

10th International Conference on Low-Volume Roads



Photo: Florida Technology Transfer Center

July 24–27, 2011

**Hilton–Walt Disney World
Lake Buena Vista, Florida**



Hosts

Florida Transportation Technology Transfer (T2) Center at the University of Florida
Florida Association of County Engineers and Road Superintendents
International Union of Forest Research Organizations
University of Naples Federico II, Italy

Sponsors

Bureau of Indian Affairs, U.S. Department of the Interior
Federal Highway Administration, U.S. Department of Transportation
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Forest Service, U.S. Department of Agriculture
U.S. Army Corps of Engineers, Engineer Research and Development Center
U.S. Environmental Protection Agency

Welcome

On behalf of the conference steering committee, it is my honor to welcome you to Lake Buena Vista, Florida, and TRB's 10th International Conference on Low-Volume Roads. Orlando—often called “a city built on imagination”—truly has something to offer everyone, from its famous theme parks to arts, culture, and history.



Prozzi

This 10th Conference continues the long tradition of low-volume roads conferences held every four years since 1975 to provide a forum for the exchange of information and innovative ideas on all aspects of low-volume road planning, financing, design, construction, maintenance, and operations.

Sunday, the conference offers four half-day workshops whose subjects vary from exploring simple low-cost soil testing to working together to make roads safer by conducting road safety audits. The day concludes with a reception, and a welcome session begins the conference on Monday morning. The remainder of the conference includes 90 technical presentations, a choice of three field trip options, exhibitions, and two interactive sessions that explore the current issues facing low-volume roads managers.

The technical presentations offer information and insight from 44 presenters from the United States and 46 presenters from eighteen other countries. The three field trip options provide the opportunity to (1) visit the Hubbard Construction Company Asphalt Plant and learn about the full-depth reclamation process, (2) visit the Stormwater Management Academy at the University of Central Florida to explore stormwater-related issues, or (3) learn about Road Safety Audits (RSAs) by conducting one at a field site. Additionally, two interactive sessions, facilitated by key experts, will engage in informal small group discussions on current issues facing low-volume roads managers. Each discussion will offer valuable information on best practices and lessons learned as well as provide helpful resource material. The conference concludes with a conference banquet on Wednesday evening. Additionally, however, participants have the option to participate in a post-conference field trip to the Florida Department of Transportation's State Materials Office in Gainesville to tour the asphalt mix design lab, foundations lab, and soil compaction lab. They will also view both the van that operates the pavement condition survey process and the heavy vehicle simulator.

In today's environment of critical funding shortfalls, the challenges—more than ever—center around planning, designing, constructing, maintaining, and operating large networks of low-volume roads with ever-declining budgets. Increasingly, transportation engineers and planners are asked to do more with less in sustaining this important road asset. This 10th International Conference on Low-Volume Roads provides a unique forum for effective technology transfer among transportation practitioners, professionals, and academics from around the world to help address today's challenges.

I encourage you to participate in this prestigious conference.

—*Jolanda Prozzi, Chair, Conference Committee*
Center for Transportation Research, University of Texas at Austin

July 24–27, 2011



Agenda at a Glance

Saturday, July 23		
2:00 p.m.–6:00 p.m.	Registration	<i>North Registration</i>
2:00 p.m.–6:00 p.m.	Speaker Ready Room	<i>Crystal Room</i>
Sunday, July 24		
8:00 a.m.–5:00 p.m.	Registration	<i>North Registration</i>
8:00 a.m.–5:00 p.m.	Speaker Ready Room	<i>Crystal Room</i>
9:00 a.m.–noon	Low-Volume Roads and Earthquakes	<i>Camellia–Dogwood</i>
	Simple Low-Cost Soil Testing	<i>Fuchsia–Gardenia</i>
Noon–1:30 p.m.	Lunch Break (lunch on your own)	
1:30 p.m.–4:30 p.m.	Low-Volume Roads Best Practices and Gravel Management	<i>Camellia–Dogwood</i>
	Road Safety Audits: Working Together to Make Your Roads Safer	<i>Fuchsia–Gardenia</i>
5:30 p.m.–7:30 p.m.	Reception	<i>International Ballroom North</i>
Monday, July 25		
7:00 a.m.–8:00 a.m.	Continental Breakfast	<i>International Foyer</i>
7:00 a.m.–6:00 p.m.	Registration	<i>North Registration</i>
7:00 a.m.–6:00 p.m.	Speaker Ready Room	<i>Crystal Room</i>
8:00 a.m.–9:45 a.m.	Opening Session	<i>International Ballroom Center</i>
9:45 a.m.–10:15 a.m.	Break	<i>International Foyer</i>
10:15 a.m.–noon	Cementitious Stabilization, Part 1	<i>International Ballroom Center</i>
	Hot-Mix Asphalt	<i>International Ballroom North</i>
	Pavement Management Systems	<i>International Ballroom South</i>
	What's New in Low-Volume Road Pavement Design and Performance?	<i>Iris–Hibiscus</i>
Noon–1:00 p.m.	Conference Lunch (NOTE: Afternoon sessions start promptly at 1:00 p.m.)	<i>Salons 1, 2, and 3</i>
1:00 p.m.–3:15 p.m.	Geogrids	<i>International Ballroom Center</i>
	Pavement Management Case Histories	<i>International Ballroom South</i>
	Potpourri of New Tools for Enhancing Low-Volume Road Design	<i>International Ballroom North</i>
3:15 p.m.–3:45 p.m.	Break	<i>International Foyer</i>
3:45 p.m.–5:30 p.m.	Cementitious Stabilization, Part 2	<i>International Ballroom Center</i>
	Erosion and Sediment Control for Native and Aggregate Surfaced Roads	<i>Iris–Hibiscus</i>
	Hot-Mix Asphalt, Warm-Mix Asphalt, and Chip Seals	<i>International Ballroom South</i>
	Planning, Financing, and Economics of Low-Volume Roads	<i>International Ballroom North</i>
6:00 p.m.–7:30 p.m.	Rural Roads Safety Policy, Programming, and Implementation Joint Subcommittee	<i>Iris–Hibiscus</i>

July 24–27, 2011



Tuesday, July 26		
6:30 a.m.–6:00 p.m.	Registration	<i>North Registration</i>
6:30 a.m.–6:00 p.m.	Speaker Ready Room	<i>Crystal Room</i>
8:00 a.m.–noon	FIELD TRIP OPTION 1: Hubbard Construction Company Asphalt Plant	<i>Attractions Entrance</i>
	FIELD TRIP OPTION 2: Stormwater Management Academy at the University of Central Florida	<i>Attractions Entrance</i>
	FIELD TRIP OPTION 3: Trip to a Road Safety Audit Site	<i>Attractions Entrance</i>
Noon–1:30 p.m.	Lunch	<i>International Foyer</i>
1:30 p.m.–3:15 p.m.	Developments in Nontraditional Stabilizers	<i>International Ballroom Center</i>
	Effects of Roadway Geometry on Low-Volume Road Safety	<i>International Ballroom North</i>
	Materials	<i>International Ballroom South</i>
3:15 p.m.–3:45 p.m.	Break	<i>International Foyer</i>
3:45 p.m.–5:30 p.m.	Current Issues Facing Low-Volume Roads Managers, Part 1	<i>Salons 1, 2, and 3</i>
6:00 p.m.–7:30 p.m.	Low-Volume Roads Committee	<i>Crystal Room</i>
Wednesday, July 27		
7:00 a.m.–8:00 a.m.	Continental Breakfast	<i>International Foyer</i>
7:00 a.m.–6:00 p.m.	Registration	<i>North Registration</i>
7:00 a.m.–6:00 p.m.	Speaker Ready Room	<i>Crystal Room</i>
8:00 a.m.–9:45 a.m.	Full-Depth Reclamation and Recycled Pavement Materials	<i>International Ballroom Center</i>
	Pavement Materials	<i>International Ballroom South</i>
	Speed Characteristics and Management on Low-Volume Roads	<i>International Ballroom North</i>
9:45 a.m.–10:15 a.m.	Break	<i>International Foyer</i>
10:15 a.m.–noon	Geotechnical Engineering	<i>International Ballroom South</i>
	Rural Roads Maintenance and Management	<i>International Ballroom Center</i>
	Safety Assessment Tools for Low-Volume Roads	<i>International Ballroom North</i>
Noon–1:30 p.m.	Lunch Break (lunch on your own)	
1:30 p.m.–3:15 p.m.	Pavement Assessment	<i>International Ballroom South</i>
	Pavement Design	<i>International Ballroom North</i>
	Use of Chip Seals and Thin Pavement for Low-Volume Roads	<i>International Ballroom Center</i>
3:15 p.m.–3:45 p.m.	Break	<i>International Foyer</i>
3:45 p.m.–5:30 p.m.	Current Issues Facing Low-Volume Roads Managers, Part 2	<i>Salons 1, 2, and 3</i>
6:00 p.m.–7:00 p.m.	Social Hour	<i>International Foyer</i>
7:00 p.m.–9:00 p.m.	Conference Banquet	<i>International Ballroom North</i>
Thursday, July 28		
8:00 a.m.–5:00 p.m.	Postconference Field Trip: Florida Department of Transportation, State Materials Office, Gainesville, Florida	<i>Crystal Room</i>



Conference Agenda

Saturday, July 23

2:00 p.m.–6:00 p.m., *North Registration*
Registration

2:00 p.m.–6:00 p.m., *Crystal Room*
Speaker Ready Room

Sunday, July 24

8:00 a.m.–5:00 p.m., *North Registration*
Registration

8:00 a.m.–5:00 p.m., *Crystal Room*
Speaker Ready Room

9:00 a.m.–noon, *Camellia–Dogwood*
Low-Volume Roads and Earthquakes: the Experiences in Chile, Haiti, and New Zealand
Robert Andrew Douglas, Golder Associates, Inc., *presiding*

Experience in Chile

Guillermo Thenoux, Pontificia Universidad Católica de Chile

Experience in Haiti

Gary Morris-Iveson, Golder Associates, Inc.

Experience in New Zealand

Neil Bennett, Fulton Hogan Ltd., New Zealand

Each Speaker to Compare and Contrast Their Experiences

Guillermo Thenoux, Pontificia Universidad Católica de Chile; Gary Morris-Iveson, Golder Associates, Inc.;
Neil Bennett, Fulton Hogan Ltd., New Zealand

9:00 a.m.–noon, *Fuchsia–Gardenia*
Simple Low-Cost Soil Testing: How To Do It and How To Use the Results
Anand J. Puppala, University of Texas at Arlington, *presiding*

Elementary Soil Testing for Gravel Roads

Lynne H. Irwin, Cornell University

The South African Gravel Roads Test Kit

Philip Paige-Green, CSIR, South Africa

Break

The USACE Rapid Soils Analysis Kit

Ernest S. Berney, U.S. Army Corps of Engineer Research and Development Center

Performance-Related Gravel Road Design Using Results from Simple Tests

David Jones, University of California, Davis

Saturday, July 23, and Sunday, July 24, 2011



Noon-1:30 p.m.

Lunch Break (lunch on your own)

1:30 p.m.–4:30 p.m., *Camellia–Dogwood*

Low-Volume Roads Best Practices and Gravel Management

Mark J. Nahra, Woodbury County, *presiding*

Overview of Low-Volume Roads Best Practices and Drainage Issues

Gordon Rex Keller, USDA Forest Service

Geosynthetic Reinforced Soil Bridge Abutments and Integrated Bridge System

Daniel Enrique Alzamora, Federal Highway Administration

Best Practices for Erosion Control and Water Quality Protection

Clayton T Gillies, FPIinnovations

Break

Gravel Roads Design and Maintenance

Ken Skorseth, South Dakota State University

Gravel Roads Management Strategies

George Huntington, University of Wyoming

1:30 p.m.–4:30 p.m., *Fuchsia–Gardenia*

Road Safety Audits: Working Together to Make Your Roads Safer

Christina A. Fogt-Boulnois, VHB, Inc., *presiding*

Introductions to Road Safety Audits

Daniel Nabors, Vanasse Hangen Brustlin, Inc.

Benefits of Road Safety Audits (RSA)

Daniel Nabors, Vanasse Hangen Brustlin, Inc.

RSA Process

Frank Gross, Vanasse Hangen Brustlin, Inc.

Brief Review of Field Review Site on Day Two

Christina A. Fogt-Boulnois, Vanasse Hangen Brustlin, Inc.

5:30 p.m.–7:30 p.m. *International Ballroom North*

Reception

Sunday, July 24, 2011



Monday, July 25

7:00 a.m.–8:00 a.m., *International Foyer*
Continental Breakfast

7:00 a.m.–6:00 p.m., *North Registration*
Registration

7:00 a.m.–6:00 p.m., *Crystal Room*
Speaker Ready Room

8:00 a.m.–9:45 a.m., *International Ballroom Center*
Opening Session
Jolanda P. Prozzi, University of Texas at Austin, *presiding*

Welcome and Introduction

Jolanda P. Prozzi, University of Texas at Austin

Welcome

The Honorable John L. Mica, United States House of Representatives

Relevance of Low-Volume Roads in Iraq for Today, Tomorrow, and the Future

The Honorable Istabraq Ibrahim Abdul Wahab Al-Shouk, Senior Deputy Minister, Ministry of Construction and Housing, Iraq

Every Day Counts

Greg Nadeau, Federal Highway Administration

Keynote Address: The Promise of Rural Roads

Asif Faiz, Consultant, World Bank

9:45 a.m.–10:15 a.m., *International Foyer*
Break

10:15 a.m.–noon, *International Ballroom Center*
Cementitious Stabilization, Part 1
(*Part 2 is on Monday, July 25, from 3:45 p.m.–5:30 p.m.*)
Anand J. Puppala, University of Texas at Arlington, *presiding*

Use of Cementitious High-Carbon Fly Ash to Stabilize Recycled Pavement Materials as Base Course

Haifang Wen and Jingan Wang, Washington State University; Jeremy Baugh and Tuncer B. Edil, University of Wisconsin–Madison

Stabilization of Flue Gas Desulfurization By-Products with Fly Ash, Cement, and Sialite

Xiaoming Liu, Beijing Municipal Commission of Communications, China; Haifang Wen, Washington State University; Tuncer B. Edil and Craig H. Benson, University of Wisconsin–Madison

Stabilization Effectiveness of Treatment with T-Shaped Deep-Mixing Column for Low-Volume Roads

Guojun Cai, School of Transportation, Southeast University, China; Songyu Liu and Liyuan Tong, Southeast University, China

Comprehensive Life Cycle Cost Analysis for Selection of Stabilization Alternatives for Better Performance of Low-Volume Roads

Filippo Giammaria Praticò, University Mediterranea of Reggio Calabria, Italy; Sireesh Saride, Indian Institute of Technology Hyderabad; Anand J. Puppala, University of Texas at Arlington

Monday, July 25, 2011



10:15 a.m.–noon, *International Ballroom North*

Hot-Mix Asphalt

Alondra Chamorro, University of Waterloo, Canada, *presiding*

Kansas's Experience with Thin Superpave Mixture Overlay of Small Aggregate Top Size

Farhana Rahman and Mustaque Hossain, Kansas State University; Stefan A. Romanoschi, University of Texas at Arlington; Cliff Hobson, Kansas Department of Transportation

Laboratory Evaluation of Hot-Mix Asphalt Containing Petroleum-Contaminated Soil as a Surface Mix for Low-Volume Roads

Hossam Farouk Hassan and Amer Ali Al-Rawas, Sultan Qaboos University, Oman

Effect of Fine Aggregate Physical Properties on the Engineering Properties of Conventional and Polymer-Modified Bituminous Mixtures

Yasreen Gasmalkhalig Suliman, Madzlan Napihah, and Ibrahim Kamaruddin, Universiti Teknologi Petronas

Performance Evaluation and Environmental Impact Assessment of Asphalt-Treated Mixtures Used in Low-Volume Roads

Louay N. Mohammad, Louisiana State University; Munir D. Nazzal, Ohio University, Athens

10:15 a.m.–noon, *International Ballroom South*

Pavement Management Systems

Steve Saboundjian, Alaska Department of Transportation and Public Facilities, *presiding*

Decision Support Models for Asset Management of Low-Volume Roads

Amirthalingam Veeraragavan, Indian Institute of Technology, Madras; Murali Krishna P, Feedback Ventures Pvt. Ltd.

Unsealed Gravel Roads Management Implementation Guide

George Huntington and Khaled Ksaibati, University of Wyoming

Development of Roughness Prediction Models for Low-Volume Road Networks in Northeast Brazil

Fernando Silva Albuquerque, Federal University of Sergipe, Brazil; Washington Peres Núñez, Federal University of Rio Grande do Sul, Brazil

Appropriate Pavement Maintenance and Rehabilitation Management System for Local Governments

Robert Andrew Douglas, Golder Associates, Inc.

10:15 a.m.–noon, *Iris–Hibiscus*

What's New in Low-Volume Road Pavement Design and Performance?

Michael T. Long, Oregon Department of Transportation, *presiding*

Mechanistic–Empirical Pavement Design Guide–Based Pavement Design Catalog for Low-Volume Roads in Arkansas

Qiang Li, University of Delaware; Danny X. Xiao and Kevin D. Hall, University of Arkansas, Fayetteville

Performance Criterion for Thin-Surface Low-Volume Roads

Umesh Chandra Sahoo, Birla Institute of Technology; K. Sudhakar Reddy, Indian Institute of Technology, Kharagpur

Impacts of Reduced Tire Pressure on Strain Response of Low-Volume Thaw-Weakened Roads in Manitoba, Canada

Qingfan Liu, Leonnie Kavanagh, and Ahmed Shalaby, University of Manitoba, Canada

Road Performance Evaluation Using Geometric Consistency and Pavement Distress Data

Gianluca Dell'Acqua and Francesca Russo, University of Naples Federico II, Italy

Noon-1:00 p.m., *Salons 1, 2, and 3*

Conference Lunch

Michael T. Long, Oregon Department of Transportation, *presiding*

Yoder Award Presentation

G. P. Jayaprakash, Transportation Research Board

The Challenges of Low-Volume Roads

Ramon D. Gavarrete, Highlands County, Florida

1:00 p.m.–3:15 p.m., *International Ballroom Center* (NOTE: Afternoon sessions start promptly at 1:00 p.m.)

Geogrids

Khaled Sobhan, Florida Atlantic University, *presiding*

Accelerated Pavement Testing of Geocell-Reinforced Unpaved Roads Over Weak Subgrade

Sanat Kumar Pokharel, Jie Han, Xiaoming Yang, and Robert L. Parsons, University of Kansas; Chandra Bahadur Manandhar, Kansas State University; Dov Leshchinsky, University of Delaware; Izhar Halahmi, PRS Mediterranean Ltd., Israel

Characterization of Mechanically Stabilized Layer by Resilient Modulus and Permanent Deformation Testing

Mark H. Wayne, Tensar; Richard L. Boudreau, Boudreau Engineering Inc; Jayhyun Kwon, Tensar

Stress Analysis on Triangular-Aperture Geogrid-Reinforced Bases over Weak Subgrade Under Cyclic Loading: An Experimental Study

Yu Qian, University of Illinois at Urbana Champaign; Jie Han, Sanat Kumar Pokharel, and Robert L. Parsons, University of Kansas

Matting Solutions for Low-Volume Roads

Timothy Wallace Rushing, U.S. Army Corps of Engineers; Isaac L. Howard, Mississippi State University

1:00 p.m.–3:15 p.m., *International Ballroom South*

Pavement-Management Case Histories

Robert Andrew Douglas, Golder Associates, Inc., *presiding*

Operational Service Management System of Forest Roads

Janis Kivilands and A. Strezs, Road Expert Ltd.

Network-Level Pavement Management: Case of Serbian Low-Volume Roads

Goran Mladenovic, University of Belgrade, Serbia; Jelena Cirilovic, Institute IMS; Cesar A.V. Queiroz, University of Belgrade

Direct Measurement of the Impact of Heavy Loads on Thin-Membrane Pavements

Lynne Gradon Cowe Falls, A'arif Hamad, and Ahmed Abdelfattah, University of Calgary, Canada; Linda Clary, Suncor Energy

Infrastructure Impacts of Iowa's Renewable Energy

Konstantina Gkritza, Iowa State University; Inya Nlenanya, Center for Transportation Research and Education; Weiwei Jiang, Robert Sperry, and Duane E. Smith, Institute for Transportation at Iowa State University

Performance Evaluation of Whitetopping and Ultrathin Whitetopping Pavements

Xiaojun Li and Haifang Wen, Washington State University

Monday, July 25, 2011



1:00 p.m.–3:15 p.m., *International Ballroom North*

Potpourri of New Tools for Enhancing Low-Volume Road Design

Maureen A. Kestler, USDA Forest Service, *presiding*

Delivery of a Low-Volume Road in the Pilbara Region of Western Australia by Alliance Contracting

Geoffrey Colin Cocks, Coffey Geotechnics Pty. Ltd.; Jacqueline M. Scott, Bateman Engineering; Terry Pearce and Mark Hazebroek, Main Roads Western Australia; Paul Fisher, GHD Pty. Ltd.; Robert Wilson, Coffey Geotechnics Pty. Ltd.

Storm Damage Risk Reduction: Stormproofing Low-Volume Roads

Gordon Rex Keller and Gary Ketcheson, USDA Forest Service

Stream Simulation for Aquatic Organism Passage at Road–Stream Crossings

Daniel A. Cenderelli, Kim Clarkin, Robert A. Gubernick, and Mark Weinhold, USDA Forest Service

Stream Simulation e-Learning Training

Greg S. Napper, U.S. Department of Agriculture Forest Service

Models of Operating Speeds for Low-Volume Roads

Paolo Discetti, Gianluca Dell'Acqua and Renato Lamberti, University of Naples Federico II, Italy

3:15 p.m.–3:45 p.m., *International Foyer*

Break

3:45 p.m.–5:30 p.m., *International Ballroom Center*

Cementitious Stabilization, Part 2

(Part 1 is on Monday, July 25, from 10:15 a.m.–noon)

David Jones, University of California, Davis, *presiding*

Accelerated Moisture Conditioning Process of Lime-Stabilized Clays

Manuel Celaya, Maryam Veisi, and Soheil Nazarian, University of Texas, El Paso; Anand J. Puppala, University of Texas at Arlington

Combined Lime–Cement Stabilization for Longer Life of Low-Volume Roads

Chakkrit Sirivitmaitrie, Laureano R. Hoyos, and Anand J. Puppala, University of Texas at Arlington; Sireesh Saride, Indian Institute of Technology Hyderabad

Evaluation of Chemical Stabilization of a Highly Expansive Clayey Soil

E. Mutaz, Mosleh Shamrani, Anand J. Puppala, and Muawia A. Dafalla, King Saud University, Saudi Arabia

Performance of Full-Scale Test Section of Low-Volume Road with Reinforcing Base Layer of Soil–Lime

Leonardo Behak, Universidad de la Republica, Uruguay

3:45 p.m.–5:30 p.m., *Iris–Hibiscus*

Erosion and Sediment Control for Native- and Aggregate-Surfaced Roads

Asif Faiz, Consultant, World Bank; Michael T. Long, Oregon Department of Transportation, *presiding*

Evaluation of Erosion Prediction for Forest Roads

Arne Edward Skaugset and Christopher G. Surfleet, Oregon State University; Matthew W. Meadows, University of California, Merced; Joseph Amann, Herrera Environmental Consultants, Inc.

Reducing Sediment Production from Forest Roads During Wet-Weather Hauling

Elizabeth Myers Toman, Ohio State University; Arne E Skaugset, Oregon State University

Environmentally Sensitive Road Maintenance Practices: Sediment Reduction with Use of Driving Surface Aggregate

Steve Michael Bloser and Barry Scheetz, Pennsylvania State University

Modeling Road Erosion in Upper Torreon Wash, New Mexico

Krista M. Schultz, New Mexico Environment Department

3:45 p.m.–5:30 p.m., *International Ballroom South*

Hot-Mix Asphalt, Warm-Mix Asphalt, and Chip Seals

Clark C. Martin, Federal Highway Administration, *presiding*

Evaluation of Effects of Recycled Concrete Aggregate on Volumetrics of Hot-Mix Asphalt

Sushanta Bhusal, Xiaojun Li, and Haifang Wen, Washington State University

Late-Season Paving of Low-Volume Road Using Warm-Mix Asphalt: An Alaskan Experience

Steve Saboundjian, Alaska Department of Transportation and Public Facilities; Juanyu Liu and Peng Li, University of Alaska, Fairbanks; Bruce Brunette, Alaska Department of Transportation and Public Facilities

Performance of Warm-Mix Asphalt Mixtures Containing Recycled Coal Ash and Roofing Shingles with Moist Aggregates for Low-Volume Roads

Punith Veeralinga Shivaprasad, Feipeng Xiao, and Serji N. Amirkhanian, Clemson University

Chip Seal with Lightweight Aggregates for Low-Volume Roads

Md Shahidul Islam and Mustaque Hossain, Kansas State University

3:45 p.m.–5:30 p.m., *International Ballroom North*

Planning, Financing, and Economics of Low-Volume Roads

Kumares C. Sinha, Purdue University, *presiding*

Planning, Design, and Construction of Low-Cost Roads and Bridge Accessibility: Conflict and Natural Disasters in Haiti and Selected Areas in Africa and Latin America

Jacob Greenstein, U.S. Agency for International Development

Financing Low-Volume Road Improvements

Gregory H. Clemmons and Victoria Saager, Washington County

Maintenance Impact on Economic Evaluation of Upgrading Unsealed Roads

Rodrigo Archondo-Callao, World Bank

Rapid Response Stimulus Package for Improving Local Roads and Creating Jobs in Armenia

Satoshi Ishihara, World Bank, Vientiane, Laos; Christopher R. Bennett, World Bank; Alexander Bakhtamyan, Armenia Road Department; Jiangbo Ning, World Bank, Baku, Azerbaijan; Asif Faiz, Consultant, World Bank

6:00 p.m.–7:30 p.m., *Iris–Hibiscus*

Rural Roads Safety Policy, Programming, and Implementation Joint Subcommittee

Keith K. Knapp, Iowa State University, *presiding*

Monday, July 25, 2011



Tuesday, July 26

6:30 a.m.–6:00 p.m., *North Registration*
Registration

6:30 a.m.–6:00 p.m., *Crystal Room*
Speaker Ready Room

8:00 a.m.–noon, depart from *Attractions Entrance*
Field Trip Options

- 1: Hubbard Construction Company Asphalt Plant**
- 2: Stormwater Management Academy at the University of Central Florida**
- 3: Trip to a Road-Safety Audit Site**

1:30 p.m.–3:15 p.m., *International Ballroom Center*
Developments in Nontraditional Stabilizers
Roger W. Surdahl, Federal Highway Administration, *presiding*

Toward Establishment of Industry Associations to Represent Nontraditional Road Stabilizer Suppliers

David Jones, University of California, Davis

Soil Stabilization in Low-Volume Roads: Obstacles to Product Implementation from Additive Suppliers' Standpoint

Alex E. Campbell, Anyway Solutions; David Jones, University of California, Davis

Use of Various Additives as Alternative to Conventional Road Construction: Case Study of Main Road 269

James Robert Uys, Consulting Engineering Services (I) Pvt. Ltd.; Llewellyn Truter, Western Cape Provincial Administration; Gerhardt Daniel van Zyl, Consulting Services

Evaluation of Sustainability of Low-Volume Roads Treated with Nontraditional Stabilizers

Wynand Jacobus van der Merwe Steyn and Alex T. Visser, University of Pretoria, South Africa

1:30 p.m.–3:15 p.m., *International Ballroom North*
Effects of Roadway Geometry on Low-Volume Road Safety
Nicholas J. Garber, University of Virginia, *presiding*

Correspondence of Horizontal and Vertical Alignment with Safe Driving Conditions on Low-Volume Roads

Daiva Zilioniene and Viktoras Vorobjovas, Vilnius Gediminas Technical University, Lithuania

Estimation of Safety Effectiveness of Widening Shoulders and Adding Passing Lanes on Rural Two-Lane Roads

Steven D. Schrock, Robert L. Parsons and Huanghui Zeng, University of Kansas

Traffic Sign Sight Distance for Low-Volume Roads

Paolo Discetti and Renato Lamberti, University of Naples Federico II, Italy

Guardrail Optimization for Rural Roads

Carl M. Ochoa and Tania A. Ochoa, Vista Engineering Services, Inc.

1:30 p.m.–3:15 p.m., *International Ballroom South*

Materials

Mustaque Hossain, Kansas State University, *presiding*

Use of Aeolian Sands in the Provision of Low-Volume Roads

Philip Paige-Green, CSIR, South Africa; Michael Ian Pinard, InfraAfrica Consultants; Martin Bizaliele Mgangira, Council for Scientific and Industrial Research, South Africa

Rational Approach to the Evaluation of Soils for Low-Volume Roads

Washington Peres Núñez, Jorge Augusto Ceratti, Matheus Lemos Nogueira, and Luiz Antônio Bressani, Federal University of Rio Grande do Sul, Brazil; Rinaldo Barbosa Pinheiro, Federal University of Santa Maria; Vinicius Peraça, UFRGS

Decreasing Moisture Susceptibility of Gravel Road Surface Aggregate by Hydrophobic Treatment Agent: Case Study

Kari Pylkkänen and Maria Sjöberg, Tampere University of Technology, Finland

Soil and Water Road Condition Index

Carolyn Napper, U.S. Forest Service

3:15 p.m.–3:45 p.m., *International Foyer*

Break

3:45 p.m.–5:30 p.m., *Salons 1, 2, and 3*

Current Issues Facing Low-Volume Roads Managers, Part 1

(Part 2 is on Wednesday, July 27, from 3:45 p.m.–5:30 p.m.)

Ann Johnson, University of Minnesota, *presiding*

Engage in informal small group discussions on timely low-volume road “hot topics” facilitated by key experts. Each round table discussion will offer valuable information on best practices and lessons learned as well as provide helpful resource material. Ask questions, share experiences, learn from others, and gain practical information to apply to your low-volume road needs. Participants will have the opportunity to rotate among their selected table topics to gather information, receive expert assistance, and expand their resource network for a wide range of timely topics. Table topics for this session will focus on management issues such as tools and methods for road management, low cost safety improvements, financing, technology transfer, and energy industry effects on low-volume roads.

1. Road Management

Discussion leader: George Huntington, Wyoming Technology Transfer Center

Key topics:

- Tools and methods needed for managing gravel roads
- Development and implementation of a rural road management program

2. Low-Cost Road Safety Improvements

Discussion leader: Howard Preston, CH2M Hill

Key topics:

- Minnesota’s county road safety plan
- Safety indicators on low-volume roads
- Implementation of low-cost safety improvements

3. Energy Industry Effects on Low-Volume Roads

Discussion leader: Mark J. Nahra, Woodbury Iowa County Engineer

Key topics:

- Results of effects of energy industry on roads
- Other indicators of the effects of the industry on roads
- Addressing the impacts seen

4. Finance and Revenue

Discussion leader: Asif Faiz, Consultant

Tuesday, July 26, 2011



Key topics:

- Impacts of low-volume roads on local economy
- Funding opportunities
- Availing state and federal funds for low-volume roads

5. Technology Transfer

Discussion leader: Hesham Mahgoub, South Dakota LTAP Center

Key topics:

- New and existing technologies for technology transfer
- Educating those in need of information on low-volume road issues and management
- T2 Centers' and agencies' efforts on reaching their audiences

6. Structures

Discussion leader: David P. Orr, Cornell University

Key topics:

- Available new methods for design of structures (bridges, culverts, retaining walls)
- Innovative products and materials used
- Best maintenance techniques for these structures
- Economic considerations during design and maintenance

6:00 p.m.–7:30 p.m., *Crystal Room*

Low-Volume Roads Committee

Michael T. Long, Oregon Department of Transportation, *presiding*

Wednesday, July 27

7:00 a.m.–8:00 a.m., *International Foyer*
Continental Breakfast

7:00 a.m.–6:00 p.m., *North Registration*
Registration

7:00 a.m.–6:00 p.m., *Crystal Room*
Speaker Ready Room

8:00 a.m.–9:45 a.m., *International Ballroom Center*
Full-Depth Reclamation and Recycled-Pavement Materials
Jeb S. Tingle, U.S. Army Engineer Research and Development Center, *presiding*

Project Selection Guidelines for Road Rehabilitation Through Full-Depth Reclamation with Foamed Asphalt

David Jones and Pengcheng Fu, University of California, Davis

Comparison of Test Sections of Low-Volume Roadways Reconstructed with Conventional Techniques and Full-Depth Reclamation

Heather Miller and Meghan Amatrudo, University of Massachusetts, Dartmouth; Maureen A. Kestler, USDA Forest Service; Robert A. Eaton and Andrew Hall, New Hampshire Department of Transportation

Linn Run Road Improvements: Case Study on the Turn-Back of Asphalt-Paved Road Surface to Maintainable Gravel Road Surface

David Shearer, Center for Dirt and Gravel Roads; Barry Scheetz, Pennsylvania State University

Performance of Recycled Asphalt Pavement in Gravel Roads

Scott B. Koch, Khaled Ksaibati and George Huntington, University of Wyoming

8:00 a.m.–9:45 a.m., *International Ballroom South*
Pavement Materials

Lynne H. Irwin, Cornell University, *presiding*

Performance of Hot-Mix Asphalt Containing Recycled Asphalt Pavement

Binh Thanh Tran and Rayya A. Hassan, Swinburne University of Technology

Study of the Application of Cashew Nut Shell Liquid in Bituminous Priming of Low-Traffic Volume Roads in the State of Ceará, Brazil

Suely Barroso, Antônio Rabêlo, and Jorge Soares, LMP/UFC

Use of Recycled Materials to Build Paver Blocks for Low-Volume Roads in Developing Countries

Maria Fernanda Serrano-Guzman, Universidad Pontificia Bolivariana; Diego Dario Perez-Ruiz, Pontificia Universidad Javeriana

8:00 a.m.–9:45 a.m., *International Ballroom North*
Speed Characteristics and Management on Low-Volume Roads

Anthony R. Giancola, National Association of County Engineers, *presiding*

Speed Distribution on Low-Volume Roads in Italy: From Inferences to Rehabilitation Design Criteria

Filippo Giammaria Praticò and Marinella Giunta, University Mediterranea of Reggio Calabria, Italy

Wednesday, July 27, 2011



Speed Table Evaluation and Speed Modeling for Low-Volume Crosstown Roads

Ana Tsui Moreno, Alfredo Garcia, and Mario Alfonso Romero, Polytechnic University of Valencia, Spain

Reducing Traffic Injuries Resulting from Excess Speed: Low-Cost Gateway Treatments in Italy

Gianluca Dell'Acqua, University of Naples Federico II, Italy

Safety of Driving Behavior on Low-Volume Roads in China: Case Study of Qinghai-Tibet Highway

Jiang-bi Hu and Yang Yang, Transportation Research Center of Beijing University of Technology

9:45 a.m.–10:15 a.m., *International Foyer*

Break

10:15 a.m.–noon, *International Ballroom South*

Geotechnical Engineering

Ernest S. Berney, U.S. Army Corps of Engineer Research and Development Center, *presiding*

Investigation of Design and Construction Practices for Bridge Pile Foundations in Iowa County Jurisdictions for LRFD Calibration

Matthew John Roling, Stanley Consultants, Inc.; Sherif AbdelSalam, The British University in Egypt; Sri Sriharan, Iowa State University; Muhannad T. Suleiman, Lehigh University

Repair of Storm-Damaged Slopes, Lower Mount Wilson Road, Los Angeles County, California

Jeffrey R. Keaton, David L. Perry, and Philip W. Kim, MACTEC Engineering and Consulting, Inc.

Warm Lake Road Frost Heave Monitoring Report

Gary L. Evans, Federal Highway Administration; Mark Truebe, Willamette National Forest; Gordon Hanek, Umpqua National Forest

Application of Coal Gangue in Low-Volume Roads in China

Dongwei Cao, Research Institute of Highway Ministry of Transport; Jie Ji, Beijing Institute of Civil Engineering and Architecture, China; Qingquan Liu, Research Institute of Highway Ministry of Transport; Zhaoyi He, Chongqing Jiaotong University, China; Hainian Wang, Chang'an University, China; Zhanping You, Michigan Technological University

10:15 a.m.–noon, *International Ballroom Center*

Rural Roads Maintenance and Management

Elizabeth M. Dodson, University of Montana, *presiding*

Analysis of Factors Causing Corrugation of Gravel Roads

Hesham Mahgoub, South Dakota State University; Christina Bennett, South Dakota Department of Transportation; Ali A. Selim, South Dakota State University

Blading Optimization: Reverting from Theory to Practice

Gerhardt Daniel van Zyl, Mycube Asset Management Systems

Condition Performance Models for Network-Level Management of Unpaved Roads

Alondra Chamorro and Susan Louise Tighe, University of Waterloo, Canada

Application of Highway Development and Management Tool in Rural Road Asset Management

Amirthalingam Veeraragavan, Indian Institute of Technology, Madras; Rathnakara Reddy KB, Infra Support Engineering Consultants Pvt. Ltd.

10:15 a.m.–noon, *International Ballroom North*

Safety Assessment Tools for Low-Volume Roads

Abishai Polus, Technion - Israel Institute of Technology, *presiding*

Evaluation of Safety Identification Methods for Low-Volume Roads Using Monte Carlo Simulation

Salvatore Cafiso and Giacomo Di Silvestro, University of Catania, Italy

Safety Inspections as Supporting Tool for Safety Management of Low-Volume Roads

Salvatore Cafiso and Grazia La Cava, University of Catania, Italy; Alfonso Montella, University of Naples Federico II, Italy

Field Traffic Sign Handbook for Local Highway Agencies

David Paul Orr, Cornell University

Resources and Tools for Local Road Safety

Ronald W. Eck, West Virginia University

Noon-1:30 p.m.

Lunch Break (lunch on your own)

1:30 p.m.–3:15 p.m., *International Ballroom South*

Pavement Assessment

David Paul Orr, Cornell University, *presiding*

Mechanistic-Based Nondestructive Structural Asset Management Testing to Optimize Low-Volume Road Structural Upgrades

Curtis F. Berthelot and Diana Podborochynski, University of Saskatchewan, Canada; Anna Anthony, Saskatchewan Department of Highways & Transportation; Brent L. Marjerison, Saskatchewan Ministry of Highways and Infrastructure, Canada

Indirect Skid Resistance Measurement for Porous Asphalt Pavement Management

Gianluca Dell'Acqua, Mario De Luca, and Renato Lamberti, University of Naples Federico II, Italy

Keeping Springtime Low-Volume Road Damage to a Minimum: Toolkit of Practical Low-Cost Methods for Road Managers

Maureen A. Kestler, USDA Forest Service; Richard L. Berg, FROST Associates; Heather Miller, University of Massachusetts, Dartmouth; Bryan C. Steinert, Haley & Aldrich, Inc.; Robert A. Eaton, New Hampshire Department of Transportation; Gregg Larson, Applied Research Associates, Inc.; John E. Haddock, Purdue University

Improvement Recommendations for Unsealed Gravel Roads

George Huntington and Khaled Ksaibati, University of Wyoming

1:30 p.m.–3:15 p.m., *International Ballroom North*

Pavement Design

Glen Legere, FPIInnovations, *presiding*

Evaluation of Gravel-Loss Deterioration Models: Case Study

James Robert Uys, Consulting Engineering Services (I) Pvt. Ltd.

New Economical and Practical Design Approach for Suburban Streets

Rafeek Moegamat Louw, CSIR, South Africa

Wednesday, July 27, 2011



Integrated Mechanistic-Based Framework for Sustainable “Green Street” Rehabilitation of Urban Low- Volume Roads

Curtis F. Berthelot, Diana Podborochynski, Colin Wandzura, and Daryl Cherry, University of Saskatchewan, Canada; Rielle Haichert, Pavement Scientific International, Canada; Brian Taylor, Consultant, Canada; Duane Guenther, City of Saskatoon, Canada

Mechanistic Design and Nondestructive Structural Validation of a “Green Street” Test Section Using Recycled Rubble Materials

Curtis F. Berthelot, Diana Podborochynski, Colin Wandzura, and Daryl Cherry, University of Saskatchewan, Canada; Rielle Haichert, Pavement Scientific International, Canada; Brian Taylor, Consultant, Canada; Duane Guenther, City of Saskatoon, Canada

1:30 p.m.–3:15 p.m., *International Ballroom Center*

Use of Chip Seals and Thin Pavement for Low-Volume Roads

Mark J. Nahra, Woodbury County, *presiding*

Simple Dynamic Hammer for Evaluation of Physical Conditions of Pavement Structures

Warat Kongkitkul, Sompote Youwai, Pornkasem Jongpradist, Saravut Moryadee, and Thitikorn Posribink, King Mongkut’s University of Technology Thonburi; Koonnamas Punthutaecha and Chakree Bamrungwong, Department of Rural Roads, Thailand; Daiki Hirakawa, National Defense Academy

Preservation of Low-Volume Flexible Pavement Structural Capacity by Use of Seal Treatments

Isaac L. Howard, Mississippi State University

Nine Steps to Constructing High-Quality Chip Seals

Thomas John Wood, MNDOT; Roger C. Olson, Minnesota Department of Transportation

Evaluation of North Dakota’s 4.75-mm Superpave Mixes for Thin Overlay Applications

Nabil Suleiman, University of North Dakota

3:15 p.m.–3:45 p.m., *International Foyer*

Break

3:45 p.m.–5:30 p.m., *Salons 1, 2, and 3*

Current Issues Facing Low-Volume Roads Managers, Part 2

(Part 1 on Tuesday, July 26, from 3:45 p.m.–5:30 p.m.)

Ann Johnson, University of Minnesota, *presiding*

Engage in informal small group discussions on timely low-volume road “hot topics” facilitated by key experts. Each round table discussion will offer valuable information on best practices and lessons learned as well as provide helpful resource material. Ask questions, share experiences, learn from others, and gain practical information to apply to your low-volume road needs. Participants will have the opportunity to rotate among their selected table topics to gather information, receive expert assistance, and expand their resource network for a wide range of timely topics. Table topics for this session will focus on design issues such as dust control, geometric standards, erosion control, materials, and base stabilization.

1. Dust Control

Discussion leader: Roger Surdahl, FHWA

Key topics:

- Environmental Certification of dust suppression and surface stabilization products
- Best way of selecting a dust palliative or surface stabilizer for a specific application
- Use of additives without any formal specifications
- Incorporation of dust palliatives and surface stabilizers in low-volume road management

2. Operational Effects of Low-Volume Road Design

Discussion leader: Ronald W. Eck, West Virginia LTAP

Key topics:

- Design consistency and its relationship to safety
- Design vehicles for low-volume roads
- Relationship between cross section elements and safety
- Accommodation of nonmotorized users

3. Cut and Fill Slopes: Stability, Drainage, and Erosion Control

Discussion leaders: Gordon Keller, U.S.D.A. Forest Service; and Clayton Gillies, FP Innovations

Key topics:

- Critical shallow slope stabilization and erosion control issues for LVR engineers and managers
- Range of options and solutions that are most cost-effective and environmentally friendly
- Corresponding erosion control and related drainage issues associated with critical shallow slope stabilization
- Newest techniques and best methods for increasing slope stability

4. Pavement Design and Materials

Discussion leader: Mark Nahra, Woodbury Iowa County Engineer

Key topics:

- Current best practices and resources in pavement design methods for LVR with regard to materials
- Research related to materials selection
- New tools to assist with pavement design for LVRs

5. Materials Construction Use and Design Issues

Discussion leaders: Roger Olson and Eddie Johnson, Minnesota Department of Transportation

Key topics:

- New research done on the use of recycled materials in LVR construction
- Use of more recycled aggregates
- Construction issues associated with the use of recycled aggregates

6. Road-Base Stabilization

Discussion leader: David Jones, University of California, Davis

Key topics:

- Existing new technologies for full-depth reclamation
- Best way to stabilize road-base layers on LVRs
- Available geosynthetic products that are appropriate for use in low-volume roads

6:00 p.m.–7:00 p.m., *International Foyer*

Social Hour

7:00 p.m.–9:00 p.m., *International Ballroom North*

Conference Banquet

Wednesday, July 27, 2011



Thursday, July 28

Postconference Field Trip: Florida Department of Transportation, State Materials Office, Gainesville, Florida
8:00 a.m.–5:00 p.m., assemble in *Crystal Room*

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10th International Conference on Low-Volume Roads

July 24–27, 2011
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2. Provide your PE number for the registration staff to record.
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Questions about PDH may be directed to the conference host agency at Florida Transportation Technology Transfer (T2) Center at the University of Florida by email t2cttassist@ce.ufl.edu or by calling 352.273.1669.

July 24–27, 2011



Announcing New TRB Report

Rockfall Characterization and Control

A new report, *Rockfall Characterization and Control*, edited by A. Keith Turner and Robert L. Schuster, will be available in print from TRB by the end of 2011. The report contains 18 chapters prepared by internationally recognized experts. The first five chapters describe the fundamentals of rockfall phenomena; the next five discuss the scientific and technical aspects of rockfall investigations; and the final eight describe rockfall mitigation and management options, with special reference to rockfall protection provided along transportation routes.

The report will interest transportation engineers responsible for rockfall investigations throughout the world, students in geosciences and geotechnical fields interested in rockfall, and researchers needing a definitive reference on rockfall evaluation and control.

For purchasing information, visit the TRB Bookstore at <http://books.trbbookstore.org/>



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July 24–27, 2011



Mezzanine - 2nd Level



Ballrooms - Lobby Level



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