/2007	Work Zone Safety & Mobility	17	45
3/20/2007	Weight in Motion – AASHTO TIG	14	37
4/10/2007	Effective Impacts of Public Outreach and Public Awareness	7	21
5/8/2007	Transportation Asset Management - Implementation and Results	6	36
6/13/2007	Use of Thermography for HMA Paving Operations & Inspection	7	27
7/18/2007	Cable Median Barrier Systems	6	54

Table 2.1 Continued: Summary of WASHTO-X Events by Topic

Date	Topic	Number of Sites Participating	Number of Participants
8/14/2007	ACTIVE TRAFFIC MANAGEMENT	17	46
9/11/2007	Consultant Selection Process	12	38
9/18/2007	Construction Analysis for Pavement Rehabilitation	14	53
10/30/2007	Winter Maintenance Technologies	3	29
11/21/2007	Construction Issues: competition in Bidding, Quality, Inspection, & Alternative Delivery Methods	7	36
12/18/2007	Hiring & Retaining Top People in State DOT's & Local Agencies	5	13
1/8/2008	WEBINAR Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS)	6*	15*
1/29/2008	Update on Innovative Financing of Transportation Projects	8*	37*
2/19/2008	Implementation of MUTCD Regulation for Maintaining Traffic Sign Reto-Reflectivity	14*	24*
2/25/2008	Update of FHWA Market Ready Technologies	10*	12*
4/21/2008	Making Work Zones Better	11*	26*
5/13/2008	Precast Concrete Slab Technology & Applications	44*	115*
6/16/2008	Prefabricated Bridge Elements & Systems	33*	71*
Average *Max* Min		**10.15** *44* 3	**33.98** *115* 5

Table 2.2 Summary of Topics by Major Category

MAJOR CATEGORY	NUMBER OF TOPIC EVENTS
ADMINISTRATION	SEVEN
BRIDGE	FOUR
CONSTRUCTION	NINE
GEOTECHNICAL	ONE
ITS	ONE
MAINTENANCE & OPERATIONS	EIGHT
PAVEMENTS	TEN
SAFETY	EIGHT
TRAFFIC OPERATIONS	FOUR
TOTAL NO. EVENTS	**Forty-Six**

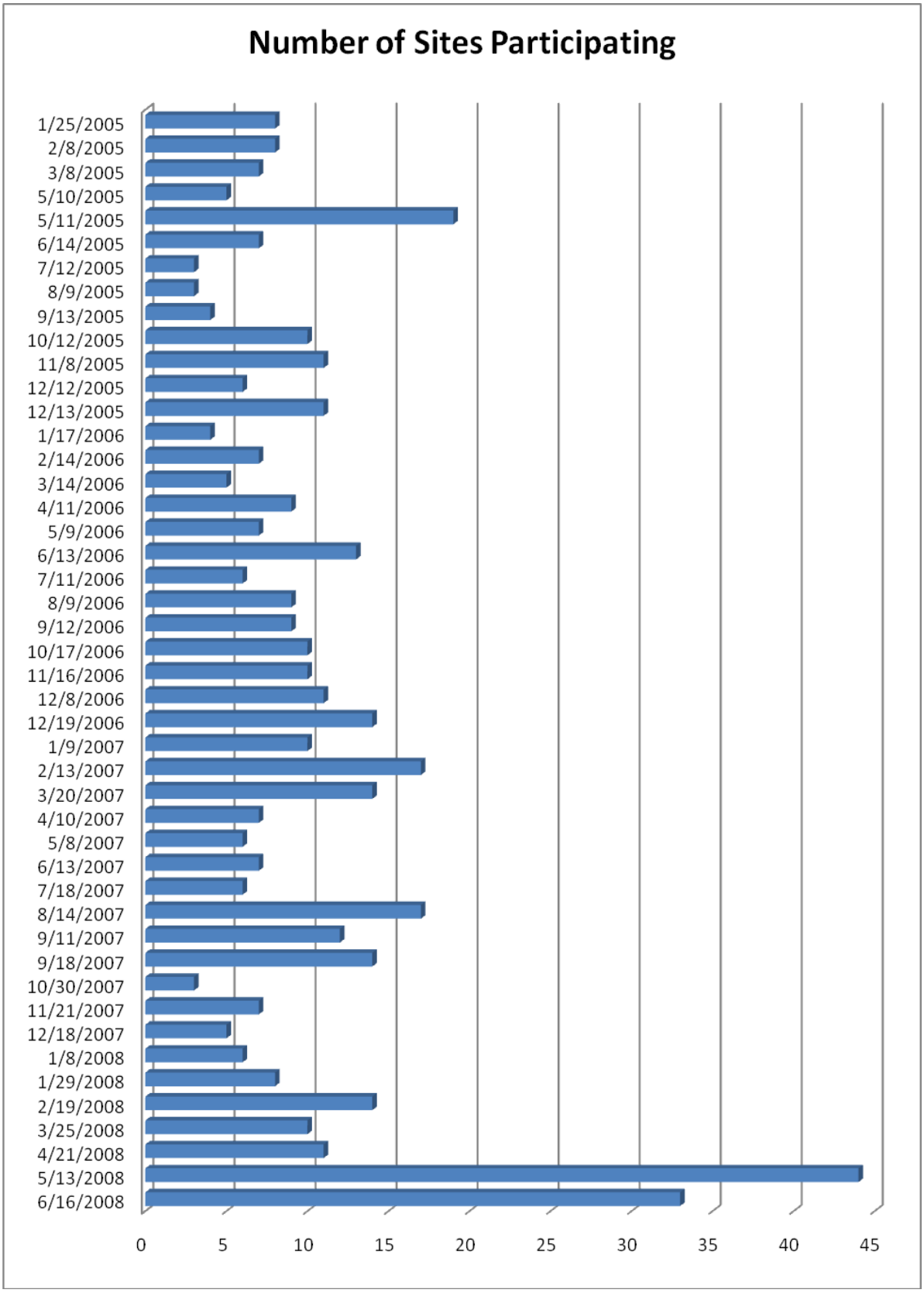
Participation Statistics & Participant Evaluation Responses

Site participation levels and participants' evaluation responses in the following graphs. The participant's evaluation form remained the same as the one adopted in December 2003. This allows us to compare the responses from the phase two report with data reported in 2004.

Participation levels for the Peer-X events has ranged from a low of five (5) to a high of one-hundred fifteen (115) participants. This upper bound increased from the 2004 high of 59. The number of agency sites connected for the events ranged from a low of three (3) to a high of forty-four (44). This was also increased from the high of 16 in the 2004 report. The FHWA bridge system continued to allow the State DOTs of Arizona, Nevada, Utah, and Washington the ability to cascade to other sites within their agencies.

Figures 2.1 and 2.2 on the next two pages give a graphical representation of the participation figures. On pages 17 and 18 of this document Figures 2.3-2.6 summarize surveys conducted after the events. A discussion of these results follows this presentation.

Figure 2.1


Number of Sites Participating
1/25/2005
2/8/2005
3/8/2005
5/10/2005
5/11/2005
6/14/2005
7/12/2005
8/9/2005
9/13/2005
10/12/2005
11/8/2005
12/12/2005
12/13/2005
1/17/2006
2/14/2006
3/14/2006
4/11/2006
5/9/2006
6/13/2006
7/11/2006
8/9/2006
9/12/2006
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12/19/2006
1/9/2007
2/13/2007
3/20/2007
4/10/2007
5/8/2007
6/13/2007
7/18/2007
8/14/2007
9/11/2007
9/18/2007
10/30/2007
11/21/2007
12/18/2007
1/8/2008
1/29/2008
2/19/2008
3/25/2008
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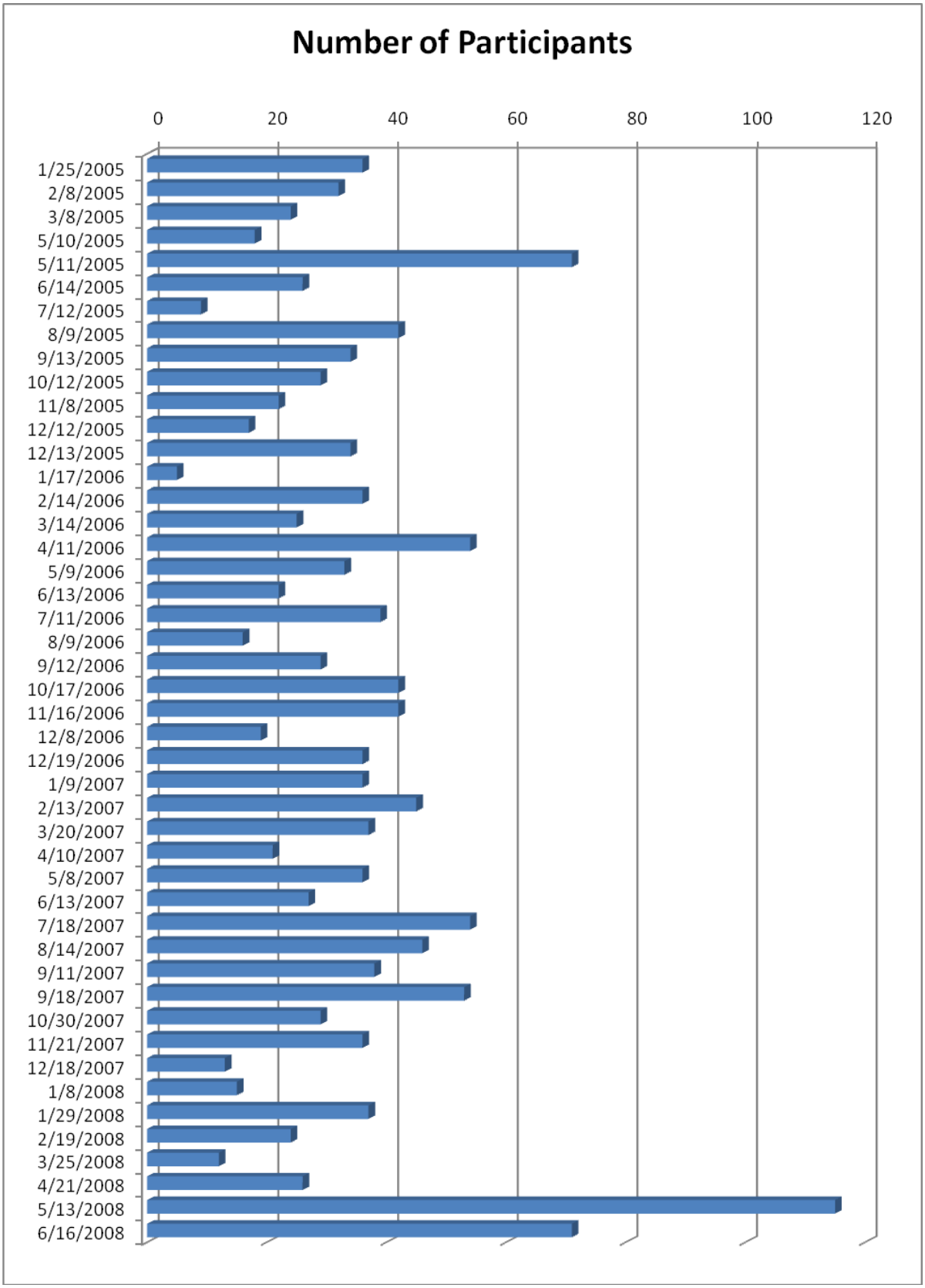
30
35
40
45

Figure 2.2


Number of Participants
0
20
40
60
80
100
120
1/25/2005
2/8/2005
3/8/2005
5/10/2005
5/11/2005
6/14/2005
7/12/2005
8/9/2005
9/13/2005
10/12/2005
11/8/2005
12/12/2005
12/13/2005
1/17/2006
2/14/2006
3/14/2006
4/11/2006
5/9/2006
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12/8/2006
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2/13/2007
3/20/2007
4/10/2007
5/8/2007
6/13/2007
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5/13/2008
6/16/2008

Figure 2.3

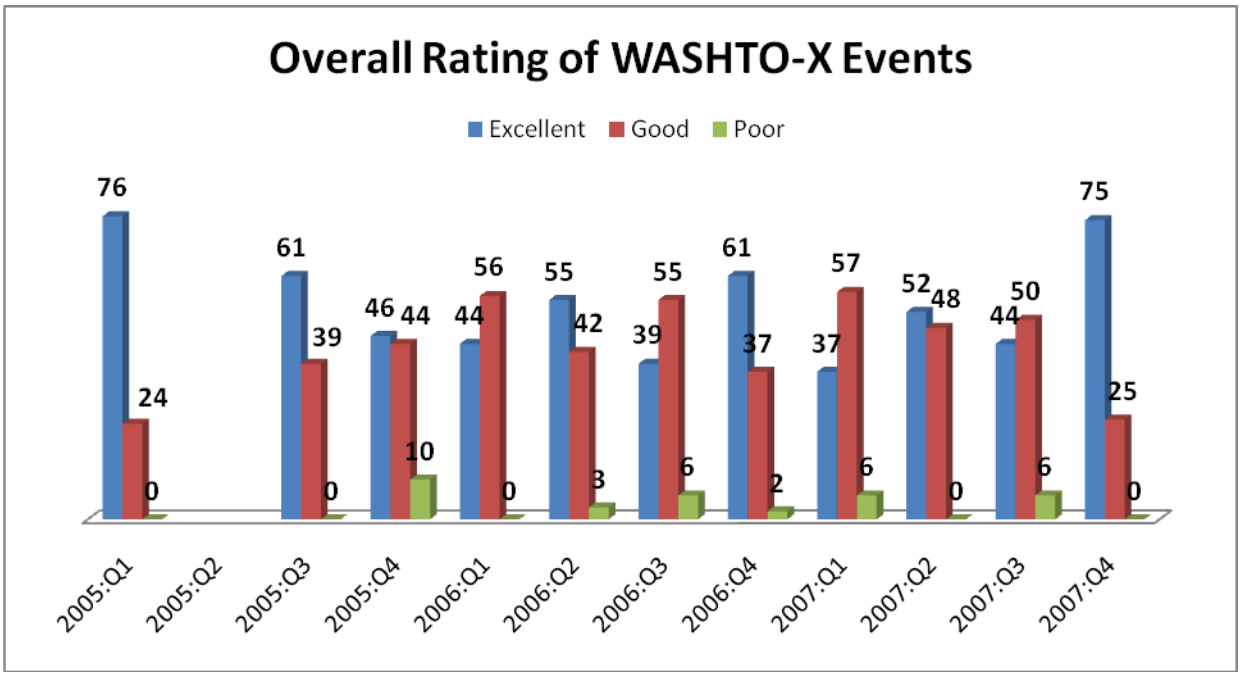
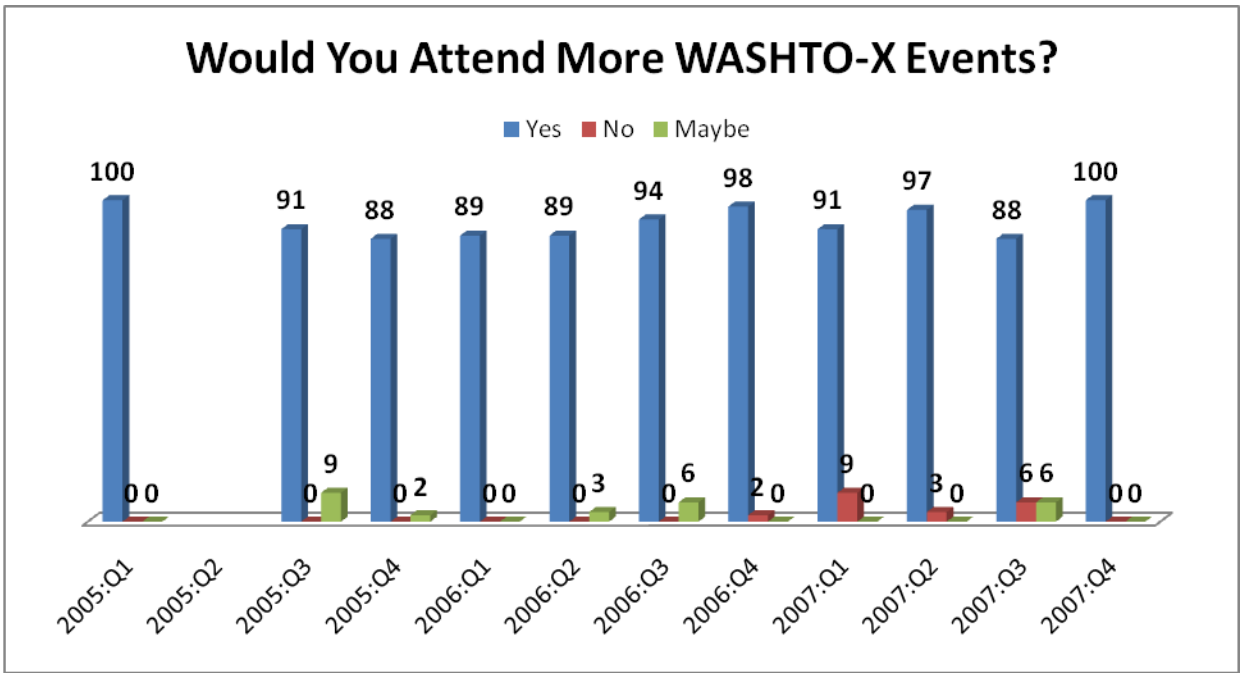


Figure 2.4



Figures 2.3 and 2.4 show that levels of satisfaction with the programs remained high throughout the phase two period. This reflects on the ability of the administrators to connect presenters and participants in a way where information was shared effectively.

Figure 2.5

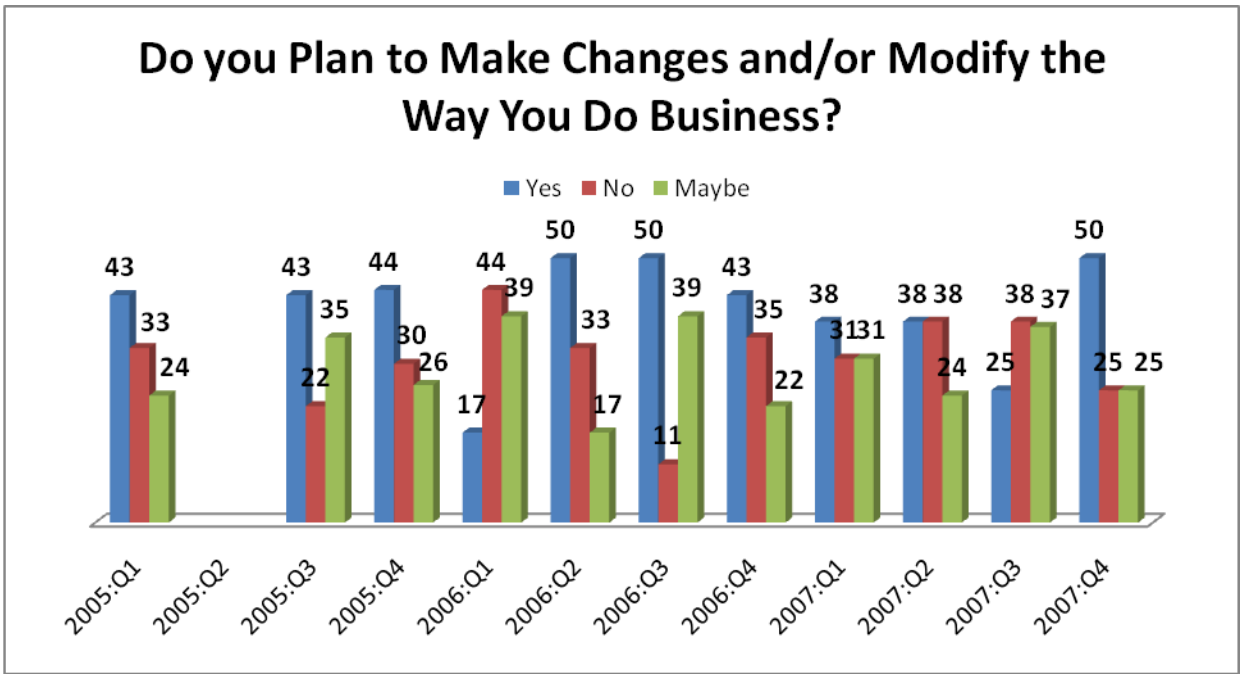
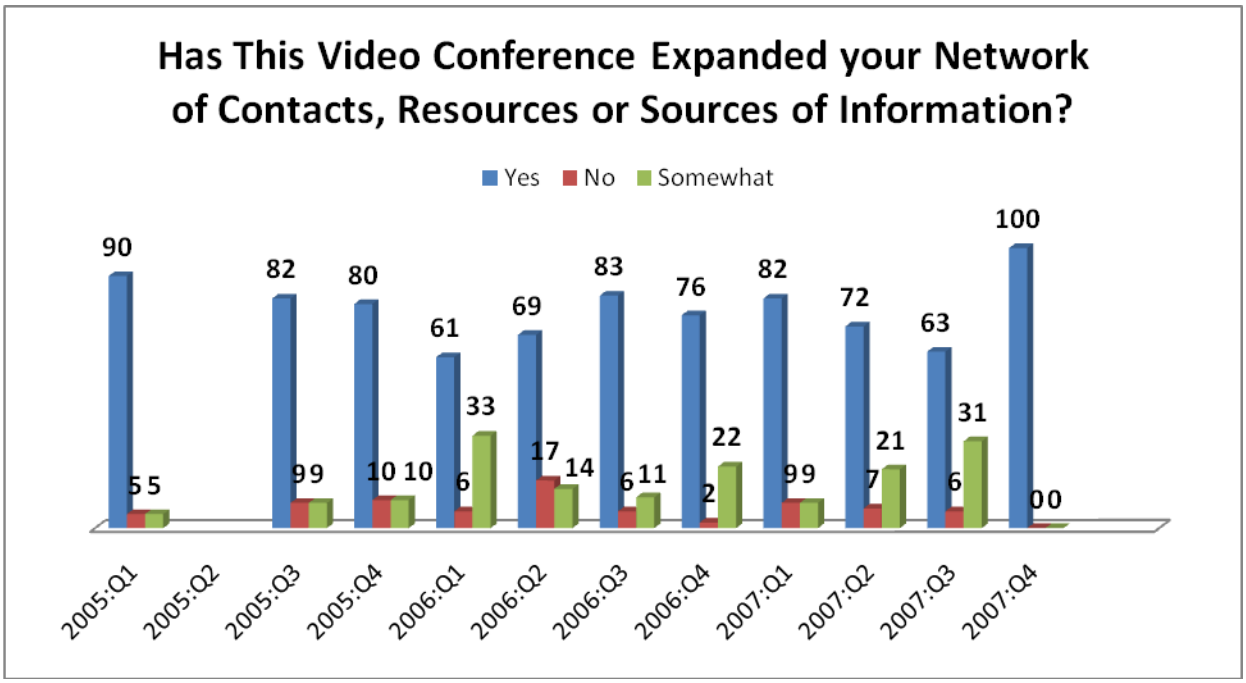


Figure 2.6



Figures 2.5 and 2.6 show additional information about how the videoconference is contributing to the participants ability to plan and reform their individual departments. This measure of connectivity between the target group is a sign of success for the project.

Phase Two's schedule of events ran from January 2005 to June 2008. The project website (http://www.washto-x.org) was updated as the events were planned..

All events conducted during the phase two period has been videotaped, subsequently edited and converted to digitized format and transferred to CD-ROM. This provides excellent documentation of each event and is posted on the WASHTO-X website for review, future reference, and for the benefit of those who may not have been able to participate. This serves as an additional means of technology transfer and information exchange. This provides additional value beyond that of the live videoconference.

Event Evaluation Detail

As familiarity increased, more problems were anticipated and corrects. This might explain some of the increase in evaluation from participants. The overall rating of WASHTO-X events by participants is positive with 53% identifying events as excellent (up from 43% in 2004), 43% good (from 52% in 2004), and 3% (from 5% in 2004) as poor. When asked, *"Would You Attend More WASHTO-X Events?"*93% answered yes (roughly the same as 2004), with 3% maybe, and only 2% no. The third question asked if the information in the session would change the way the participants did business. 40% said they Finally, the ability of people from diverse regions of the country were able to network with other experts and benefit from the exchange of knowledge. This is represented in the fourth question, where 78% of respondents thought the program had expanded their current network compared with only 7% which said no, and 15% chose the moderate response, "maybe."

Table 2.3: Average Responses to Survey Questions

(From 2005:Q1- to 2008:Q2)

Question	**Excellent**	**Good**	**Poor**
1. Overall rating of WASHTO-X events	53.64%	43.36%	3%
(2004 Report)	*(43%)*	*(52%)*	*(5%)*
	Yes	**No**	**Maybe**
2. Would you attend more WASHTO-X Events?	93.18%	1.82%	2.36%
(2004 Report)	*(92%)*	*(1%)*	*(7%)*
3. Do you plan to make changes and/or modify the way you do business?	40.09%	30.91%	29%
(2004 Report)	*(34%)*	*(29%)*	*(37%)*
	Yes	**No**	**Somewhat**
4. Has the videoconference expanded your network of contacts, resources, or sources of information?	78%	7%	15%
(2004 Report)	*(84%)*	*(10%)*	*(6%)*

This table indicates a strong endorsement of the WASHTO-X program. The responses to evaluation question number three are perhaps the most significant. Responses from a third of participants indicated that their participation in the program events will result in "changes in the way they do business" with about another third indicating they might make some changes. These findings indicate the profound impact of this new medium's potential in improving working practices, and procedures and the use of new technologies.

When assessed over time, the evaluations retain a constant mix of responses. This shows that as study continued additional three and one-half years progressed, there was an increase in the evaluation of the events and slightly higher participation on average. However, the overall rating summarized in Figure 2.3 suggests a starting point to evaluate the successes and failures as well as the attractiveness of the various topics offered in phase two.

This table (2.3) shows that, most participants were satisfied with the administration of the events.

Project Benefits

Newcomers to Videoconference Peer Exchange

The pooled fund study has brought a number of people into videoconferencing for the first time. Some people are reluctant to embrace new means of communicating. This project has served to show people how teleconferencing can help them in peer exchange and training. The project has exposed people to this potential. One of the unexpected outcomes of experimenting with video-conferencing is that the medium actually improves on traditional meetings in an unexpected way. When a videoconference meeting is composed of several sites, each has the opportunity and ability to discuss issues individually without disrupting the flow of the overall meeting. One group may explore ideas privately, simply through hitting the mute button.

Networking

Senior staff personnel typically enjoy travel budgets that permit them to meet their counterparts in meetings and conferences and exchange experiences and practices. Middle and junior level staff have traditionally been denied the ability to establish such informal networks. It is these unofficial associations with peers from other states and agencies that help people to grow and make changes in the way they do business. The project has facilitated the development of these networks for some that might otherwise not travel and has resulted in subsequent interaction and interchange of information.

Project “Products”

Although not specified in the study, the project has delivered a valuable set of by-products – some tangible, others intangible.

Information Exchange

When an engineer responsible for pavement markings hears about a new material from a colleague in another state, the recommendation is potent. Similarly, when a colleague, eager to share his experience with a new technique or material, offers a recommendation it carries much more weight and reliability than a "pitch" from a vendor. When state transportation officials learn of failures and share bad practices or pitfalls in new procedures from their peers it helps other professionals avoid such experiences. Vendors and contractors are understandably reluctant to publicize such failures. In addition, sharing of successes in the implementation of new technologies and procedures expedites and facilitates their adoption by others.

Compact Disc Recordings

Most events have been documented and burned onto CD-ROMs as well as posted on the WASHTO-X website to download. By so doing, the project has provided a diverse library of knowledge, relevant to transportation officials in a variety of program and topic areas.

Networking & Synergy

People have a natural inclination to reciprocate. When other share insight we are more likely to establish paths and habits of trade. The WASHTO-X program has provided a forum for positive sharing of ideas, best practices, and "war stories". Conferences and seminars offer a similar service, but the speaker on the podium is elevated. Videoconference peer exchanges are akin to informal discussions around the virtual water fountain. This cooperation leads to the whole exceeding the sum of the parts. Networking and leveraging of efforts among the participating State DOTs and FHWA offices has resulted in several event topic and program areas.

Agency Dialog &Cooperation

Many of the events involved state, Federal and local agency participants. This provided an excellent forum in which to express and exchange various technical, operational and program objectives, as well as more clearly communicate information in each of these areas. Organizational cultures generate mistrust and suspicion between colleagues in a vertical hierarchy. Videoconferencing with peers who are working in the same programs and using similar technologies aids in the sharing of information. Here participants learn about new technologies, materials, and procedures that save time and money ultimately providing better service to the public. Networking among professional peers allows for synergy as each brings their efforts to the group and leverages other's resources. As people get to understand each other's perspectives, they communicate better and grow in cooperation.

Web Based Session Documentation

A special website (http://www.washto-x.org) was developed for the study and was used extensively to communicate, advertise, schedule, and register sites and participants. Along with event scheduling, the website was used to obtain participants' evaluations of each event and to collect valuable statistical details regarding the study and to develop a network of peers for the event. Some events relied on web based documentation. The study, therefore, effectively generated new web based material.

Workforce Development – Professional Training

The main thrust of the study is Peer exchange through sharing information. One of the spin-offs is the innovation of training. People were exposed to videoconference based training that would not have been available traditionally.

The event with the most participants was the event: Quiet Pavements: Measures for Reducing Pavement Noise. A large majority indicated that they would be "more inclined to take another videoconference/web-based course." The majority of participants indicated they would recommend the class to others. Many commented on the break-down of the document camera during the first session. The overall impression was that, while the idea of technical training

through videoconference is novel and somewhat intimidating, the concept is well worth being sustained. Many have requested that other topics be scheduled.

Benefit/Cost Analysis

Taking the information from Table 2.1, a preliminary benefit/cost analysis shows that, were the WASHTO-X experiment to be fully funded, it would to offer dramatic savings compared to the same level of information sharing offered in a more traditional conference model.

				Annual cost
Traditional Costs	Average # Participating Sites		10.15	
	# sites traveling to meeting		7	
	Average # participants		34	
	# participants traveling yearly (13 events * 30)		390	
	estimated hotel & meal cost per person		$250	
	estimated travel cost per person		$500	
	total hotel & meal cost		$97,500	
	total travel cost		$195,000	
	time cost associated with travel @8hrs@$50/hr		$156,000	
	total equivalent "traditional meeting" cost		$351,000	$ 351,000
Videoconference Costs				
Bridge Capital Cost (IP & ISDN)	(Bridge Life Assumed: 5 Years)		$200,000	$ 40,000
	Line Rental Charges (ISDN Only, IP Free)			
	Events	22		
	Average Duration	180	Minutes	
	# Sites	8.55		
Line Rental (ISDN only)/Minute		$0.119		
	Total Line Rental Costs		$ 4,029	$ 4,029
Videoconference Administration	Program Director (inc benefits)		$ 50,000	$ 50,000
	Administrator		$ 25,000	$ 25,000
	Total Equivalent Video-Conference Cost			$ 119,029
	Annual Savings			$ 231,971

Assumptions	One Year Of Programming Based On The Last Three and a Half Years of WASHTO-X Programming. Hotel & Meals Cost = $250 Per Meeting Travel Cost = $500 Per Meeting Time Lost In Travel = $50/Hour Including Benefits New Bridge Cost = $200k (Based On TEL8 Estimates) Line Rental Charges Attracted Only For ISDN Connections - IP Free Line Charges Of 11.9c Per Minute - TEL8 Private Network, AT&T

The cost-benefit analysis shows:

- Videoconferencing saves traditional travel expense.
- The estimated annual cost for each agency is only $ 7,439 per year.
- The estimated cost per agency, per event is $ 375.00.
- The assumptions underlying the analysis are conservative.
- Assumptions about continued benefit from the first phase of the project were justified.
- Technological advances, such as Internet (IP) communication will decrease costs and increase ease of use.

Lessons Learned

Three scheduled Round-Table conferences, along with frequent email contacts, were conducted with agency site coordinators/technology transfer agents to improve on operating procedures, deal with technical problems, enhance advertising of the program, and make various improvements. The details of these conferences are presented in Appendix B. Major lessons learned are listed as follows:

1. Periodic conferences among Program Director and Site Coordinators are essential.

2. Event promotion <u>emphasizing that the program is highly participative in nature</u> prepares appropriate participants to actively take part in the scheduled event.

3. <u>Schedule of events and event agendas must be posted early and key people invited to participate.</u>

4. <u>The event topic must be clearly defined and described.</u>

5. <u>Event moderators must be adept in stimulating discussion and active participation.</u>

6. Marketing and promotion of the opportunities the program offers, along with making sure the appropriate people take part, is critical.

7. Timely solicitation of topics and getting them submitted so events can be scheduled and agendas posted, is critical to getting the appropriate people to participate.

8. It is very important to educate and train new participants on videoconferencing protocols.

9. Agency experts and program managers should be encouraged to participate and actively share their experiences and knowledge.

10. As a result of participating in a program event, a significant percentage of participants have stated that they intended to change the way they do business.

11. Videoconference room facilities need to be designed with regard to lighting and sound to ensure maximum effectiveness of presentations and participant interactions.

A promotional flyer was developed initially, along with other promotional materials for agency site coordinators/technology transfer agents to use to generate interest and invite potential participants to visit the website and register for events pertaining to their interest. Individual contacts by site coordinators has been found to be the most effective means for promoting and getting the right persons to participate in an event.

The key elements that have been identified for making an event successful are getting the right people to participate, having a specific agenda that is not too broad in scope, having two to three short informative presentations to facilitate discussion, and providing adequate lead time for people to plan to attend. Most problematic for the WASHTO-X program has been getting feedback about agenda presentations and subtopics/issues for discussion so sufficient time is provided for persons to plan to participate.

Several ideas have been put forward with regard to promoting the program. Special efforts by site coordinators to periodically notify potential participants by email, telephone, and personal contact have been the most effective. Ms. Kathleen Bergeron and Susanna Hughes-Reck of FHWA's Western Resource Center and Paul Mooney of the FHWA Utah Division have been especially helpful in providing information and resources to promote the WASHTO-X Program.

With the two-hour period allotted for each event, various approaches have been tried in the conduct of each event. A very short welcome to participants with an announcement of participating sites seems to work well to start each event. After this, the conference is turned over to the host site moderator who introduces the two to three introductory presentations that run for twenty to forty minutes. After these presentations, the floor is opened to a round table discussion with self-introductions at each site. Participants at each site are given the opportunity to ask any questions or make comments. This is done on a rotating basis to facilitate exchange of information and to build a network of contacts among participants. So far, this has worked reasonably well. Overall, comments and discussion has proceeded very well. Occasionally, the presiding round table moderator stimulates discussions and responses by asking pertinent questions and by requesting information from sites or persons who have been reticent to comment.

An introductory videotape provided by TEL-8 staff was used to introduce and educate participants who were unfamiliar with videoconferencing as to the proper protocols and procedures.

Technology

Technical Difficulties

"Technical Difficulties" was an important evaluation criteria in the 2004 report. A difficulty may be due to equipment failure or communication malfunction. The authors believe that some of the "technical difficulties" can be attributed to users' inexperience with the medium. This has been improved over time through experience with the conferences, but remains an important concern.

WASHTO-X Program Personnel

In addition to the provision of FHWA's bridge by Mrs. Betty Warren and the excellent technical support of Mr. Jeffrey Smith, the site coordinators and technical staff of each participating agency exercised key roles in the conduct of the WASHTO-X Program. The site coordinators advertised and promoted the program within their respective agency, as well as solicited topics and served as moderators for events. The names of these individuals are listed in Appendix E.

The success of each event largely depended on the candid interaction of each participant and those who made brief presentations to introduce the event topic.

Organizational, scheduling, and operational duties, along with documentation of events and collecting and compiling participant responses, were carried out by the Utah LTAP Center staff. The names of these individuals are attached as an appendix.

Recommendations

Expansion: Systems & States

Several additional State DOTs, FHWA offices, and University representatives were invited and given the opportunity to participate in WASHTO-X events. The State DOTs included Maine, Ohio, Colorado, New Mexico, Iowa, and Idaho. Personnel from the University of Texas, Texas A & M, Iowa State, as well as, the University of Utah and Utah State University have participated in selected events. Technical experts from FHWA's Resource Centers and FHWA Headquarters Program Offices have participated and contributed significantly to a number of events.

Technical limitations and opportunities

The WASHTO-X participants have benefited greatly from the excellent support of the FHWA network. Videoconference facilities are enabled through the FHWA Bridge in Washington DC. The communication medium is a switched ISDN connection, configured for both voice and data. ISDN can be described as a bundle of 24 copper telephone lines, bundled together.

A future option is to switch to an IP (Internet Protocol) based communication. This is a great opportunity for the future as more sites switch to IP, but is impractical right now. Although line charges are eliminated, as communication is through the Internet instead of rented copper wires, IP communication must wait for improvements in technology for quality and for more sites to have IP capable "CODEC's," which is the electronic device that disassembles and reassembles the video signals.

Currently, the FHWA Bridge carries all line charges. Should this facility be withdrawn, the line charges to States would be substantial. As IP based videoconference systems continue to improve in quality, the WASHTO-X team needs to monitor developments and ultimately switch to the new medium, should FHWA support be suspended.

The goal and objectives of the study have clearly been reached. While there are technical and administrative difficulties, the project should be sustained with a fresh pooled fund study. The benefits are many: peer exchange and networking the most striking. The spin-offs are valuable: information dissemination and professional development. The costs are low.

Washto-X Programming Staffing List

CO-PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR – DOYT Y. BOLLING (Half Time)
CO-PRINCIPAL INVESTIGATOR – PROF. PETER MARTIN (Part Time)
POOLED FUND PROJECT MANAGER – DOUGLAS ANDERSON, UTAH DOT (Part Time)
WASHTO-X Program Webmaster – Brian Birch, Utah LTAP Center

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Wesley Lum – Caltrans
Alan Hilton – Nevada DOT
Tie He – Nevada DOT
David Streb – Oklahoma DOT
Barnie Jones - Oregon DOT
Douglas Anderson – Utah DOT
Martin Pietz – Washington DOT
Paul Moody – FHWA Utah Division

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Peggy Harding - Arizona DOT
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Tie He – Nevada DOT
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Sarah Skeen – California Division
Greg Novak - Nevada Division
Steve Busick – North Dakota Division
Elizabeth Romera – Oklahoma Division
Richard Jurey – Oklahoma Division
Kim Hoovestol – Oregon Division
Paul Mooney – Utah Division
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