Contents

PRESENTATIONS NOT INCLUDED IN PROCEEDINGS x

FREEWAY TRAFFIC OPERATION AND MODELING

Traffic Flow Simulation for an Urban Freeway Corridor 1
Lonnie E. Haefner and Ming-Shiun Li

Simulating Traffic for Incident Management and ITS Investment Decisions 7
Michael D. Anderson and Reginald R. Souleyrette

Examination of Fundamental Traffic Characteristics and Implications to ITS 12
Lonnie E. Haefner, Ming-Shiun Li, Luis A. Porrello, Mermel V. Blanco, and Daniel B. VanPelt

ROADSIDE SAFETY

Strategies for Improving Roadside Safety 18
Kenneth S. Opiela and Richard M. McGinnis

Guidelines for Developing a Guardrail Manual for Low-Volume Roads 22
Eugene R. Russell and Margaret J. Rys

ITS IN TRUCKING

The Importance of Measuring Fuel Consumption In Evaluating Electronic Clearance 26
Dennis Kroeger

Weigh Stations’ Capacity Enhancement Alternatives: A Comparison of Mainline Electronic Screening and Physical Expansion 29
Alireza Kamyab
WINTER STORM MAINTENANCE

Use of Pavement Temperature Measurements for Winter Maintenance Decisions 33
David S. Knollhoff, Eugene S. Takle, William A. Gallus, Jr., and Dennis Burkheimer

Economic Evaluation of Advanced Winter Highway Maintenance Strategies 37
Duane E. Smith and Jeffrey A. Zogg

BRIDGE DECKS

Impact of Bridge Deck Cracking on Durability 41
Jeff Pape and Fouad Fanous

NUDECK - A New Prestressed Stay-In-Place Concrete Panel for Bridge Decks 45
Sameh S. Badie, Mantu C. Baishya, and Maher K. Tadros

Bridge Deck Deicing 51
Sherif Yehia and Christopher Y. Tuan

MANAGING TRAFFIC AND PROGRAMMING IMPROVEMENTS IN MEDIUM AND SMALL CITIES

A “Trigger Mechanism” Concept for Arterial Street Improvement Programming 58
Barry D. Lundberg and Virendra Singh

Neighborhood Traffic Control Planning for Small Cities 62
William Troe and Linda Hartman

Quick-Response Bypass Forecasting for Small Urban Communities Using an Economic Gravity Model for External Trip Analysis 67
Michael D. Anderson and Reginald R. Souleyrette

CONCRETE PAVEMENTS

PCC Pavement Deterioration and Expansive Mineral Growth 71
Hyomin Lee, Anita M. Cody, Robert D. Cody, and Paul G. Spry

Evaluation of Mix Time on Concrete Consistency and Consolidation 76
James K. Cable

Evaluation of Glass Fiber Reinforced Plastic Dowels as Load Transfer Devices in Highway Pavement Slabs 78
Dustin Davis and Max L. Porter

Evaluation of Bonding Between Ultra-Thin Portland Cement Concrete and Asphalitic Concrete 82
James K. Cable and John M. Hart
# Use of Friction in Winter Storm Maintenance

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friction as a Tool for Winter Maintenance</td>
<td>86</td>
</tr>
<tr>
<td><strong>Wilfrid A. Nixon</strong></td>
<td></td>
</tr>
<tr>
<td>A New Paradigm for Winter Maintenance Decisions</td>
<td>90</td>
</tr>
<tr>
<td><strong>Duane E. Smith</strong></td>
<td></td>
</tr>
<tr>
<td>The Measurement and Theory of Tire Friction on Contaminated Surfaces</td>
<td>94</td>
</tr>
<tr>
<td><strong>James C. Wambold and Arild Andresen</strong></td>
<td></td>
</tr>
</tbody>
</table>

# Bridge Repair and Evaluation

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrofit Solution for Out-of-Plane Distortion of X-Type Diaphragm</td>
<td>99</td>
</tr>
<tr>
<td><strong>Bridges</strong></td>
<td></td>
</tr>
<tr>
<td>Effects of Damage on the Behavior of Pretensioned/Prestressed Concrete Beam (PPCB) Ridges</td>
<td>103</td>
</tr>
<tr>
<td><strong>Francesco M. Russo, F. Wayne Klaiber, Terry J. Wipf, and William A. Lundquist</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ayman Khalil, Lowell Greimann, Terry J. Wipf, and Douglas Wood</strong></td>
<td></td>
</tr>
</tbody>
</table>

# Managing Highway Access

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Secondary Data Sources to Determine the Business Vitality Impacts of Access Management Projects in Iowa</td>
<td>113</td>
</tr>
<tr>
<td><strong>David Plazak, Tom Sanchez, and Ken Stone</strong></td>
<td></td>
</tr>
<tr>
<td>Bridging the Gap Between Access Management Ideals and Land Use Planning Practice: Suggested Policies and Potential Benefits</td>
<td>118</td>
</tr>
<tr>
<td><strong>Christopher P. Albrecht and David Plazak</strong></td>
<td></td>
</tr>
</tbody>
</table>

# Methods in Travel Demand Modeling

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Impact of Factoring Traffic Counts for Daily and Monthly Variation in Reducing Sample Counting Error</td>
<td>122</td>
</tr>
<tr>
<td><strong>Sam Granato</strong></td>
<td></td>
</tr>
</tbody>
</table>

# ITS in International and Multimodal Freight Transportation

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Summary of the Economic Analysis Concerning the Application of Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) to the Mid-Continent Corridor</td>
<td>126</td>
</tr>
<tr>
<td><strong>Christopher M. Monsere and T. H. Maze</strong></td>
<td></td>
</tr>
</tbody>
</table>
ITS Opportunities in Port Operations  
Lonnie E. Haefner and Matthew S. Bieschke  
131

HIGHWAY MAINTENANCE MANAGEMENT DECISION MAKING

Use of Highway Network Level Data for a Project Level Life Cycle Analysis  
Raymond J. Gerke, Clarence M. Dewald, and Ron Gerbrandt  
135

Managing the Preservation of State Highway Systems  
John R. Selner  
139

IMPROVING TRANSPORTATION FACILITY CONSTRUCTION

Pile Bearing in Burlington Limestone  
Brett Gunnink and Chad Kiehne  
145

Using NDT to Reduce Traffic Delays in Concrete Paving  
James K. Cable  
149

Implementing Benchmarking Recommendations in the Offices of Construction for the Iowa DOT  
Mark O. Federle and Charles T. Jahren  
151

TRAFFIC OPERATIONS, SAFETY, AND CRASH ANALYSIS

Using Concepts of Driver Expectancy, Positive Guidance and Consistency for Improved Operation and Safety  
Eugene R. Russell  
155

Digital Camera Traffic Accident Investigation System  
Patrick T. McCoy, Sharad C. Seth, Stephen E. Reichenbach, and Ashok Samal  
159

STATEWIDE TRANSPORTATION PLANNING, IMPLEMENTING ISTEA

The Involvement of Regional Planning Organizations in the Statewide Transportation Planning Process  
Kent B. Van Landuyt  
164

Response of State Transportation Planning Programs to the Intermodal Surface Transportation Efficiency Act of 1991  
Michael A. Lipsman and Clyde Kenneth Walter  
167
TRANSPORTATION PLANNING, LAND USE, AND ECONOMIC DATA

Economic Growth, Property Valuation Change, and Transportation Investments  227
David Swenson, Liesl Eathington, and Daniel Otto

Transportation and Urban Form: A Case Study of the Des Moines Metropolitan Area  232
Chunlin Cao, Tim Strauss, Reginald R. Souleyrette, and R. Duane Shinn

RURAL ITS OPERATIONAL TESTS

FORETELL™: Providing Integrated Weather Information Services Across the Upper Midwest  238
Peter Davies, Dean Deeter, and Clare E. Bland

Case Study: The Branson Travel and Recreational Information Program (TRIP)  241
Tim Garrett

Cross-Cutting Study of Advanced Rural Transportation System ITS Field Operational Tests  245
Keith Jasper

ASPHALT PAVEMENTS

Iowa Thickness Design Guide for Low Volume Roads Using Reclaimed Hydrated Class C Fly Ash Bases  253
Kenneth L. Bergeson and Andrew G. Barnes

Review of Cold In-Place Asphalt Recycling in Iowa  259
Charles T. Jahren, Bryan Cawley, Brian Ellsworth, and Kenneth Bergeson

SUPERPAVE® Compaction  264
Brian J. Coree and Kera VanDerHorst

MISCELLANEOUS

Strategic Issues for a City Roadways Re-Engineering Project  268
Ray Gerke and Doug Drever
PREFACE

Crossroads 2000 was the second biennial transportation research conference cosponsored by the Center for Transportation Research and Education (CTRE) at Iowa State University and the Iowa Department of Transportation. The conference and proceedings were developed under a collaborative arrangement between the two organizations formalized in a Memorandum of Agreement in 1992 and expanded in 1996 to include the University of Iowa and the University of Northern Iowa. The day-and-a-half conference provided an opportunity for Iowans and other Midwesterners to focus on regional and national transportation research and technology transfer issues through presentations of the caliber generally found at national events. The conference allowed transportation professionals from the region to attend a content-rich event without having to travel outside the region.

This proceedings is the set of papers presented at the conference. Twenty-five categories of papers were presented in five concurrent sessions. Reflecting the increasingly critical role of intelligent transportation systems (ITS) in maintaining and enhancing transportation safety and efficiency, one category in each concurrent session addressed an area of ITS. However, papers were included from all areas of interest, ranging from transportation infrastructure design to transportation policy. Together the 76 papers presented at the conference showcase the variety of research that is shaping the next era of transportation.

Tom Maze, Director
Center for Transportation Research and Education
Iowa State University
Ames, Iowa
The following presentations were not available for inclusion in the proceedings:

“The Kansas City International Trade Processing Center” Ronald Achelpohl, Mid-America Regional Council

“The Role of Anti-Icing and Prewetting at the Iowa DOT (Moving away from Theory)” Dennis Burkheimer, Iowa DOT

“Advanced Public Transit Systems” Craig Cole, Rockwell

“Travel Model Improvement Program Current Status” Michael Culp, FHWA

“Using a Desktop GIS and Travel Demand Software to Develop Traffic Models for Small Cities” Jennifer Kragt, Iowa Northland Regional Council of Governments

“Public Perceptions of the Midwest’s Pavements” David Kuemmel, Marquette University

“Statewide Freight Modeling Using the 1993 Commodity Flow Survey” Mike Lipsman, Iowa DOT

“What Comes after the ISTEA Management Systems? Asset Management” Tom Maze, CTRE, Iowa State University

“The Montana Experience in Statewide ITS Planning” Pat McGowen, Western Transportation Institute


“Rural Minnesota: Recognizing the Benefits of a Statewide Strategic Plan” Marthand Nookala, Minnesota DOT

“Intelligent Transportation: Setting Statewide Strategic Direction” Vincent Pearce, Booz-Allen & Hamilton

“Encouraging Public Access to GIS Data” Ann Peton, Iowa Office of Information Technologies Services

“Improving Employment Data for Transportation Planning” David Plazak, CTRE, Iowa State University

“Multimodal Statewide Freight Transportation Planning” David Preissig, Iowa State University

“Traffic Flow and Safety Implications of Access Management on Arterial Roadways” Howard Preston, BRW, Inc.

“Traffic Safety and Operational Effects of Protected-Permitted Left Turn Traffic Signal Phasing” Howard Preston, BRW, Inc.

“Roadsurfing the Web in ITS” Matthew Tondl, HDR Engineering

“Selecting Roadside Safety Hardware” Bill Wendling, HCR

The following acronyms may be used without definition in this proceedings:

AASHTO American Association of State Highway and Transportation Officials
ASCE American Society of Civil Engineers
ASME American Society of Mechanical Engineers
ASTM American Society of Testing and Materials
FHWA Federal Highway Administration
NCHRP National Cooperative Highway Research Program
NHTSA National Highway Traffic Safety Administration
SHRP Strategic Highway Research Program
TRB Transportation Research Board
USDOT United States Department of Transportation