



CROSSROADS 2000

PROCEEDINGS

August 19-20, 1998
Iowa State University
Ames, Iowa

Sponsored by
Iowa State University and
Iowa Department of Transportation

Crossroads 2000 Proceedings

Contents

PRESENTATIONS NOT INCLUDED IN PROCEEDINGS	x
---	---

FREEWAY TRAFFIC OPERATION AND MODELING

Traffic Flow Simulation for an Urban Freeway Corridor <i>Lonnie E. Haefner and Ming-Shiun Li</i>	1
Simulating Traffic for Incident Management and ITS Investment Decisions <i>Michael D. Anderson and Reginald R. Souleyrette</i>	7
Examination of Fundamental Traffic Characteristics and Implications to ITS <i>Lonnie E. Haefner, Ming-Shiun Li, Luis A. Porrello, Mermel V. Blanco, and Daniel B. VanPelt</i>	12

ROADSIDE SAFETY

Strategies for Improving Roadside Safety <i>Kenneth S. Opiela and Richard M. McGinnis</i>	18
Guidelines for Developing a Guardrail Manual for Low-Volume Roads <i>Eugene R. Russell and Margaret J. Rys</i>	22

ITS IN TRUCKING

The Importance of Measuring Fuel Consumption In Evaluating Electronic Clearance <i>Dennis Kroeger</i>	26
Weigh Stations' Capacity Enhancement Alternatives: A Comparison of Mainline Electronic Screening and Physical Expansion <i>Alireza Kamyab</i>	29

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

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

BRIDGE DECKS

Impact of Bridge Deck Cracking on Durability	41
<i>Jeff Pape and Fouad Fanous</i>	

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

Bridge Deck Deicing	51
<i>Sherif Yehia and Christopher Y. Tuan</i>	

MANAGING TRAFFIC AND PROGRAMMING IMPROVEMENTS IN MEDIUM AND SMALL CITIES

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

Neighborhood Traffic Control Planning for Small Cities	62
<i>William Troe and Linda Hartman</i>	

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

CONCRETE PAVEMENTS

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

Evaluation of Mix Time on Concrete Consistency and Consolidation	76
<i>James K. Cable</i>	

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

Evaluation of Bonding Between Ultra-Thin Portland Cement Concrete and Asphaltic Concrete	82
<i>James K. Cable and John M. Hart</i>	

Friction as a Tool for Winter Maintenance <i>Wilfrid A. Nixon</i>	86
A New Paradigm for Winter Maintenance Decisions <i>Duane E. Smith</i>	90
The Measurement and Theory of Tire Friction on Contaminated Surfaces <i>James C. Wambold and Arild Andresen</i>	94

BRIDGE REPAIR AND EVALUATION

Retrofit Solution for Out-of-Plane Distortion of X-Type Diaphragm Bridges <i>Ayman Khalil, Terry J. Wipf, Lowell Greimann, Douglas Wood, and Bruce Brakke</i>	99
Effects of Damage on the Behavior of Pretensioned/Prestressed Concrete Beam (PPCB) Bridges <i>Francesco M. Russo, F. Wayne Klaiber, Terry J. Wipf, and William A. Lundquist</i>	103
Modal Testing for Nondestructive Evaluation of Bridges: Issues <i>Ayman Khalil, Lowell Greimann, Terry J. Wipf, and Douglas Wood</i>	109

MANAGING HIGHWAY ACCESS

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

METHODS IN TRAVEL DEMAND MODELING

The Impact of Factoring Traffic Counts for Daily and Monthly Variation in Reducing Sample Counting Error <i>Sam Granato</i>	122
---	------------

ITS IN INTERNATIONAL AND MULTIMODAL FREIGHT TRANSPORTATION

A Summary of the Economic Analysis Concerning the Application of Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) to the Mid-Continent Corridor <i>Christopher M. Monsere and T. H. Maze</i>	126
--	------------

ITS Opportunities in Port Operations <i>Lonnie E. Haefner and Matthew S. Bieschke</i>	131
---	------------

HIGHWAY MAINTENANCE MANAGEMENT DECISION MAKING

Use of Highway Network Level Data for a Project Level Life Cycle Analysis <i>Raymond J. Gerke, Clarence M. Dewald, and Ron Gerbrandt</i>	135
Managing the Preservation of State Highway Systems <i>John R. Selmer</i>	139

IMPROVING TRANSPORTATION FACILITY CONSTRUCTION

Pile Bearing in Burlington Limestone <i>Brett Gunnink and Chad Kiehne</i>	145
Using NDT to Reduce Traffic Delays in Concrete Paving <i>James K. Cable</i>	149
Implementing Benchmarking Recommendations in the Offices of Construction for the Iowa DOT <i>Mark O. Federle and Charles T. Jahren</i>	151

TRAFFIC OPERATIONS, SAFETY, AND CRASH ANALYSIS

Using Concepts of Driver Expectancy, Positive Guidance and Consistency for Improved Operation and Safety <i>Eugene R. Russell</i>	155
Digital Camera Traffic Accident Investigation System <i>Patrick T. McCoy, Sharad C. Seth, Stephen E. Reichenbach, and Ashok Samal</i>	159

STATEWIDE TRANSPORTATION PLANNING, IMPLEMENTING ISTEA

The Involvement of Regional Planning Organizations in the Statewide Transportation Planning Process <i>Kent B. Van Landuyt</i>	164
Response of State Transportation Planning Programs to the Intermodal Surface Transportation Efficiency Act of 1991 <i>Michael A. Lipsman and Clyde Kenneth Walter</i>	167

Des Moines Metropolitan Area ITS Strategic Plan	172
<i>Thomas Kane, T.H. Maze, and Vincent P. Pearce</i>	

System Architecture Efforts in the Gary-Chicago-Milwaukee Corridor	177
<i>Jeff Hochmuth and Sydney Bowcott</i>	

DEVELOPING DATA AND DATA MANAGEMENT RESOURCES FOR TRANSPORTATION ANALYSIS

Organizing a High Accuracy GIS Prototype Using Diverse Existing Elements	182
<i>Ed Krum, Joella Givens, and David P. Pieper</i>	

Iowa Department of Transportation Statewide Coordinated GIS	187
<i>William G. Schuman, Tim Strauss, Dan Gieseeman, and Reginald R. Souleyrette</i>	

NEW TECHNOLOGIES AND TECHNIQUES FOR MANAGING AND CONSTRUCTING PAVEMENTS

Roller Mountable Asphalt Pavement Quality Indicator	192
<i>Edward J. Jaselskis, Hsiu Han, Lawrence Tan, and Jonas Grigas</i>	

Development of End-Result and Performance-Related Specifications for Asphalt Pavement Construction in Illinois	195
<i>William G. Buttlar and Michael Harrell</i>	

Incorporating Innovative Technologies into Traditional Pavement Management Activities	203
<i>Kathryn A. Zimmerman</i>	

COMPUTERIZED METHODS FOR CRASH ANALYSIS

A Methodology for Studying Crash Dependence on Demographic and Socioeconomic Data	209
<i>Michael D. Pawlovich, Reginald R. Souleyrette, and Tim Strauss</i>	

Collision Diagram Software Compatability with Iowa Accident Database	216
<i>Duane E. Smith, Jeff Gerken, and Phil Mescher</i>	

An Assessment of Emergency Response Vehicle Pre-Deployment Using GIS Identification of High-Accident Density Locations	221
<i>Bradley M. Estochen, Tim Strauss, and Reginald Souleyrette</i>	

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

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

RURAL ITS OPERATIONAL TESTS

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

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

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

ASPHALT PAVEMENTS

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

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

SUPERPAVE® Compaction	264
<i>Brian J. Coree and Kera VanDerHorst</i>	

MISCELLANEOUS

Strategic Issues for a City Roadways Re-Engineering Project	268
<i>Ray Gerke and Doug Drever</i>	

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

“Electronic Commerce in Transportation: A Carrier's Response to Global Shipper Needs” Gary Nichols, Contract Freighters, Inc.

“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