
ROAD DUST MANAGEMENT AND FUTURE NEEDS 2008 Conference Proceedings

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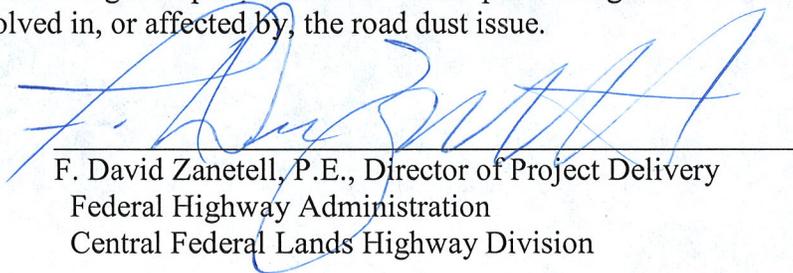


**Central Federal Lands Highway Division
12300 West Dakota Avenue
Lakewood, CO 80228**

FOREWORD

The Federal Lands Highway (FLH) of the Federal Highway Administration (FHWA) promotes development and deployment of applied research and technology applicable to solving transportation-related issues on Federal lands. The FLH provides technology delivery, innovative solutions, recommended best practices, and related information and knowledge sharing to Federal agencies, Tribal governments, and other offices within the FHWA.

This report provides information from the 2008 Road Dust Management and Future Needs Conference, a first-of-its-kind event for those interested in mitigating dust from unpaved roads. While unpaved roads provide important linkages in the overall road network, the dust created from these surfaces creates environmental challenges. Although considerable experimentation on a variety of chemical additives has been carried out in the last 70 years, chemical dust control and unsealed-road stabilization has not progressed to the point that road authorities can implement wide-scale programs with confidence. This report presents the proceedings from the first road dust management conference where issues, road dust best management practices, knowledge gaps, research needs, barriers to implementation, and identification of future needs were discussed. Given the volume of road dust that is generated from the unpaved road network, a cooperative and sustainable mitigation plan is needed. These proceedings serve to bring together stakeholders involved in, or affected by, the road dust issue.



F. David Zanetell, P.E., Director of Project Delivery
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16. Abstract The first Road Dust Management and Future Needs Conference in 2008 brought together practitioners, scientists and vendors to review the state of the practice and to determine the future direction of dust suppression and stabilization. The four themes explored at the conference were dust suppression, soil stabilization, environmental impacts of dust suppressants used to control dust, and planning and design for the future. Panel discussions and a group vote were used to identify four priorities for formalizing industry standards in road dust management. A major outcome of the conference was the decision to form an association. These proceedings serve to summarize conference discussions as well as to invite interested parties into the planning for a sustainable future in road dust management.			
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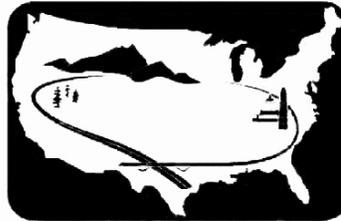
ROAD DUST MANAGEMENT PRACTICES AND FUTURE NEEDS – ACKNOWLEDGEMENTS

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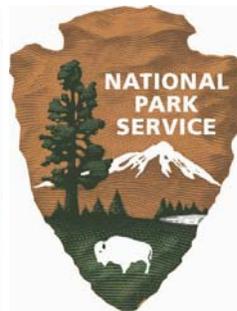
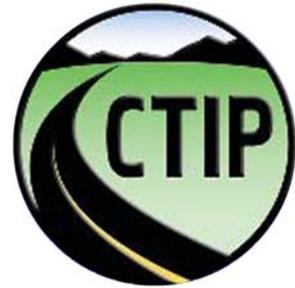


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GLOSSARY AND ACRONYMS

Additive	A chemical or material applied atop or mixed into a road surface to minimize particulate loss (i.e., dust). Also, something that is added, as one substance to another, to alter or improve the general quality or to counteract undesirable properties; in this case something added to the road surface to suppress dust or stabilize the soil.
Dust Suppressant	A chemical additive applied to an unsealed road surface to temporarily reduce the level of particulate matter entrained from the surface by passing vehicles or wind, but does not influence strength or plasticity characteristics of the natural material. Also, any substance that is applied onto, or into a surface, to prevent or reduce the dispersion of dust into the air.
Soil Stabilizer	A chemical or material additive mixed into an unsealed road surface to permanently increase or improve density, compaction, shear strength, and/or changes plasticity characteristics. Also, a chemical or mechanical treatment designed to increase or maintain the stability of a mass of soil or to otherwise improve its engineering properties.
Palliative:	Something that mitigates or alleviates a condition, in this case dust.
PM ₁₀	Air particulate matter less than 10 microns in size.
ADT	Average Daily Traffic
ASTM	American Society for Testing and Materials
BLM	Bureau of Land Management
BMP	Best Management Practice
CFLHD	Central Federal Lands Highway Division
CSIR	Council for Scientific and Industrial Research
CTIP	Coordinated Technology Implementation Program
DOD	Department of Defense
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
ISO	International Organization for Standardization
LTAP	Local Technical Assistance Program
LVR	Low Volume Roads (TRB committee)
MSDS	Material Safety Data Sheet
PNS	Pacific Northwest Snowfighters

ROAD DUST MANAGEMENT PRACTICES AND FUTURE NEEDS – TABLE OF CONTENTS

RITA	Research and Innovative Technology Administration
TRB	Transportation Research Board
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
UTC	University Transportation Centers

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EXECUTIVE SUMMARY

The first Road Dust Management and Future Needs Conference was held in San Antonio, Texas, November 13–14, 2008. The purpose of the conference was to bring together practitioners, scientists and vendors to provide an overview of the state of the practice and to determine the future direction of dust suppression and stabilization. This was accomplished through speakers, panels and open discussions with conference attendees, and a vote on priorities. The four themes explored at the conference were dust suppression, soil stabilization, environmental impacts of dust suppressants used to control dust, and planning and design for the future. Panel discussions and a group vote were used to identify four priorities for future growth in dust control. These were then developed into the following problem statements.

Guidelines and Best Management Practices

Develop a synthesis document on the current status and state of the practice of guidelines and best management practices for soil and soil stabilization.

Performance Measures

Develop an association that will define limits for performance measures, minimum performance standards, and balance these limits with a reporting-based system that allows for complaints to be made by product users and for resolution of these complaints. The limits should provide the end user with enough information for make informed decisions on products.

Specifications and Protocols

Develop a science-based standard for testing and auditing products, including a list of acceptable test methods, specifications for products and projects, and an end user decision making tool, with testing occurring at regional testing facilities.

Education, Clearinghouse, Outreach, and Training

Develop a clearinghouse of information that is owned by the association. Education, training, and outreach can be developed once the clearinghouse is in place.

In addition to developing the four priorities, conference attendees said an association should be assembled to continue the forward progress of the conference. Conference attendees volunteered to be project champions and potential funding sources.

Desired outcomes of this conference were to assemble an association, to make progress on at least one of the four identified priorities, and to hold a follow-up conference in one to two years.

Additional information including the conference white paper, speaker presentations, speaker papers, and posters can be found at the website: www.roaddustinstitute.org.

CHAPTER 1 – INTRODUCTION

The Road Dust Management and Future Needs Conference convened for the first time in the fall of 2008 in San Antonio, Texas, thanks to the hard work of the U.S. Department of Transportation, Federal Highway Administration, Federal Lands Highway, the Western Transportation Institute–Montana State University, Meetings Northwest LLC, and those on the planning committee. The conference was attended by 93 people representing 27 states as shown in Figure 1 and three countries—the United States, Canada and South Africa. The goal of the conference was to bring together practitioners, scientists, and vendors to provide an overview of the state of the practice and to determine the future direction of dust suppression and stabilization. Conference attendees represented federal and state departments of transportation (DOTs), city and county municipalities, Federal Highway Administration (FHWA), Environmental Protection Agency (EPA), Local and Tribal Technical Assistance Programs (L/TTAP), Bureau of Land Management (BLM), U.S. Forest Service (USFS), seven universities, and about 20 private companies.

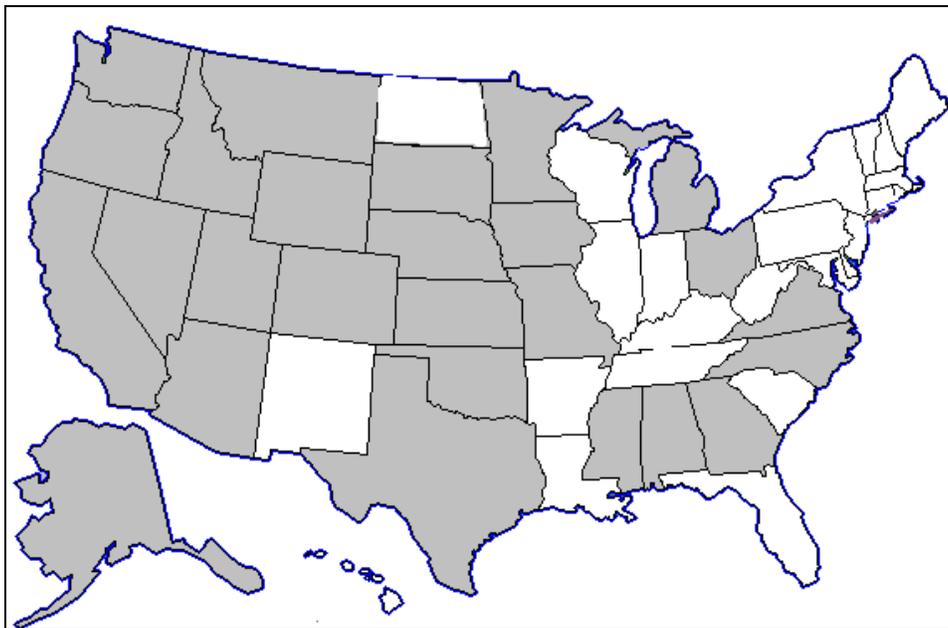


Figure 1 Map. United States locations of the conference attendees are highlighted in gray.

The conference began with a series of lecture-style talks on dust suppression, soil stabilization, environmental impacts of dust suppressants used to control dust, and planning and design for the future. Following these talks, four panel-led discussions were used to generate ideas for the future directions of the topics discussed in the panels. The ideas generated from each panel-led discussion were presented to the conference audience and the attendees voted on the top four ideas to pursue. Four breakout sessions were used to develop these ideas into tangible problem statements, as shown in Figure 2.

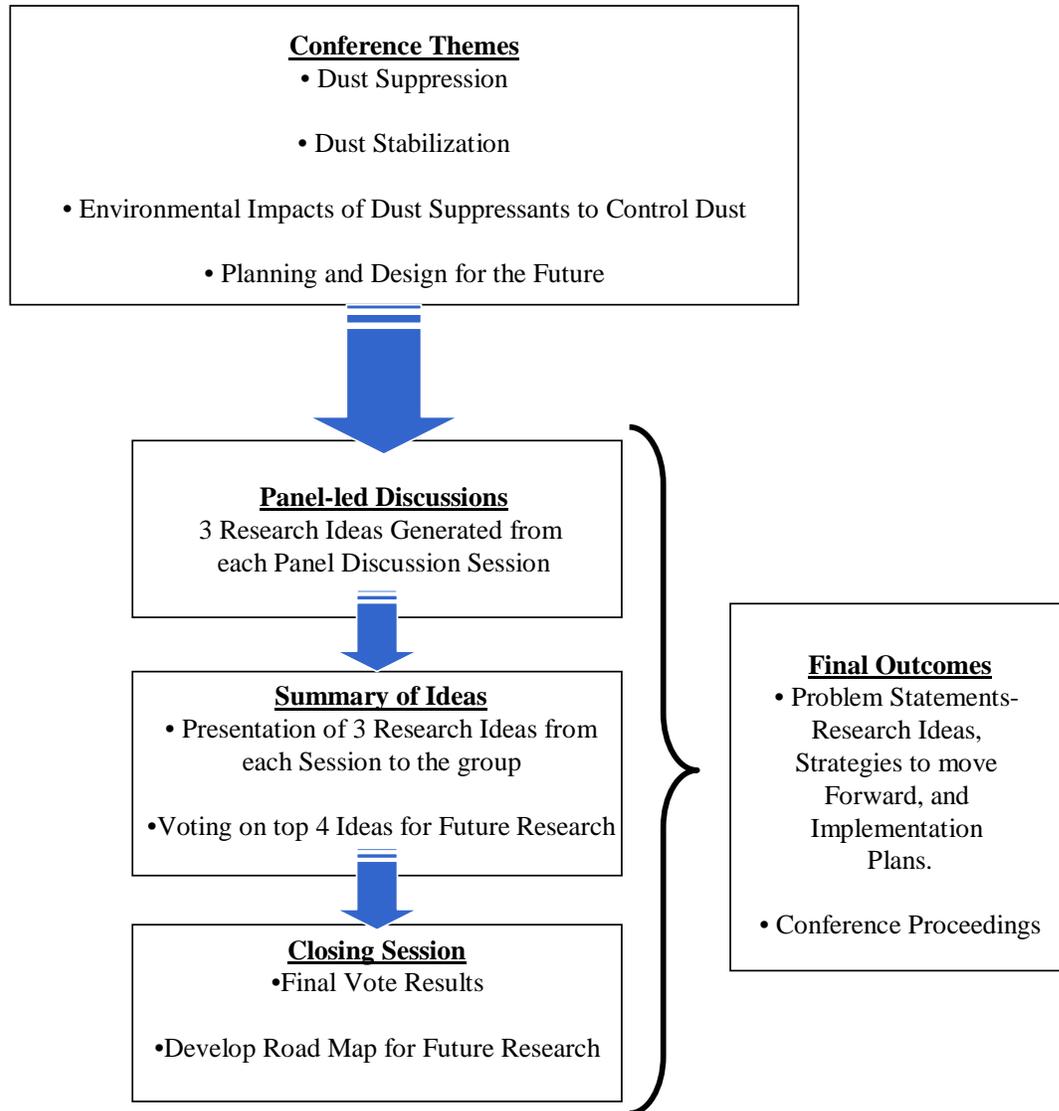


Figure 2. Flowchart. Conference outcome methodology.

The success of the conference was demonstrated by the number of attendees, the diverse fields they represented, enthusiasm for getting the four problems statements funded, and discussion of a follow-up conference in one to two years.

The following Chapter 2 provides background on the topic of dust suppression and stabilization. Chapter 3 provides an overview of what was covered in the keynote and speaker sessions. Chapter 4 presents the ideas generated in each panel-led discussion from the four sessions. Chapter 5 presents the four ideas chosen for development into problem statements, a summary of the problem statements, challenges discussed at the conference, and potential project champions. The conclusions of the conference are then presented in Chapter 6, followed by the References. Appendix A lists the conference attendees, and Appendix B shows the original conference agenda.

CHAPTER 2 – BACKGROUND

“Road dust control and unsealed road stabilization are significant road management issues. Although considerable experimentation on a variety of chemical additives has been carried out in the last 70 years, very little wide-scale implementation has taken place. There are many reasons for this, including the absence of a national authority, a fragmented industry, and a lack of funding for programs among unsealed-road authorities and owners.

This conference was planned to bring practitioners together to discuss road dust and adjacent area management issues, road dust best management practices, knowledge gaps, research needs, barriers to implementation, and identification of future needs. Participants attempted to explain why chemical dust control and unsealed-road stabilization had not progressed to the point that road authorities can implement wider-scale programs with confidence. Remedies were sought to initiate the development of nationwide administrative structures, information resources, and consistent experimental and maintenance protocols that, in a manner similar to those already in place for paved/sealed roads, would facilitate the adoption of standards and practices that will improve performance and reduce both maintenance costs and environmental impacts of unsealed roads. The conference was not intended to be a platform for reporting on another round of experiments, but rather a forum for identifying and overcoming the barriers to wider implementation of the results and recommendations of the past 100 years of research.”

The material above originally appeared in the conference white paper titled *Road Dust Management: State of the Practice* by David Jones of the University of California–Davis, David James of the University of Nevada–Las Vegas, and Robert (Bob) Vitale of Midwest Industrial Supply of Canton, Ohio. The complete white paper can be found at <http://www.wti.montana.edu/TechnologyTransfer/DustControl.aspx>.

The main themes of the white paper were:

- Unsealed road networks
- Volume of dust generated
- Consequences of road dust
- Dust control using chemicals, compaction aids, and stabilizers
- Environmental considerations
- An overview of dust control research
- Certification of dust control additives
- The way forward

CHAPTER 3 – SPEAKER SESSIONS

This section provides an overview of the speaker session topics and the talking points of the speakers. Speaker presentations, speaker papers, and presented posters can be found at <http://www.wti.montana.edu/TechnologyTransfer/DustControl.aspx>, and the conference agenda can be found in Appendix B.

KEYNOTE SPEAKERS

The keynote speakers provided background on dust suppression and stabilization, and offered insight from four perspectives: (1) regional to national scale, (2) research, (3) vendor/construction, and (4) maintenance.

David Jones of the University of California–Davis gave a background talk on the main themes of the white paper that was prepared for the conference as mentioned in section three.

Michael Long of the Oregon DOT and TRB LVR Committee spoke about road dust management from a national and international perspective. He provided a general overview of what is considered dust and why it is a problem, the global scale of the dust problem, and dust issues at the road and project level. He then provided some examples of local and international dust problems.

David James of the University of Nevada–Las Vegas spoke about research needs in the fields of dust suppression and stabilization. Dr. James provided an overview of the current literature, discussed the state of the practice, outlined efforts that have been made to define all the important parameters that need to be measured, and provided ideas on how to move forward.

Ron Wright of the Idaho Transportation Department and Pacific Northwest Snowfighters (PNS) spoke about the development of a chemical selection process that eventually became a qualified product list for PNS in the field of winter maintenance. He provided the specifications they decided upon, lessons learned, and discussed a pathway forward.

Ken Skorseth of South Dakota State University and SDLTAP provided a maintenance perspective and discussed managing the frequency of gravel road blade maintenance, maintaining shape of the road and shoulder, and the need to specify good surface gravel/aggregate. He went on to discuss the general lack of specifications, and of the specifications that exist the problems associated with them, as well as the difference in road performance between surface and base gravel use.

DUST SUPPRESSION

David James of the University of Nevada–Las Vegas moderated this session on research, monitoring and evaluation of road dust suppressants. This session highlighted the current methods, available products, and aggregates used in dust suppression. What works and what does not work, as well as road base preparation were discussed. New technologies and ecological impacts from a research-based perspective were presented.

Chatten Cowherd of the Midwest Research Institute discussed how to quantify dust emissions from unpaved roads and how to measure/control performance monitoring of dust control products. He provided a formula to estimate a national average emission rate in mass per time. Cowherd addressed the importance of field studies in determining performance and also shared techniques using mobile sampling devices.

Tom Sanders of Colorado State University presented results from a study that found maintenance costs for treated roads was 50 percent less than similar costs for untreated roads. Much research is still needed to determine optimal application methods. However, he has found that treating roads with dust suppressants is a win-win situation for those concerned about air quality and maintenance costs.

Dennis Fitz of University of California–Riverside’s Center for Engineering Research discussed a mobile method to determine emission rates and evaluate the overall effectiveness of dust suppressants. His work pertained to unpaved roads in public as well as industry settings.

John Bosch of the EPA’s Air Program discussed his role in the regulation of fugitive dust. He promoted the formation of a standardized protocol to control dust and presented the myriad motivations of the various types of stakeholders involved in the dust issue. Ultimately, however, due to other pressing environmental concerns, road dust is not a major focus for the EPA. Therefore, Bosch recommended that the association that is to be formed from this conference take the lead if national attention is to be brought to mitigating the road dust problem (see Appendix C - EPA Letter of Support).

SOIL STABILIZATION

Roger Surdahl of the Central Federal Lands Highway Division (CFLHD) moderated this session on road stabilization and maintenance. This session highlighted the current methods, available products, and aggregates used in soil stabilization. What works and what does not work were discussed, as well as road base preparation. New technologies were also presented.

Steve Bytnar of Envirotech provided the perspective of the vendor when dealing with different clients in different climates and explored many of the complexities of deciding how to treat individual road projects. He made a distinction between results from dust suppressants versus road stabilization and emphasized the overriding importance of knowing the goal of each road project. Steve Bytnar was a replacement speaker in the session due to Stan Vitton’s delayed arrival.

Heine Junge of South Dakota shared his success story of unpaved road stabilization with the Pennington County Highway Department. He provided many examples of what products and methods work in various road situations and provided insight on how to work with county commissioners and private citizens.

Melvin Main of Midwest Industrial Supply shared information about geo-technology and its use in road stabilization. He provided a case study from the city of Scottsdale, Arizona. Main discussed what they learned about the predictability, strength, and durability of stabilizers from field test installations and evaluations.

Stan Vitton of Michigan Technological University provided a case study on fugitive dust control from mine haul roads in Michigan. Traditional measures for stabilization during cold weather were unsuccessful because the piles are so dynamic and grow by several feet per year. Experimental testing of various stabilizers found that light paper sludge application is a very effective method for controlling cold weather dusting from sublimation. For road applications, Finland compacts paper sludge for use on shoulders and in the pavement structure itself, making geosynthetics and geomembranes obsolete in that country.

ENVIRONMENTAL IMPACTS OF DUST SUPPRESSANTS USED TO CONTROL DUST

Susan Finger of the U.S. Geological Survey moderated and spoke in this session on the environmental impacts of dust suppressants used to control dust. This session covered dust impacts to air quality, human health, vegetation, soil, wildlife, water quality, and dust suppressant chemistry. Susan Finger shared how the USGS's experience with the assessment of environmental contaminants from other fields could aid in the assessment of dust suppression and stabilization chemicals. She presented information on the Columbia Environmental Research Center where lab and field testing can be conducted.

Fred Hall of Environmental Quality Management, Inc., presented information for additional authors Bill Kemner of Environmental Quality Management and Karen Irwin of the EPA Region 9. He provided information on a lab study that looked at a variety of soil types and dust suppressants. He addressed heavy metal concentrations, water leaching studies, the effectiveness of dust suppressants in disturbed and undisturbed environments, a variety of water quality parameters, and aquatic toxicity data.

Rodney Langston of Clark County, Nevada, Air Quality and Environmental Management presented information on what to do if you have PM₁₀ issues. His talk covered how and why PM₁₀ issues are usually reported. He discussed elements of state implementation plans and control measures and spoke specifically about the Clark County program that involves a working group assigned to develop recommendations and guidelines and conduct research. He presented information on the current unmet needs in this field and different roles of federal, state, and local agencies.

PLANNING AND DESIGN FOR THE FUTURE

Dave Jones of the University of California Pavement Research Center and Council for Scientific and Industrial Research (CSIR) in South Africa was the moderator for the speaker panel on planning and design for the future. This session covered planning projects from conception to completion as well as dust control based on average daily traffic (ADT). Cost analysis of dust control versus soil stabilization was also given.

Pete Bolander provided an overview of USFS perspectives on dust control. The USFS manages 375,000 miles of road (paved and unpaved). The agency has no formal dust abatement management policy but does have a number of guidelines, specifications, toolkits and unpublished studies available. The challenge is to transfer this knowledge to the USFS's 400 district road managers and beyond. A centralized location in the form of a website would drastically improve communication for everyone concerned about road dust issues. In order to improve the state of the practice of dust abatement, everyone from users to manufactures to researchers ought to share and publish failures as well as successes.

Ken Skorseth provided insight into the county engineer's perspective. The state of dust control operations varies widely across the country depending on the agency, substrate, political pressure, product compatibility and other variables. There are many examples of surface treatment failures, the memories of which linger and hinder user and public acceptance of products and projects. However, Skorseth is hopeful that more and more surface treatment successes with documented outstanding performance will drive others to engage in the practice of road dust mitigation.

John Rushing gave the U.S. Army Corps of Engineers' perspective on the Department of Defense (DOD) applications of road dust suppressants, focused on air and ground soldier safety. The DOD has published criteria for road dust management but much of the guidance therein is outdated or environmentally unacceptable. Ongoing military research of products in various scenarios serves to keep guidance and protocols current. Key elements in the process are user training and evaluation to ensure effectiveness and instill confidence in dust suppression products.

Steve Bytnar provided an additive industry perspective. The main barrier to implementation of dust additives is the work it takes to fully understand customers' needs and to agree on expectations. It is necessary to educate customers on the fundamentals of road preparation and compaction, on aggregates, soil types, pH levels and the types of products that can be expected to work in each situation. No standard testing protocols exist so companies are currently forced to devise their own. The industry as a whole will benefit from regionalized performance testing and standardization.

David Jones completed the session with an academic/researcher perspective. The presentation covered the status quo on research on road dust management, an overview of the results of a survey of road industry practitioners' thoughts on road dust management, the need for and use of research protocols, and what constituted appropriate documentation for non traditional road additives. The use of fit-for-purpose certification procedures was also discussed.

CHAPTER 4 – BREAK-OUT SESSIONS TO PRIORITIZE TOPIC IDEAS

The audience had a choice of four concurrent sessions during which they could discuss the most pressing needs. Each session culminated in a vote of the top three priorities within each session topic.

DUST SUPPRESSION

David James of the University of Nevada–Las Vegas moderated this session. He posed a series of questions to panel members and the audience, which are presented below along with a summary of each discussion.

1. What really is the problem?

Dust causes safety problems, in particular, for the military, including loss of visibility and loss of material leading to economic problems. Specifically, (1) tight budgets prevent agencies, users, etc., from testing all products; (2) different approaches to testing result in incomparable data sets; and (3) lack of information available on the impacts of chemical dust suppressants and stabilizers on the environment when applied as recommended.

Customers, private and public, do not know criteria by which to judge the products. A lack of minimum standards and a need for an independent agency to certify the products was also mentioned. In South Africa there is a public testing agency. A vendor added that vendors should provide material information data sheets (MSDS) for customers to use as a reference, and that this should be enough information to evaluate different products against one another.

An audience member commented that the town of Queen Creek, Arizona, was under non-attainment for PM_{10} and that it must implement control measures, but it is not sure what options are available. There is a need for a menu of options for controls. Additionally, a list of what products work, where, and under what parameters (e.g., weather conditions, soil types, specific environments) would be beneficial.

2. Is there a need for testing of dust suppression and stabilization products?

An audience member said that there are a variety of purposes for measurements and protocols, such as temporary versus permanent sealing of roadways. Any developed solution would need to be simple for customers to utilize, for example, an if–then table.

It was also remarked that manufacturers could establish minimum specifications, as has been done in other industries. An audience member remarked that vendors do not have common testing protocols. This means that agencies cannot use a sole source to purchase the product they want to use because it is difficult to compare results/specifications between vendors. A vendor from the audience suggested the need for developing test methods that all interested parties could accept and training people how to use products appropriately. He then gave the example of standard smokestack test methods, and the need to do method verification. Unfortunately, there is no parallel in a non-smokestack environment. The problem is that fugitive dust sources are more variable than smokestacks and that testing in the field is very embryonic. An audience member reiterated the need for test protocols and an independent testing agency, and to approach the issue with wider standards.

3. Where do we start?

Performance criteria should be set by the user. We can look at larger purchasers, such as in the military, as an example, and examine their performance criteria. An audience member suggested that test protocols and methods should be universal to alleviate confusion. One example provided was the EPA, which establishes a workgroup with all stakeholders at the table to develop test methods.

A vendor reminded everyone that there are various categories of dust suppression products that work differently under different conditions. What may work best in some soils will not work as well in other soils. Therefore, test methods should accommodate this variability. An audience member referred back to the if-then table to help with this variability between products.

An audience member reminded everyone of environmental safety issues, and another suggested the need for an index for consumers. There is also a need for guidance for private owners that specifies exposure risk for those doing small applications, such as on driveways. Both public and private roads need to be controlled, but the users are very different. Private haul roads are very important and are major emitters in some areas. Different protocols for different purposes are also needed.

4. How do we accomplish this?

One way would be to institutionalize methods through American Society for Testing and Materials (ASTM) or International Organization for Standardization (ISO) because compliance with either of these organizations has meaning for both private and public consumers.

A vendor suggested we need to decide what problem to address and use screening methods to “bracket” performance. Vendors could then show they have met the minimum criteria with screening methods before going to full-scale performance testing. An audience member then asked who would do performance tests. The vendor responded that contract labs could conduct the testing once they have shown they are able to perform the tests.

An audience member stated that local entities lack resources to do testing. However, there are models for working around this for example, the work done by the Western Regional Air Partnership, an effort administered jointly by the Western Governors' Association and the National Tribal Environmental Council, where review is done by associated responsible state agencies, but this can take a year to get done. An audience member brought up that homeowner protocols might be different from agency protocols.

An audience member said that most DOTs do have qualified products. Some products are more experimental, such as line paint, while others are more mature, like asphalt cement, in testing. Dust control products are likely to be considered experimental at this point, so we must take baby steps.

Below is a summary of the ideas generated from this session to present to the larger conference audience. The ideas in italics were then condensed to three ideas, as seen in the next section.

- 1. Development of reliable, repeatable and appropriate-to-use protocols focused on unpaved roads for now, and then look for broader applications later such as vacant lots, construction areas, etc.*

2. *The protocols should measure environmental safety and impacts, occupational safety, and the effectiveness or performance of products against a minimum standard for the purpose of determining an expected lifetime.*
3. *Attributes that should be defined and posted include the service life and manufacturer's warranty, geology, temperature, precipitation, cure time, depth of penetration of the product, solubility of the product for clean-up purposes, MSDS, sufficient information to assess risks, a defined shelf life, corrosivity, application methods, and unit weight.*
4. Performance should be tied to application practices.
5. *A manual of essential practices that is available on the web and contains information about application methods and necessary maintenance linked to performance, and should include case studies or examples of good practice.*

SOIL STABILIZATION

Roger Surdahl of CFLHD moderated the session. The session consisted of a discussion of identifying problems with the current state of road soil stabilization practice. At the end, some ideas were generated on how to start solving those problems.

Roger Surdahl posed the following questions (a summary of the group discussion is provided after each):

1. How many more research studies do we need to do in road stabilization?

It may not be a question of needing more research, per se, but needing guidelines on how to incorporate cost-effective stabilizing materials. Still, there will always be a need for research.

2. What drives the use of the products—is it cost and availability or is it performance?

It depends on the perspective. For some, such as researchers, performance is the key for whether products are used. Another key component in selection of products is the soil type, specifically the amount of clay. For others, such as suppliers or counties, cost is most important. While performance ought to drive use, in reality it comes down to cost.

3. Is there any guidance already available that can be used more widely?

Current manuals may suffice for guidance on maintaining gravel roads but more guidance is needed on applying products. The USFS is creating a guidance document by compiling information on how to choose products for different scenarios. The Cold Regions Research and Engineering Lab published an unsurfaced road condition rating index, which is probably the best example of a guide to gravel road management that is available.

4. What is a reasonable cost per mile for road stabilization?

It is generally agreed that road stabilization is more cost-effective than dust control. Some believe stabilization costs can be recouped within a year, however it may take several years to treat 100 percent of a program. Two cost estimates for stabilization were 1) 10 to 22 cents/square foot, and 2) \$3,500/mile/year (compared to an asphalt road, which costs \$8,000/mile/year). For sandy bases, a biennial maintenance schedule is needed, whereas for clayey soils, the maintenance schedule becomes less expensive over time. The cost to mobilize equipment can be more than the cost of the product itself. In some places, homeowners must pay for road stabilization or dust control directly. In order to convince decision makers that

stabilization is worth the cost, unbiased documentation is needed, such as the paper by Tom Sanders (Sanders and Addo 2000). The question was raised, “What are the costs if unpaved roads are not treated?”

5. What is the single most important problem that needs to be solved in soil stabilization? (Answers are generally listed in order presented; these problems were then voted upon with the resulting top three in italics):
 - *Need to improve the long-term durability/life expectancy of product in terms of ultraviolet degradation, freeze–thaw cycling, etc.*
 - Political influence; need to learn how to convince decision makers that treatment will pay off in the long run.
 - *Need to include dust in long-term pavement management systems; need for more quantifiable and standardized documentation; need for better specifications and best management and construction practices*
 - Environmental and compliance issues; potential violation of Clean Air Act? Other environmental issues such as weed invasions via road corridors, etc.
 - Lack of funding
 - *Need for education for all involved, i.e., customer, politicians, practitioners, etc.*
 - The cost of the product
 - Need for consistent process

While environmental and compliance issues ranked relatively high in the voting, environmental issues were discussed in another session and, therefore, was not included in the final vote results from this group.

6. How are we going to address these top three problems?

There are some examples to follow, such as the Federal Highway Administration’s national pooled fund study or perhaps a more regional approach. Ultimately, there is a need to form an organization that can disseminate information via a centralized website, workshops, etc. The key is to keep it simple so that all levels of practitioners may understand how to put the information into practice. However, in order to educate, first you need to have something to teach.

ENVIRONMENTAL IMPACTS OF DUST SUPPRESSANTS USED TO CONTROL DUST

Susan Finger provided an overview talk of what was covered the previous day by the session speakers and information from any relevant conversations she had outside of the session. Panelists were available to address specific topics and provide direction for the session. The audience provided input on a variety of needs and challenges, resulting in the following list of suggestions for the future direction for this topic. The audience then voted on their top three ideas to present to the whole conference audience (in italics). Ideas five through eight listed below were combined into one idea that was then presented to conference audience.

1. Develop an inter-agency working group—a national shell to serve regional groups
2. *Develop a database and/or a management tool*

3. *Develop/standardize test protocols based on EPA environmental and performance protocols and Bureau of Land Management (BLM) mandates*
4. Develop a current list of BMPs
5. *Develop a road safety audit program applied to dust control*
6. *Education/Training*
7. *Guidance document on dust control—Low volume road committee at TRB as a potential champion*
8. *Collect manuals, design and guidance documents to find an appropriate model*
9. Develop a document/template to assess a road's impacts on the adjacent environment

Organizations that most likely have information to help move these ideas forward include: USFS, EPA, BLM, and Federal Highways. The main focus was intended to be on protocols and impacts to water and terrestrial environments, where air quality could fall under the purview of performance of dust suppressants and stabilizers.

PLANNING AND DESIGN FOR THE FUTURE

Dave Jones guided the audience discussion and panelists were available to address specific topics. The audience provided input on a variety of needs and challenges, resulting in a top-ten list of barriers. The audience then voted on their top three barriers (in italics):

1. *Client expectations/knowledge*
2. Client perceptions
3. *Category specifications*
4. New product acceptance
5. Politics/money/future costs
6. Central information location
7. Research/testing protocols
8. Reinventing the wheel
9. Product documentation and information
10. *Education and training*

The top three priorities were then refocused for presentation to the conference audience.

1. Guidelines and specifications (performance based/cost benefit)
2. Education, training and technology transfer
3. Additive category specifications (tied with the following)
3. An “owner” for unsealed road specifications

CHAPTER 5 – COLLECTIVE DISCUSSION

Following the break-out sessions, the attendees met and each break-out session moderator presented his or her group's top three priorities. The conference audience then voted on the top four ideas presented and developed these into problem statements, all of which are presented in this section. This section also discusses potential challenges and project champions.

COLLECTIVE VOTE ON PRIORITIES

Dust suppression

1. Develop reliable, repeatable, and appropriate use of protocols
2. Define what the protocols should measure and specify what attributes that should be defined and posted
3. Develop a manual of essential practices

Soil Stabilization

1. Long-term durability/life expectancy of the product
2. Education for all involved
3. Long-term pavement management system, specifications, and best management and construction practices

Environmental impacts of dust suppressants

1. Develop a database and/or a management tool
2. Develop/standardize test protocols based on EPA environmental and performance protocols and BLM mandates
3. Education, training, guidance document, state of the practice, clearinghouse

Planning and design for the future

1. Guidelines and specifications (performance based/cost benefit)
2. Education, training and technology transfer
3. Additive category specifications (tied with the following)
4. An "owner" for unsealed road specifications

Each audience member was given the opportunity to vote on his or her top four priorities from the list above, some of which were combined due to their similar nature. The following four priorities received the most votes:

1. Guidelines and Best Management Practices
2. Performance Measures
3. Specifications and Protocols
4. Education, Clearinghouse, Outreach, and Training

There was a final concurrent break-out session that focused on the four identified priorities. Moderators facilitated the group in writing brief problem statements for each.

There was also overwhelming support to develop an association. Most conference attendees said that there should be an association even though it was ranked fifth, after the four identified priorities listed above. A steering committee representing various stakeholders will be formed to implement the proposed association and plan the next conference.

PROBLEM STATEMENTS

The following are brief summaries and preliminary problem statements for each of the top four voted priorities.

Guidelines and Best Management Practices

There is a need to develop a synthesis document on guidelines and best management practices for dust control and soil stabilization. Such a document would allow for future comparison between products and to mark progress over time. The document would be submitted to the Transportation Research Board (TRB), the Coordinated Technology Implementation Program (CTIP) or University Transportation Centers for funding.

Performance Measures

“All dust all the time is not acceptable but no dust all the time is unattainable.” Finding a necessary balance ought to be the responsibility of the association that will be formed as a result of this conference. The Better Business Bureau model may be the best approach for this complex situation where many different products exist, many of which have no guarantees or even product labels. Develop a reporting-based form that would allow for complaint resolution, and give the end user some information to make informed decisions. Ultimately, the risk of defining performance measures should be shared by the three-legged stool of the government, the end users, and the manufacturers and suppliers.

Specifications and Protocols

The industry needs a science-based standard for testing and auditing products so that MSDSs have meaning and environmental impacts are kept to a minimum. An array of deliverables are needed in order to define industry standards, such as “protocols for protocols,” a list of acceptable test methods, specifications for products and for projects, and an end user decision-making tool. To remove bias and to increase accuracy, regional test facilities that represent different climates and soils may be the best option to meet the diversity of needs across the continent.

Education, Clearinghouse, Outreach, and Training

Particulates from fugitive road dust threaten air quality. Products and technology exist to minimize road dust and their use can reduce maintenance costs. Before we can educate, train or reach out to all stakeholders involved, however, we must first assemble the available information. Development of a clearinghouse is the first step in accumulating and disseminating this information. The clearinghouse should be “owned” by the association that will be formed as a result of this conference. Two types of training/outreach formats are needed, one focusing on awareness and promotion (e.g., the “sales pitch” for decision makers) and the other for a more technical audience (e.g., how to build unpaved roads, guidelines, specifications, protocols, best management practices, compendium of studies, etc.).

CHALLENGES

The following is a list of potential short- and long-term challenges that were discussed at the conference.

Short-Term

- Developing an association—who, what, when, and where
- Location of the clearinghouse (EPA volunteered its website)
- Funding to accomplish the top four priorities

Long-Term

- Maintaining continued open dialog and support from practitioners, vendors, and scientists
- Locating funding for the association and conferences

Conference participants were asked to help mediate the short- and long-term challenges listed above by volunteering to join the association, act as project champions, and/or provide funding.

POTENTIAL PROJECT CHAMPIONS

Following the presentation of the problem statement ideas, conference attendees were asked to volunteer if they were interested in helping to move these ideas forward. Provided below, in no particular order, is a list of interested individuals and their affiliations.

John Bosch, Environmental Protection Agency

Steve Albert, Western Transportation Institute–Montana State University

Roger Surdahl, Central Federal Lands Highway Division

Tom Sanders, Colorado State University

Chatten Cowherd, Midwest Research Institute

Ron Wright, Pacific Northwest Snowfighters

Joseph Althouse, The Dow Chemical Company

Gary Kindrick, Maverick Venture Partners

David Jones, University of California–Davis

Bob Vitale, Midwest Industrial Supply, Inc.

Moh Lali, Alberta Transportation

John Fendt, Great Basin Solutions, L.L.C.

John Cary, Envirotex

Tony Accordino, Hill Brothers Chemical Company

Rhino Rohrs, CBR Plus LLC.

Jake Rader, SoilWorks, LLC.

David Barnes, University of Alaska–Fairbanks

Billy Connor, Alaska University Transportation Center

Swayne Walther, EnviRoad

Neville Mercado, Greenmarket Solutions

Matt Duran, Envirotech Services, Inc.

CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The first Road Dust Management and Future Needs Conference held in San Antonio, Texas, in November 2008 brought together practitioners, scientists and vendors from all levels of public and private agencies. It provided an overview of the state-of-the-practice and set a path for the future direction of dust suppression and soil stabilization. The conference was deemed a success by the hosts and participants alike. Speakers, panels, and audience discussions culminated in a vote on priorities.

The four identified priorities discussed previously in Chapter 5 are listed below.

1. Guidelines and Best Management Practices
2. Performance Measures
3. Specifications and Protocols
4. Education, Clearinghouse, Outreach, and Training

Each priority was developed into a problem statement. Potential funding sources and project champions were suggested at the conference.

RECOMMENDATIONS

Desired outcomes of this conference were to hold a follow-up conference in one to two years and, before that time, to make progress on at least one of the four identified priorities.

A steering committee will be formed to lead and deliver the next phases of the work.

The steering committee will work to form an association for interested groups in the road dust community.

REFERENCES

Sanders, T.G. and J.Q. Addo. "Experimental Road Dust Measurement Device." *Journal of Transportation Engineering*, ASCE. 2000.

APPENDIX A – LIST OF CONFERENCE ATTENDEES

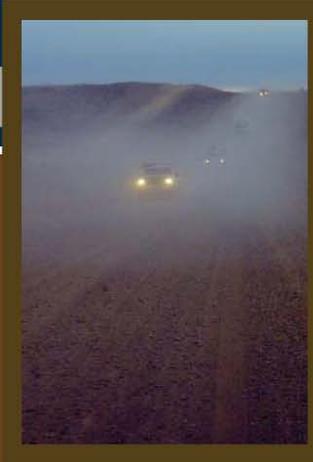
APPENDIX A – LIST OF CONFERENCE ATTENDEES

Name		Title	Organization
Tony	Accordino		Hill Brothers Chemical
Steve	Albert	Director	Western Transportation Institute
Joe	Althouse	Tech Service	The Dow Chemical Co.
Joel	Anderson	Waste Section Manager	TCEQ
Jason	Bagley		North American Salt
Bruce	Beanchum	Roads Maintenance Tech	CTUIR Public Works
Luc	Beaulieu	Graduate Student/Master Student	Laval University
Peter	Bolander	Civil Engineer	USDA Forest Service
John	Bosch		US Environmental Protection Agency
Keith	Browning	Public Works Director	Douglas County, Kansas
Steve	Bytnar	Director, Research & Quality	EnviroTech Services, Inc.
John	Cary	Regional Manager	EnviroTex
Dennis	Casamatta	Field Engineering Support	Midwest Industrial Supply, Inc.
Beth	Chester	Botanist	USFWS
Lisa	Christianson	Air Quality Specialist	Bureau of Land Management
Brian	Church		Western Transportation Institute
Billy	Connor	Director	Alaska UTC, University of Fairbanks
Chatten	Cowherd, Jr.	Principal Advisor	Midwest Research Institute
Scott	DiBiase	Planning Manager	Pinal County Air Quality
Jeff	Dobson	President	Roadwise, Inc.
Rich	Douglass	Local Government Coordinator	Wyoming Department of Transportation
Matthew	Duran	Vice President of Sales	EnviroTech Services, Inc.
Laura	Fay	Research Scientist	Western Transportation Institute
John E	Fendt	President	Great Basin Solutions, LLC
Susan	Finger	Program Coordinator	US Geological Survey
Dennis	Fitz	Research Engineer	UC Riverside, CE-CERT
Chris	Forti	Street Operations Supervisor	City of El Paso Street Department
Sean	Furniss	National Coordinator Refuge Roads Program	National Wildlife Refuge System
Richard	Garcia	Regional Director	TCEQ
Glen	Ginzel		Intermodal Facility & Maintenance
Gordon	Ginzel		Intermodal Facility & Maintenance
Dale	Green	Production Planner	Western Energy Company
Norman D.	Hadfield	Field Project Manager	Utah LTAP Center
Fred	Hall	Project Manager	Environmental Quality Management, Inc.
William	Heiden	Circuit Rider	Colorado State University
Christopher	Horan	Environmental Engineer	Salt River Pima Maricopa Indian Community
Richard	Hunter	President	Midwest Industrial Supply, Inc.
George	Huntington	Senior Engineer	Wyoming T2/LTAP
Dave	James	Associate Vice Provost for Academic Programs	University of Nevada Las Vegas
Ed	Johnson		Minnesota Department of Transportation
David	Jones	Project Scientist	University of California Pavement Research Center
Marilyn	Jordahl-Larson, PE		Minnesota Department of Transportation
Sylvain	Juneau	Project Manager	Laval University
Hiene	Junge	Highway Superintendent	Pennington County
Dewey	Kennedy	Roadmaster	Gilliam County Road Department
Maureen	Kestler	Civil Engineer	USDA Forest Service
Gary	Kindrick		Maverick Venture Partners
Angela	Kociolek	Research Scientist	Western Transportation Institute
Scott	Koefod	Principal Scientist	Cargill Salt
Jim	Kozik	Road Operations & Maintenance Engineer	US Forest Service

APPENDIX A – LIST OF CONFERENCE ATTENDEES

Name		Title	Organization
Moh	Lali	Director, Highway Operations	Alberta Transportation
Rodney	Langston	Principal Planner	Clark County Dept. of Air Quality & Environmental Mgmt.
Glen	Legere	Associate Program Leader Resource Roads	FPInnovations FERIC
Edward	Little	Chief, Ecology Branch	USGS, Columbia Environmental Research Center
Lee-Ann	Lochhead	Sales Manager	Da-Lee Dust Control
Michael	Long	Chair - TRB Low Volume Roads Committee	Oregon Department of Transportation
Travis	Luiting	Sales Representative	Da-Lee Dust Control
Melvin	Main	Director of New Technologies	Midwest Industrial Supply
John	McDonald	Faribault County Engineer	Faribault County
Bekee	Megown	Botonist	USFWS
Bob	Meister	Public Works Director	Minnehaha County
Neville	Mercado	President	Green Market Solutions
Clark	Milne, PE	Northern Region Maintenance Engineer	Alaska Department of Transportation & Public Facilities
Geeta	Nakra	Technical Marketing Manager	SNF Holdings
Sean	O'Brien	Pavement Engineer	DOT/FHWA/EFLHD
Joe	Odhiambo		Agreement South Africa
Pascale	Pierre	Researcher	Laval University
Ted	Plank	Road Supervisor	Boulder County Transportation Department
Philippe	Poulin	Universite Laval	Pavillion Adrien Pouliot Department de genie civil
Craig	Prete	President	Dustbusters, Inc.
Jake	Rader	Sales Rep	Soilworks, LLC
John	Rasmussen	County Engineer	Pottawattamie County
Dan	Ratermann	Outreach Coordinator	Missouri LTAP
David	Rogers	General Manager	Da-Lee Dust Control
Taylor	Rossetti	Program Coordinator	Wyoming Department of Transportation
John	Rushing	Research Physical Scientist	US Army Engineer Research and Development Center
Thomas	Sanders	Associate Professor	Colorado State University
Alan	Sarver	President	Z&S Dust Control Systems
Ramana	Simpson	Management Assistant	Town of Queen Creek, Arizona
Ken	Skorseth	Field Services Manager	SDSU/SDLTAP
Roger	Surdahl	Technology Delivery Engineer	Federal Highway Administration
Roland	Taff	Technical Sales Representative	LignoTech USA
Jaime	Tamez	President	CBR Plus, LLC
Samuel	Tlmaedi Skosana		Agreement South Africa
Russell	Van Leuven	Air Quality Program Manager	Arizona Department of Agriculture
Jerold	Vincent	Liquid Calcium Chloride Business manager	TETRA Technologies, Inc.
Bob	Vitale	CEO/Markets Manager	Midwest Industrial Supply, Inc.
Stan	Vitton, PhD, PE		Civil & Environmental Engineering
Swayne	Walther	Sales & Environmental Specialist	EnviRoad
Michael	Weimar	Commissioner	Gilliam County Road Department
Laressa	Wong	Compliance Assistance Specialist	Texas Commission on Environmental Quality
Ron	Wright	Chemist Supervisor	Idaho Transportation Department
Alan	Yamada	Civil Engineer	USDA Forest Service

APPENDIX B – CONFERENCE AGENDA



November 13-14, 2008 ♦ San Antonio, Texas

Road Dust Management Practices and Future Needs Conference

2008



WELCOME

Table of Contents

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 Agenda.....5
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Special Thanks

Planning Committee - Many individuals have come together to help make this event a success. In addition to those individuals speaking and moderating at the conference, we want to extend a special thank you to our conference planning committee:

- Steve Albert, Western Transportation Institute
- Brian Allen, FHWA Federal Lands Highway
- Amit Armstrong, FHWA Western Federal Lands
- Gary Brown, FHWA Eastern Federal Lands
- Matt Duran, Envirotech Services, Inc.
- Laura Fay, Western Transportation Institute
- Susan Finger, USGS, Columbia Environmental Research Center
- Sean Furnis, Fish and Wildlife Service
- Tony Giancola, National Association of County Engineers
- David James, University of Nevada, Las Vegas
- David Jones, University of California Pavement Research Center
- Rodney Langston, Department of Air Quality & Environmental Management, Clark County, Nevada
- Ed Little, US Geological Survey
- Mark Nagra, Delaware County
- Ken Skorseth, South Dakota State University
- Roger Surdahl, FHWA Central Federal Lands
- Bob Vitale, Midwest Industrial Supply
- Dale Wegner, Coconino County
- Dan Williams, Western Transportation Institute
- Ron Wright, Idaho Transportation Department
- Alan Yamada, USDA Forest Service

Welcome to San Antonio!

On behalf of the planning committee of the *2008 Road Dust Management Practices and Future Needs Conference*, we would like to welcome you to San Antonio, Texas. As the first conference of its kind, this conference is bringing together experts from industry, research and the environment to present, discuss and prioritize current and future road dust management best practices. We have crafted an agenda which will present the issues, engage you in dialogue and be holistic in examining the realistic solutions for the future. With your help we will reach our goal of drafting a road map to the future for dust management." I would like to recognize and thank the sponsors and partners for their vision for bringing this conference together. We hope you find the conference enjoyable and productive.



Steve Albert, Co-Chair
 Western Transportation Institute

Roger Surdahl, Co-Chair
 FHWA Central Federal Lands

Conference Proceedings

Presentations and papers available prior to the conference have been assembled and placed on thumb drives for attendees to pickup at the close of the conference. Every attempt will be made to collect additional presentations onsite for loading on the subject drives. However, it is likely that some presentations will not be available. As such, presentations, papers, podcasts and proceedings information from the conference will also be made available on the Western Transportation Institute's website at <http://www.wti.montana.edu/TechnologyTransfer/Conferences.aspx>. It is anticipated that information will be available via the website beginning December 1, 2008.

Vendors

The following vendors will have displays setup in Section E of the Coronado Ballroom beginning at 8:00 am, Thursday, November 13th and continuing through 3:30 pm Friday, November 14th.

- CBR Plus, LLC
- EnviRoad
- Midwest Industrial Supply, Inc.
- North American Salt, Inc.
- Soilworks, LLC

A vendor reception and poster session will be held from 4:30 - 6:00 pm on Thursday, November 13th in Section E of the Coronado Ballroom. Hors d'oeuvres will be served and a cash bar will be open for attendees and guests to enjoy. This will be a wonderful opportunity to see the new products that are available and network with peers. There will be plenty of time to enjoy dinner on your own at one of the many fine Riverwalk restaurants following the reception.

Site Map

All sessions and special events will be held in the Coronado Ballroom. Located directly adjacent to the main hotel facility.



Schedule at a Glance

Thursday, November 13, 2008

7:00 am	Registration/Continental Breakfast/Vendor Area Opens	
8:00 am	Opening Session	
9:30 am	BREAK	
10:00 am	Session A: Dust Suppression	
12:00 pm	LUNCH, sponsored by North American Salt	
1:00 pm	Session B: Dust Stabilization	
2:30 pm	BREAK	
2:45 pm	Concurrent Sessions (C)	
	Session C1: Environmental Impacts of Dust Suppressants to Control Dust	Session C2: Planning and Design for the Future
4:15 pm	Sessions Adjourn	
4:30 - 6:00 pm	Poster Session and Vendor Reception	

Friday, November 14, 2008

7:00 am	Registration/Continental Breakfast/Vendor Area Opens			
8:30 am	Concurrent Sessions - Summary of Future Needs and Roadmap			
	Session D1: Environmental Impacts of Dust Suppressants to Control Dust (guided discussion)	Session D2: Dust Suppression (guided discussion)	Session D3: Dust Stabilization - Benefits from Soil Stabilization (guided discussion)	Session D4: Planning and Design for the Future (guided discussion)
10:00 am	BREAK			
10:30 am	Summary of Ideas from Morning Session			
12:00 pm	LUNCH			
1:30 pm	Vote Results and Outline of the Road Map to the Future			
3:30 pm	End of Conference			

Sponsors

This event is sponsored in part by the Bureau of Indian Affairs, EnviroTech Services, Inc., FHWA - Federal Lands Highway, National Park Service, North American Salt, United States Fish and Wildlife Service, United States Forest Service, and the Western Transportation Institute - Montana State University. Special thanks to the United States Geological Survey, National Association of County Engineers, University of Nevada at Las Vegas, University of California at Davis, Department of Environmental Quality & Environmental Management in Clark County, Nevada, Local Technical Assistance Program, San Diego State University, Idaho Transportation Department, and Midwest Industrial Supply, Inc. for their input and assistance in planning this event.



U.S. Department of Transportation
Federal Highway Administration



Conference Background

There are millions of miles of unsealed roads around the world which are managed by a wide assortment of national, state, and local authorities as well as private entities. Unacceptable levels of dust, poor riding quality, and impassability in wet weather are experienced on much of this global unsealed road network. Although it is acknowledged that these roads are fundamental to the economies of almost every country in the world, many of the management practices followed leave much to be desired, with programs for dust control, chemical stabilization, low-cost upgrading, etc., largely overlooked.

Chemical dust control on unsealed roads has been researched for decades and there are numerous published papers documenting the establishment and monitoring of experiments. However, much of this has been agency-specific and there are no comprehensive guidelines or specifications available to help practitioners with establishing longer-term dust control programs, identifying which type of additive would be most appropriate for a specific application, undertaking life-cycle analyses, quantifying negative environmental impacts and positive social benefits, designing appropriate treatments, applying the additive, and maintaining the treated road.

Increasing concerns with regard to deteriorating air quality, the sustainability of repeatedly replacing gravel on unsealed roads, and the increasing cost of asphalt binders used for sealing roads have placed renewed interest on road dust management. Attendees of this conference will be provided a brief current status of global road dust management together with some points for consideration that may lead to wider implementation of dust control programs in unsealed road management initiatives. Discussions on the extent of unsealed road networks, the volume of dust generated, the consequences of dust, categorization of road additives, environmental considerations, and dust control research will also be held.

The ultimate goal for this event is to generate a roadmap for achieving wider, effective and environmentally sustainable, and cost-effective implementation of dust control Best Management Practices on unsealed roads and adjacent areas.

How will this goal be achieved? A series of invited keynote speaker presentations will provide attendees with critical background information on past, continuing and new dust management efforts. Supplemented with paper and poster presentations, participant workshops and roundtable discussions, attendees will learn about:

- (1) Environmental Impacts of Dust Suppressants - including air quality, human health, and impacts to vegetation, soil and wildlife, water quality, as well as impacts from products and suppressant chemistry.
- (2) Topical Dust Suppression - including Best Management Practices for topical applications of dust-control additives such as current methods, available products, application and construction procedures, and implementation of experimental findings.
- (3) Soil Stabilization - including Best Management Practices for mix-in applications of dust-control additives and surface stabilizers such as current methods, available products, applications, construction and engineering procedures, and implementation of experimental findings.
- (4) Planning and Design for the Future - including implementation of dust-control programs as unsealed-road management strategies, design procedures, additive certification, performance evaluation techniques considering current/future average daily traffic, cost/benefit analysis, and models for unsealed road management systems.

Portions of the above taken from *Road Dust Management: State of the Practice* by David Jones, University of California Pavement Research Center, David James, University of Nevada, and Robert Vitale, Midwest Industrial Supply. This document will be presented at the Conference.

Agenda

THURSDAY, NOVEMBER 13TH

All events are held in the Coronado Ballroom at the El Tropicano Riverwalk in San Antonio. It is a separate building directly behind the hotel adjacent to the self parking lot.

7:00 am
REGISTRATION, *Coronado E*

The Registration Desk will open at 7:00 am. Attendees should pickup their registration packets prior to attending the continental breakfast.

7:00 am
CONTINENTAL BREAKFAST, *Coronado E*

This event sponsored by EnviroTech Services, Inc.

7:00 am
VENDOR AREA OPENS, *Coronado E*

8:30 am
OPENING SESSION, *Coronado E*

Welcome/Overview

- Steve Albert, Western Transportation Institute
- David Jones, University of California Pavement Research Center

Keynotes

- Michael Long, Chair, TRB LVR Committee, Oregon Department of Transportation
- David James, University of Nevada, Las Vegas
- Ron Wright, Idaho Transportation Department
- Ken Skorseth, South Dakota State University

Keynote speakers will provide insight from four perspectives: (1) national, (2) research, (3) vendor/construction, and (4) maintenance.

9:30 am
BREAK, *Coronado E*

10:00 am
SESSION A: DUST SUPPRESSION, *Coronado E*
Moderator: David James, University of Las Vegas, Nevada

Chatten Cowherd, Midwest Research Institute
Road Dust Control Performance Monitoring

Tom Sanders, Colorado State University
Road Dust Suppressants Research Results

Dennis Fitz, University of California Riverside
Evaluation of Dust Control Suppressants on Unpaved Roads Using Mobile Sampling

This session will highlight the current methods, available products, and aggregates used in Dust Suppression. What works and what does not work as well as road base preparation will be discussed. New technologies and ecological impacts from a research based perspective will also be presented.

12:00 pm
LUNCH, *Coronado E*
This lunch sponsored by North American Salt.

1:00 pm
SESSION B: DUST STABILIZATION, *Coronado E*
Moderator: Roger Surdahl, Central Federal Lands Highway Division

Stan Vitton, Department of Civil and Environmental Engineering,
Michigan Technological University
The Use of Paper Sludge for Dust Stabilization on Mine Haul Roads and Tailing Impoundments

Hiene Junge, South Dakota Pennington County Highway Department
Magnesium Chloride Stabilization and Spot Dust Control

Melvin Main, Midwest Industrial Supply
The Predictable Nature of Materials Stabilized with Polymer Agents

This session will highlight the current methods, available products, and aggregates used in Soil Stabilization. What works and what does not work as well as road base preparation will be discussed. New technologies will also be presented.

2:30 pm
BREAK, *Coronado E*

Agenda

2:45 pm

CONCURRENT SESSIONS

Session C1: Environmental Impacts of Dust Suppressants to Control Dust, *Coronado A/B*

Moderator: Susan Finger, Columbia Environmental Research Center

Fred Hall, US Environmental Protection Agency

Investigation of Water Runoff and Leaching Impacts from Dust Suppressants

Rodney Langston, Department of Air Quality & Environmental Management, Clark County Nevada

What to do if You Have PM 10 Issues

Susan Finger, Columbia Environmental Research Center

Determining Ecological Effects of Dust Suppressant Chemicals on Terrestrial and Aquatic Resources

This session will cover air quality, human health and impacts to vegetation, soil and wildlife, water quality and impacts from products as well as suppressant chemistry.

Session C2: Planning and Design for the Future, *Coronado C/D*

Moderator: Dave Jones, University of California Pavement Research Center

Pete Bolander, US Department of Agriculture, Forest Service

US Forest Service Perspective on Planning and Design for the Future

Ken Skorseth, South Dakota State University

County Engineers' Perspective on Planning and Design for the Future

John Rushing, US Army Engineer Research and Development Center

US Army Corps of Engineers' Perspective on Planning and Design for the Future

Steve Bytnar, EnviroTech Services

Additive Industry Perspective on Planning and Design for the Future

Dave Jones, University of California Pavement Research Center

Research/Academia Perspective on Planning and Design for the Future

This session will cover planning projects from conception to completion as well as dust control based on ADT. Cost analysis of dust control versus dust stabilization will also be given.

4:15 pm

Sessions conclude for the day.



4:30 - 6:00 pm

Poster Session and Vendor Reception, *Coronado E*

Welcome to the *Poster Session and Vendor Reception!* Enjoy some hors d'oeuvres while visiting with poster session authors and vendors. A wonderful opportunity to see the new products that are available and network with peers.

POSTER PRESENTATIONS:

Chatten Cowherd, Midwest Research Institute

Mobile Monitoring of Unpaved Road Dust Emissions

P. Poulin et al, Civil Engineering Department, Universite Laval, Quebec

Field Study Evaluation of Granular Materials Treated with Dust Suppressants - Behavior Evolution under Traffic and Climate

Stan Vitton, Department of Civil and Environmental Engineering, Michigan Technological University

Cold Weather Dusting: Its Generation, Testing and Control

L. Beaulieu et al, Civil Engineering Department, Universite Laval, Quebec

Field Test Program of Stabilization on a Principle Forest Road

Eddie Johnson et al, Minnesota Department of Transportation

Investigation of Dust Control Practices in Minnesota

George Huntington et al, Wyoming Technology Transfer Center

Dust Suppression by Incorporating Reclaimed Asphalt Pavement (RAP) into Gravel Road Surfacing

Tom Sanders et al, Colorado State University

Mobile Dust Measuring Devices - Dustometer System

Dennis Fitz, University of California Riverside

Mobile Dust Measuring Devices - SCAMPER System

Vic Etyemezian, Desert Research Institute

Measurement of Road Dust Emissions: The TRAKER and PI-SWERL Tools



Agenda

FRIDAY, NOVEMBER 14TH

7:30 am

REGISTRATION/CONTINENTAL BREAKFAST/VENDOR AREA OPENS, *Coronado E*

8:30 am

CONCURRENT SESSIONS

Session D1: Environmental Impacts of Dust Suppressants to Control Dust (guided discussion), *Coronado A*
Moderator: Susan Finger, Columbia Environmental Research Center

Panelists

- Bob Vitale, Midwest Industrial Supply
- Ron Wright, Idaho Transportation Department

This session is a follow-up to Thursday and will feature a panel of experts and audience participation.

Session D2: Dust Suppression (guided discussion), *Coronado B*
Moderator: David James, University of Nevada, Las Vegas

Panelists

- John Bosch, US Environmental Protection Agency
- TBD

This session is a follow-up to Thursday and will feature a panel of experts and audience participation.

Session D3: Dust Stabilization - Benefits from Soil Stabilization (guided discussion), *Coronado C*
Moderator: Roger Surdahl, Central Federal Lands Highway Division

Panelists

- Melvin Main, Midwest Industrial Supply
- TBD

This session is a follow-up to Thursday and will feature a panel of experts and audience participation.

Session D4: Planning and Design for the Future (guided discussion), *Coronado D*
Moderator: Dave Jones, University of California Pavement Research Center

Panelists

- Pete Bolander, US Department of Agriculture, Forest Service
- Ken Skorseth, South Dakota State University
- John Rushing, US Army Engineer Research and Development Center
- Steve Bytnar, EnviroTech Services

This session is a follow-up to Thursday and will feature a panel of experts and audience participation.

10:00 am

BREAK, *Coronado E*

10:30 am

SUMMARY OF IDEAS FROM MORNING SESSION, *Coronado E*
Moderator: Steve Albert, Western Transportation Institute

12:00 am

LUNCH, *Coronado E*

1:30 pm

VOTE RESULTS AND OUTLINE OF THE ROAD MAP TO THE FUTURE, *Coronado E*
Moderator: Steve Albert, Western Transportation Institute

3:30 pm

Conference adjourns.

Speaker Bios

BEAULIEU, LUC
Universite Laval, Quebec

Luc Beaulieu obtained his Bachelor of Science degree from Université Laval (Québec) in June 2008. He is now a graduate student at the Department of Civil Engineering at Université Laval under the supervision of the researcher Pascale Pierre. His master subject deals with the mineralogy and grading influence on granular aggregate stabilized or treated with dust suppressant.

BOLANDER, PETE
USDA Forest Service

Pete Bolander is a civil engineer with 27 years of experience with the USDA Forest Service in providing technical assistance on road surfacing and geotechnical engineering for the design, construction and maintenance of Forest Service roads in the Pacific Northwest. He has written a USDA-FS publication entitled "Dust Palliative Selection and Application Guide", presented three papers at the TRB Low Volume Roads Conference concerning dust abatement, and was a panel member of EPA's "Potential Environmental Impacts of Dust Suppressants: Avoiding Another Times Beach" in 2002.

BOSCH, JOHN
US Environmental Protection Agency

Since 1971 Mr. Bosch has worked in the national air programs within the U.S. Environmental Protection Agency located in Research Triangle Park in North Carolina. Prior to joining EPA, he obtained his M.S. degree in Chemical Engineering from the University of Washington in Seattle and worked as an environmental consultant in Vancouver, British Columbia. Mr. Bosch developed and implemented both EPA's AP-42 emission factor program and the engineering protocols for estimating emissions which are still in use by Federal, State, and local environmental agencies throughout the country. For the past fourteen years, he has focused on advancing new concepts and technologies related to quantifying air emissions for purposes of both research and compliance measurements. He has been EPA's liaison with the Department of Defense and the USARMY on research programs relating to the air issues challenging military installations, of which fugitive fine-particulate emissions are an important part. One of his main recent interests is to further agency and national acceptance of new, more accurate, more inexpensive, and more streamlined ways to estimate fugitive dust emissions from paved and unpaved roads.

BYTNAR, STEVE
Envirotech Services, Inc.

Steve Bytnar is the Director of Research and Quality for Envirotech Services, Inc. He has been involved in the development of products for dust control and soil stabilization since 1998. Through the work at Envirotech the research team has spent countless hours testing and evaluating different road bases from throughout North America. The data gathered in analyzing the varying road bases has become an invaluable tool in developing new products and application techniques for dust control and road base stabilization.

The focus of Mr. Bytnar and his team at Envirotech is to develop new high performance products with keen attention to the environmental impacts of such products. Mr. Bytnar and his group at Envirotech have multiple patents (issued and pending) in the arenas of dust control, soil stabilization, erosion control and highway de-icing.

COWHERD, CHATTEN, PHD
Midwest Research Institute

Dr Cowherd is internationally known for his work on the characterization and control of open source particulate matter (PM) emissions, including fugitive dust. He specializes in field and laboratory studies of the kinetics and mechanisms of particle entrainment from stabilized and unstabilized surfaces. He has performed extensive field studies of dust plume generation and dispersion using fixed and mobile monitors, with a recent focus on airborne particle capture by vegetation and other types of groundcover.

Dr. Cowherd pioneered the isokinetic exposure profiling technique, which became the EPA-preferred method for quantifying particulate emissions from line or moving point sources such as roadway traffic. In addition, he has been instrumental in the recent development of mobile monitoring strategies for mapping road dust emission potential and the effectiveness of dust control measures.

Dr. Cowherd received his Ph.D. in Chemical Engineering from the Johns Hopkins University. He has coauthored more than 100 technical publications and papers during his career of more than 30 years. He is a Fellow Member of the Air and Waste Management Association and has served on the AWMA national board of directors. He maintains certification as a Qualified Environmental Professional by the Institute of Professional Environmental Practice (No. 11940135).

Speaker Bios

FINGER, SUSAN

Columbia Environmental Research Center

Susan is an aquatic toxicologist with the Biological Resources Division of the US Geological Survey. She has over 25 years of experience assessing the effects of contaminants on aquatic resources. In her position as Program Coordinator for the Columbia Environmental Research Center, she provides guidance in the identification and implementation of new research areas for the Center and its field stations. She has led research studies assessing the effects of irrigation drain water on endangered fish species in the western United States, in studies evaluating the effects of oil spills on freshwater ecosystems, and in a multi-year study to determine the effects of contaminants on striped bass survival in tributaries of Chesapeake Bay. During the past 15 years, she has also been involved in investigations to determine the ecological effects of fire-fighting chemicals on the terrestrial and aquatic environment. She currently serves as the USGS Science Advisor for the Department of Interior's Natural Resource Damage Assessment and Restoration Program and plays an active role in the design and review of scientific studies to evaluate biological injury and ecological recovery at over 30 historically contaminated sites nationwide. She will be actively involved in the recently initiated US Geological Survey's study for assessing potential responses of terrestrial and aquatic organisms to dust suppressant chemical application in critical habitats including those managed by the US Fish and Wildlife Service National Wildlife Refuge Systems.

FITZ, DENNIS

University of California Riverside

Mr. Fitz has a Masters Degrees in both Chemistry and Applied Sciences from the University of California, Riverside. He is currently the manager of the Atmospheric Processes Group and Deputy Director at the College of Engineering-Center for Environmental Research and Technology (CE-CERT) at that institution. Mr. Fitz has more than 30 years of experience in managing air quality measurement studies. The Atmospheric Processes group conducts research to determine the fate of air pollutants after they are emitted into the atmosphere using measurements and modeling. The current research includes determining the reactivity of VOC to form ozone and particulate matter in smog chambers and evaluating and developing measurement methods to better characterize products formed in photochemical air pollution. The group also conducts studies to determine emission rates from fugitive sources into the atmosphere.

Mr. Fitz's research focuses on developing and applying methods to accurately measure trace pollutants in the atmosphere. He is currently the Principal Investigator on projects to evaluate ammonia emission rates from dairies, measure PM emission rates from vehicles on paved roads using on-board sensing instruments and evaluate methods to minimize particulate organic carbon collection artifacts. Mr. Fitz has also conducted studies to evaluate the exposure to pollutants when riding in school buses and how to minimize that exposure. He has over 30 publications in peer-reviewed journals.

HALL, FRED

US Environmental Protection Agency

Fred Hall is a Senior Project Manager and Engineer for Environmental Quality Management, Inc. headquartered in Cincinnati, Ohio with eleven other offices, including Las Vegas. His major areas of experience are in projects dealing with control technology evaluation, fugitive dust measurement and control, evaluation of control strategies, and environmental control costs. He received his undergraduate degree in Chemical Engineering from the University of Kentucky and a Masters in Business Administration from Xavier University. He is a registered Professional Engineer in several states.

HUNTINGTON, GEORGE

Wyoming Technology Transfer Center

Mr. Huntington has a Bachelor's Degree in Earth Science from Dartmouth College and Bachelor's and Master's degrees in Civil Engineering from the University of Wyoming. He spent eight years with the Wyoming Department of Transportation, including five years as a materials research engineer in Cheyenne and three years as a project engineer in Sundance and Rawlins. In 2003 he went to work with the Wyoming T²LTAP Center where he has taught workshops on erosion and sediment control, soils, work zone traffic control, pavement design, and other topics. He has also worked extensively on the Center's asset management project. He has served on NLTAPA's Executive Committee for the past two and a half years where he co-chairs the Products and Services workgroup.

JAMES, DAVID, PHD

University of Las Vegas, Nevada

David James is currently Associate Vice Provost for Academic Programs and Associate Professor of Civil Engineering at the University of Nevada Las Vegas. He is a licensed Civil Engineer in the state of Nevada. Dave earned a B.A. in Chemistry from the University of Nevada, Las Vegas, and MS and Ph.D. degrees in Environmental Engineering Science from the California Institute of Technology. Dave has worked on dust emissions and controls since the mid-1990's, and has evaluated the long-term weathering performance of dust suppressants on vacant lands, the effects of water on dust-emission potential of desert soils, and measured dust emissions from paved roads in support of the Clark County Department of Air Quality and Environmental Management's efforts to develop and maintain a State Implementation Plan for particulate matter.

Speaker Bios

JOHNSON, EDDIE

Minnesota Department of Transportation

Eddie Johnson is a research project engineer with the Minnesota Department of Transportation. He holds a Masters in Civil Engineering from the University of Minnesota. He is specifically interested in aggregate roads, asphalt mixtures, and recycled materials and has authored or co-authored several publications and reports including: *Investigation of Winter Pavement Tenting; Investigation of Superpave Fine Aggregate Angularity Criterion for Asphalt Concrete; Flexibly Slurry-Microsurfacing System for Overlay Preparation: Construction and Seasonal Monitoring at Minnesota Road Research Project; and Special Practices for Design and Construction of Subgrades in Poor, Wet and/or Saturated Soil Conditions.*

JONES, DAVID, PHD

University of California Pavement Research Center

Dr. David Jones is a Project Scientist at the University of California Pavement Research Center (UC Davis and UC Berkeley), on assignment from the Council for Scientific and Industrial Research in South Africa. He manages the UCPRC Accelerated Pavement Testing facility and related research, as well as all research related to sustainability in the design, construction, and maintenance of transportation infrastructure. He maintains close involvement in unsealed road research in South Africa and other countries.

JUNGE, HIENE

South Dakota Pennington County Highway Department

Hiene started his career in road and bridge construction in 1968. He has been employed as a highway superintendent for 25 years. He is currently the Highway Superintendent of Pennington County, Rapid City, SD.

Pennington County covers 2,783 square miles and has a population of approximately 92,776. He is responsible for 1,800 lane miles of road, 138 bridges and supervises 50 employees.

Hiene is a past president of the National Association of County Engineers (NACE) 2006-2007 and has been a member of NACE since 1988.

He was President of the South Dakota Association of Highway Superintendents in 1990-1991, is chairman of their certification committee and is a member of the South Dakota Transportation Hall of Honor committee.

He has three children and just last month celebrated his 44th year of marriage to his wife LaVonne.

LANGSTON, RODNEY

Department of Air Quality & Environmental Management, Clark County, Nevada

Mr. Langston holds the position of Principal Planner with the Clark County (Nevada) Department of Air Quality and Environmental Management. Mr. Langston's work experience includes State Implementation Plan development, fugitive dust control measure development, air pollution control regulation development, and emission factor development over a sixteen-year period with air regulatory agencies in California and Nevada. He is an active participant in the Best Available Control Measures Working Group, the STAPPA/ALAPCO Criteria Pollutants Committee, and the Western Regional Air Partnership Dust Emissions Joint Forum. Mr. Langston holds a B.S. Degree in Biology with Environmental Studies Concentration and a Master of City and Regional Planning degree.

LONG, MICHAEL

TRB LVR Committee
Oregon Department of Transportation

For the past three years, Mr. Long has been the Project Delivery Manager for the Oregon Department of Transportation, Region 2, which includes 13,000 square miles of western Oregon. Mr. Long manages a program that includes project development and community affairs, engineering design, and construction, with a staff of 200 employees and a program budget of over \$300 Million. His primary responsibilities are to keep over 150 projects on time and under budget, and to coordinate issues with locally elected officials and the public.

Prior to this assignment, he spent six years as the manager of the Oregon D.O.T. statewide Geo-Environmental Section in Technical Services. His section was responsible for technical design standards, and regulatory agency coordination. During the previous ten years, he served as the geotechnical services manager, with the U.S. Forest Service, for six National Forests in Oregon. Prior to that, he worked six years as a project geologist with both the Oregon D.O.T. and the U.S. Forest Service.

Mr. Long holds undergraduate degrees in Geography and Geology from the University of Oregon and the State University of New York, Cortland, respectively. He was appointed by the Governor of Oregon to two three-year terms on the Oregon State Board of Geologist Examiners, and is a registered professional geologist and a certified engineering geologist in Oregon and Washington. He has published over a dozen professional papers, co-authored the National Slope Stability Design Guide for the U.S. Forest Service, and was featured in three Oregon Public Television programs on the environment.

Mr. Long currently serves on the National Academies, Transportation Research Board, as Chair of the Committee on Low-Volume Roads, and was Chair for the Ninth International Conference on Low-Volume Roads held in Austin, Texas in June 2007. Mr. Long is a Vietnam veteran and is married with four children (two of which are still at home). He enjoys boating and holds a Black Belt in Tae Kwon Do.

Speaker Bios

MAIN, MELVIN
Midwest Industrial Supply

Melvin Main has an undergraduate and graduate education in physics. He has spent over thirty years designing, developing and manufacturing complex electro-mechanical systems for both military and commercial applications.

Germane to this meeting is Mel's ten years of experience with the stiffness and modulus-based evaluation of geotechnical materials. He has initiated the use of such evaluation and corresponding QA/QC methods in support of the application of stabilized materials by numerous state and local DOTs.

POULIN, PHILIPPE
Universite Laval, Quebec

Philippe Poulin obtained his Bachelor of Science degree from Université Laval (Québec) in August 2008. He is now a graduate student at the Department of Civil Engineering at Université Laval under the supervision of the researcher Pascale Pierre. His master subject deals with the performance of unpaved roads stabilized or treated with dust suppressants in a northern context

RUSHING, JOHN
US Army Engineer Research and Development Center

John has been employed by the Airfields and Pavements branch of the Geotechnical and Structures Laboratory at the U.S. Army Engineer Research and Development Center in Vicksburg, MS since 2003.

He received a B.S. in Polymer Science from The University of Southern Mississippi in 2003. John is currently finishing a M.S. in Civil Engineering from Mississippi State University.

His research areas include dust mitigation, asphalt pavement materials, pavement evaluation, soil stabilization, and contingency airfield preparation

SANDERS, TOM
Colorado State University

Not available at time of printing.

SKORSETH, KEN
South Dakota State University

Ken Skorseth has studied unpaved roads across the US and as far away as New Zealand. He has lectured on the subjects of Gravel Road Maintenance and Low Volume Road Maintenance to audiences of engineers, managers, elected officials and maintenance workers over the past 15 years. Ken first developed a Gravel Road Maintenance Course in 1989 and has lectured on that subject in many states since that time. He also served as the lead author of the FHWA *Gravel Roads Manual* and has presented the course to over 3000 participants. Ken has assisted in developing several other courses related to low volume road maintenance.

Ken has served on the Executive Board of the South Dakota Association of County Highway Superintendents (SDACHS), as the Region Eight representative on the Executive Committee of the National Local Transportation Assistance Program Association (NLTAPA), and is currently serving as the NLTAPA liaison to the National Association of County Engineers. He has also served on several SDDOT Research Review panels, the SDACHS Certification Committee, and as Coordinator of the annual Region County Road Conference.

Ken has spent nineteen years as the Field Services Manager at the South Dakota Local Transportation Assistance Program at South Dakota State University in Brookings, SD and is currently the Program Manager. He has twelve years experience in the highway and heavy construction industry and eight years as a County Highway Superintendent in Deuel County, SD. Ken is a graduate of Associated Schools of Miami, FL and Minnesota West Technical College, Canby, MN.

SURDAHL, ROGER
Central Federal Lands Highway Division

Roger Surdahl has worked since 1987 for the Federal Highway Administration (FHWA) in Baton Rouge, Louisiana; McLean, Virginia; Baltimore, Maryland; Washington, DC; and is now in Lakewood, Colorado with the FHWA's Central Federal Lands Highway Division Office.

He holds a Civil Engineering Master's Degree from Montana State University, and is a Registered Professional Civil Engineer in Colorado. Roger has been a construction inspector, material sampler and tester, construction supervisor, material engineer, and most recently, a Technology Deployment Engineer.

The Technology Program managed by Mr. Surdahl focuses on deploying solutions for transportation problems encountered on low volume roads. For results of his deployment studies visit www.cflhd.gov/techDevelopment. While Roger has a broad range of knowledge in many areas, his key interests are promoting geophysical imaging methods, preventing alkali-silica reactivity in concrete, stabilizing and controlling dust on unsurfaced roads.

Speaker Bios

VITALE, BOB
Midwest Industrial Supply

Bob Vitale founded Midwest Industrial Supply, Inc in 1975 and has spent the past 33 years providing the company its leadership and vision for providing the market with dust control and stabilization solutions that assist in the achievement of air quality and water quality goals.

In addition to his responsibilities of managing business basics Bob is responsible for the company's product development activities and has been responsible for the introduction of more than 35 innovative products. The company's emphasis has been environmental efficacy and reliable, predictable performance. In this role, he has had the company's products participate in and support programs including the US EPA Environmental Technology Verification Program, Canada Environmental Technology Verification Program, CalCert California Environmental Technology Certification Program, and Pennsylvania DEQ Dirt and Gravel Roads Program. He has included the new products in testing performed for US EPA by Midwest Research Institute, Desert Research Institute, San Diego State University, RTI International and for the US military by US Army Engineer Research and Development Center.

VITTON, STAN, PHD, PE
Department of Civil and Environmental Engineering, Michigan Technological University

Dr. Vitton has been at Michigan Tech for 14 years. Prior to Michigan Tech he was an Assistant Professor at the University of Alabama. He spent eight years with the Shell Oil Company in their mining company. He was the Engineering Manager for Shell's R&F Coal Mine located in Cadiz, OH for approximately four years. His first four years at Shell were spent on the development of surface coal mines located in the Powder River Basin. Dr. Vitton's PhD is in Civil Engineering (Geotechnical Engineering) from the University of Michigan, his MSE is in Mining Engineering (rock mechanics) and his BSE is in Geological Engineering both from Michigan Technological University.

WRIGHT, RON
Idaho Transportation Department

Ron Wright has over 30 years experience in laboratory operations. He has worked as a Bench Chemist, Quality Control Coordinator, Chief Chemist, Laboratory Manager, and Chemist Consultant for both independent and governmental laboratories. Ron graduated with a Bachelor of Sciences Degree in Chemistry from the University of Idaho in 1978. He is a participating member of the American Chemical Society, Steel Structures Painting Council, and the National Association of Corrosion Engineers. Ron is a founding member of the Pacific Northwest Snowfighters, which has developed chemical specifications for snow and ice control products. Ron has participated on several research pool fund projects either as a member of the Steering Committee or the Technical Advisory Committee. He has experience in the fields of analytical, environmental, and materials chemistry. Ron has worked for the Idaho Transportation Department since 1989 in the Materials and Research Laboratory. He currently manages the operations of the Chemistry Laboratory, Materials Section, within the Division of Highways for the State of Idaho.

APPENDIX C – EPA LETTER OF SUPPORT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

December 31, 2008

Mr. Steve Albert , Director
Western Transportation Institute
P.O. Box 174250
Bozeman, Montana 59717-4250

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Dear Mr. Albert:

I wish to commend you for your leading and sponsoring the Workshop, "2008 Road Dust Management Practices and Future Needs Conference" recently held in San Antonio, TX. As I discussed with you and others at the time, the Workshop created an essential national focus for networking between regulators, the transportation industry, and vendors of dust suppression/soil stabilization technologies. Another very positive result was the formation of a strategic plan with committed partners and a beginning list of specific projects on which to build. Guidelines, performance measures, specifications & protocols, and outreach are all essential parts of the national solution to dust issues.

I attended and spoke at the Workshop as the EPA person responsible for developing and improving emission factors and associated methodologies for the estimation of fugitive particulate emissions from roadways, construction, and similar activities. In this capacity, I foresee that PM10 and PM2.5 particulate emissions from public and private roadways and construction sites will become increasingly important components of air permits and State pollution control strategies. Moreover, President-Elect Obama has placed high priorities on construction and roadways in his infrastructure program. By their very nature, these will produce environmental problems through the generation of vast quantities of dust. It is thus very fitting that the regulating agencies, regulated entities, and the private manufacturers of control techniques join forces as quickly as possible to find common and workable solutions to these growing national issues.

Projects either being undertaken or planned by Department of Defense and associated military services strongly suggest the strategic need for a national Center of Excellence in the area of fugitive particulate emissions. A nationally known firm has indicated to me their interest in pursuing such a program and would welcome, I am sure, partners and joint ventures in such an endeavor.

I am planning to retire from the Environmental Protection Agency in early January and am now discussing succession of my responsibilities with Agency management. I plan to continue to be active in this field, however, after my retirement and can be reached at the following numbers:

[REDACTED] Please feel free to call me anytime if I can be of help.

Sincerely yours,

John C. Bosch Jr.
Senior Engineer

Office of Air Quality Planning and Standards

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