



Midwest Safety Scanning Tour

October 16-21, 2005

Brian Chandler, PE, PTOE
Traffic Studies & Corrections Engineer
Traffic Division – Safety Section
Missouri Department of Transportation



EXECUTIVE SUMMARY

In recent years an emphasis has been placed on highway safety at the national and state levels. Goals have been set nationally and in the State of Missouri to focus efforts on decreasing the number of fatalities on our highways. In order to meet these goals, it is imperative to look outside the state borders. Traffic Safety expertise exists across the country; among the leaders in safety engineering, enforcement and education are Iowa and Minnesota.

In October of 2005, Traffic's Safety Section led a team to these states to learn from them and incorporate new ideas into Missouri's safety efforts. This scanning tour report provides a toolbox of best practices gleaned from a scan of these two states' safety programs.

Scanning Team Composition

The five scan team members offered a range of expertise in traffic operations, safety engineering, data analysis, long-range planning, and local issues. The study benefited from the backgrounds of each team member on the scan. Team members included:

- Brian Chandler, Missouri DOT, Traffic Division
- John Schaefer, Missouri DOT, Traffic Division
- John Miller, Missouri DOT, Planning Division
- Jacob Ray, Missouri DOT, Central District
- Michael Briggs, Mid-America Regional Council

Sites Visited

The team visited with Department of Transportation staff, industry leaders in traffic safety systems, and various other safety partners in Ames, Iowa, and Minneapolis, Minnesota during the four-day scanning tour.

Key Findings

The purpose of this report is to bring ideas from other states back to Missouri safety professionals for discussion and implementation. These best practices, if incorporated into Missouri's safety efforts, could greatly impact safety in the state.

- **Partnerships** From universities to law enforcement to optometry, safety engineers in Iowa and Minnesota realize the importance of stretching beyond traditional engineering solutions to save lives.
- **Information sharing** Iowa and Minnesota are breaking down the privacy barrier shielding crash data from the public. This transparency gives the public a real view of the safety issues in their state, and allows the DOTs to show the public the effort they are making to increase safety.
- **Innovative Funding** In both Iowa and Minnesota an emphasis is placed on the cost of crashes, not only on specific projects (for Benefit/Cost ratio analysis) but on a statewide level as well. This gives safety engineers a common ground for discussion with management and safety partners. Additionally, Iowa uses 0.5% of the state's Road Use Tax for safety projects.

INTRODUCTION

In recent years an emphasis has been placed on highway safety at the national and state levels. The Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) have adopted a goal to reduce fatalities on the nation's highways to 1.0 per 100 million vehicle miles traveled by 2008.

In Missouri, the Coalition for Roadway safety has established a goal of 1000 or fewer highway fatalities in the State of Missouri by that same year. In order to meet that goal, the Coalition drafted Missouri's Blueprint for Safer Roadways. The Blueprint is a focused document utilizing a partnership approach to outline explicit opportunities to reduce fatalities and serious injuries on our roadways.

To increase safety on Missouri's roads, it was deemed imperative to look outside the state borders. Traffic Safety expertise exists across the country, and Missouri's neighbors to the north are among the leaders.

This study provides a toolbox of best practices gleaned from a scan of Iowa and Minnesota's safety engineering programs. Each of our three states has unique characteristics, and we also have many similarities. And we all aspire to the same goal: to reduce the number and severity of highway crashes.

Technical Transfer Assistance Program

This scanning tour was funded through the Federal Highway Administration's Technical Transfer Assistance Program. Don Neumann, Highway Safety Specialist, provided sponsorship and support for the tour.

Scanning Team Composition

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Key Findings

The purpose of this report is to bring ideas from other states back to Missouri safety professionals for discussion and implementation. These best practices, if incorporated into Missouri's safety efforts, could greatly impact safety in the state.

- Partnerships
- Electronic Crash Reporting
- Information Sharing
- Innovative Funding

PARTNERSHIPS

The most important concept gleaned from our scanning tour was the realization what we cannot improve safety alone in our engineering silo. It is vital to enlist and lead other disciplines to make our roadways safer.

Other States

The benefits of the safety scanning tour were many, not the least of which was the relationship building among our states. The increase in interstate discussion about safety topics between Missouri safety professionals and our counterparts in Iowa and Minnesota has been significant.

Iowa and Minnesota are involved in additional peer exchange opportunities throughout the year with Nebraska, Illinois, Kansas, other other nearby states.

Local Government

Iowa's state highway system is 9300 miles – only 8% of the total roadway system. Because of this, it is vital for safety in Iowa that the locals are heavily involved in planning, construction, and operation of the system. Iowa's nine Metropolitan Planning Organizations (MPOs) work closely in conjunction with Iowa DOT to plan safety projects.

In Iowa, the DOT brings in MPO & Regional Planning Associations (RPA) directors every three months to discuss safety issues and projects. In Minnesota, the MPOs are involved in the selection process for Hazard Elimination projects.

A signing program has been developed for small towns in Iowa. The DOT provides signs to local jurisdictions at no charge.

Law Enforcement

Minnesota DOT sets speed limits on all roads, regardless of jurisdiction. In a partnership effort with law enforcement, the Highway Patrol enacted data-driven scheduling. The DOT will send the patrol the previous month of speed data (gathered from sensors throughout the Minneapolis/St. Paul area). Each officer will then know what time of day has the most speeders at each location and set his patrol schedule accordingly.

Iowa is on the forefront in the area of electronic entry of crash reports. Jack Latterell lead development of the National Model for data entry, transforming Iowa's traffic data from paper to electronic. The National Model team created the TraCS software program for citations, commercial vehicle information, and crash reports. This software is available free of charge to participating agencies, who then pay a yearly user fee.

Academia

Iowa DOT has a wonderful working relationship with Iowa State University. The Center for Transportation Research and Education (CTRE) works as an extension of the DOT staff and is heavily involved in safety research projects.

Partnerships with non-traditional disciplines

Minnesota DOT contracted with an optometrist to help them learn what a driver is seeing, particularly in a gap judgment situation. His expertise was invaluable in determining countermeasures at locations with a history of severe crashes.

Road Safety Audits

Iowa puts together a Road Safety Audit (RSA) team for each overlay project in the state. This team studies the safety aspects of the road, targeting run-off-road crashes where applicable. Iowa has created a workshop to train RSA team members.

Minnesota builds 6-member multi-disciplinary teams to study intersections, interchanges, and segments. The team is often deployed at locations with crash problems, either before or after a project is built. In their experience, RSA teams work best when other countermeasures have already been tried. The team meets with the locals to learn about the situation, but it is important for the audit to be independent. After each study, the RSA team receives a response from the district.

INFORMATION SHARING

Sharing Crash Data

There is no barrier between the state and local governments with regard to crash data. Even the public has access to location-specific crash data. In Iowa, the belief is that open sharing of information keeps them out of court. (with protection from 23 U.S. Code Section 409).

Engineers from Iowa explained that the more information they share, the more they show the public they are doing something at the requested locations.

Software for Crash Analysis

Also discuss software available to locals to query and analyze crash data. Using a simple Geographic Information System (GIS)-based interface, a local official can easily plot crashes on a map of his jurisdiction. The software is distributed at no cost.

The Iowa Traffic Safety Data Service (ITSDDS), housed at the Center for Transportation Research and Education (CTRE), is a quick-response service for crash data queries, analysis and support. It is designed to fill the gap between data users can get for themselves and the complex data queries obtained by experts with the latest technology. ITSDDS serves local engineers, law enforcement, universities, and the general public.

INNOVATIVE FUNDING

DOT Funding

In Iowa, a number of funding mechanisms have been put in place to assure adequate funding levels for safety. 0.5% of the Road Use Tax Fund is set aside for safety projects. This gives Iowa about \$7 Million of state funds per year (with no federal strings attached) to attack safety in the state. This pot has funded projects like experimental pavement marking, data software development, and research projects at CTRE. It also funds low-tech solutions, such as the small town signing program.

Crash costs

In both Iowa and Minnesota an emphasis is placed on the cost of crashes, both for specific projects (for Benefit/Cost ratio analysis) and on a statewide level.

The cost of fatalities is handled differently by each state. Because of the high cost (nearly \$4 Million), it is infeasible to use this value in crash cost analyses. Iowa uses a "Modified Crash Cost" system, treating the first fatality at any location as a serious injury. Any additional fatality at that same location receives the full dollar amount of a fatality. In Minnesota, each fatality is given a cost of two serious injuries. Segments in Minnesota are ranked at crash cost per mile.

ENGINEERING SOLUTIONS

Addressing Run-off-road Crashes

As part of a safety initiative, Iowa identified its 30 curves with the most crashes and addressed those curves with countermeasures (chevrons, lighting, etc.)

Additionally, the state has addressed run-off-road crashes by adding a 4-foot shoulder to all routes with 3000 AADT or higher. This project includes a 6-foot additional granular shoulder and rumble strip when possible.

4-Lane to 3-Lane Conversions

At locations with an ADT less than 20,000, a history of left turn crashes, high driveway density and high turning volumes, converting a four-lane facility to three lanes can reduce the number and severity of crashes. At locations in Iowa, the number of crashes was significantly reduced, particularly those involving young drivers.

Roadway Visibility

Drivers use signs when they can read them. 3M is constantly researching new products to enhance safety on the roadways. The company demonstrated its DG-cubed retroreflective sign sheeting, wet reflective tape as a permanent pavement marking, and wet reflective elements for paint.

Guard Cable Usage

Beyond using cable as a median barrier, Iowa has expanded its use to include shoulder-mounted cable as a guardrail replacement.

Work Zones

Iowa has developed a Work Zone Traffic Safety Committee that meets monthly to discuss safety issues in work zones. Ninety percent of work zone crashes are attributed to only driver error, so educational efforts are key. Iowa writes out a short paragraph describing each work zone fatality and shares this information with safety partners. Iowa DOT trains their staff, consultants, cities, and counties in work zone safety.

Minnesota's statewide work zone committee includes patrol staff. This relationship with law enforcement is vital.

Minnesota is among the nation's leaders in work zone technology. The state has implemented dynamic late merge concepts to reduce the queue length of work zones by 40%. Conflict warning systems utilize Changeable Message Signs to warn drivers in advance of a work zone queue (5 miles upstream). Additionally, Minnesota's work zone committee actively pursues emerging technologies. Including Highway Patrol staff on the committee is vital to work zone safety in the state.

APPENDIX A: SCANNING TOUR AGENDA

Sunday, October 16

12:30 – 8:00 Travel to Ames, Iowa. Iowa safety project field checks.

Monday, October 17

Iowa DOT Conference Center, Ames

Host: Tim Simodynes, Iowa DOT

8:00–8:30 Introductions / Agenda Maker

8:30–9:30 Safety in Iowa Joyce Emery, Mary Stahlhut

- Overview of Iowa’s highway safety structure and programs
- Iowa Highway Safety Management System, CHSP www.iowasms.org
- Implementation/Funding of Projects

9:30–10:30 Data Analysis Joyce Emery, Michael Pawlovich

- Crash analysis tools & Training: GIS-SAVER, CMAT

10:30–11:30 Safety in Planning Stu Anderson

- The Planning Process – incorporating safety
- Role of MPOs in the process

11:30–12:30 Lunch with State Traffic Engineer

12:30–1:30 Data Collection Joyce Emery, Michael Pawlovich, Jack Latterell, Jerry Roche

- Collection Process: From crash scene to safety professional’s desk
- National Model www.dot.state.ia.us/natmodel
- Sharing information (23USC409 protection)
- SAFETEA-LU implications
 - Traffic Records Coordinating Committee (TRCC)
 - “Safety Needs” Locations

1:30–2:30 Safety Training Jack Latterell, Tom McDonald, Troy Jerman

- Safety Circuit Rider Program www.ctre.iastate.edu/ltap/safety.htm
- LTAP Safety Workshops
- Training for Cities, Counties, Design Engineers
 - 3R Safety Audits
 - Low Cost Safety Improvements
 - Accommodating Older Drivers
 - Intersection Safety (planned)

- 2:30–3:30 Run-off-the-Road Crashes
• Lane Departure Strategic Action Plan
• Guard rail, guard cable, median barriers
Troy Jerman, Deanna Maifield,
Jerry Roche, Dave Matulac
- 3:30–4:30 Work zone safety
Dan Sprengler, Mark Bortle
- 5:00–6:00 Scanning Team Debrief

Tuesday, October 18

Center for Transportation Research and Education (CTRE), Ames

Host: Reg Souleyrette, CTRE

- 8:00 – 8:30 Introductions / Agenda Maker
- 8:30 – 10:30 Research Projects / Safety Strategies
• Red light running
• Expressway intersection safety
• High speed signalized intersections
• 4-lane to 3-lane conversions
- 10:30 – 11:30 ITSDS (Iowa Traffic Safety Data Service) www.ctre.iastate.edu/itsds
- 11:30 – 12:30 Lunch
- 12:30 – 1:30 CTRE Facilities Tour
- 1:30 – 7:00 Field visits to Iowa safety sites
Travel to Minneapolis
Scanning Team Debrief

Wednesday, October 19

Minnesota DOT Metro Office, Minneapolis

Host: Loren Hill, Minnesota DOT

- 8:00 – 8:30 Introductions / Agenda Maker
- 8:30 – 10:30 Safety in Minnesota
• Comprehensive Highway Safety Plan www.dot.state.mn.us/trafficeng/safety/chsp/
• “Toward Zero Deaths” program www.tzd.state.mn.us
- 10:30 – 12:00 Safety Strategies
• Rumble strips
• Median cable barrier
• Road Safety Audits
Dan Brannan, Gary Dirlam,
Maggie Chalkine,

- Speed enforcement effort
- Intersection Decision Support (TH 52 at CSAH 9)
- Debrief of Minnesota's Intersection Scanning Tour

12:00 – 1:00 Lunch

1:00 – 3:00 Field check of safety project installations / Open Discussion

3M Corporate Headquarters Tour

Host: John Tobin, 3M Traffic Safety Division

3:00 – 5:30 Presentation in research lab

- Signing – Safety Applications
- Older drivers, trucks, new headlights, Internally illuminated sheeting
- Pavement marking – Safety Applications
- Wet reflective tape

5:30 – 7:00 Dinner

7:00 – 9:00 Demonstration Track – Night Visibility

- Wet reflective tape
- Work zone setup
- Missouri-used materials

Thursday, October 20

Minnesota DOT Metro Office, Minneapolis

Host: Loren Hill, Minnesota DOT

8:00 – 8:30 Introductions / Agenda Maker

8:30 – 10:00 Pavement Markings

- Rumble Strips – MoDOT and MnDOT experience
- Wet Reflective Marking Demonstration Project
- MoDOT's use of 6 inch markings

Jon Jackels

10:00 – 11:30 Work Zone Safety

- Crash studies: motorists and workers in work zones
- Intelligent Work Zone systems
- Dynamic late merge
- Travel times
- Automated Flagger Assist Devices (AFAD)
- Crash analysis and reports
- Safety Audits in Work Zones

Marvin Sohlo

11:30 – 12:30 Lunch

12:30 – 2:00 Open Discussion

2:00 – 4:00 Tour Minnesota DOT Traffic Management Center / Discussion Brian Kary

- Safety effects of ramp metering
- Incident Management
- Motorist Assist

4:00 – 5:00 Scanning Team Debrief

Friday, October 21

Travel back to Missouri

APPENDIX B: CONTACTS

Scanning Tour Team

Brian Chandler
Traffic Studies & Corrections Engineer
Missouri DOT – Traffic Division
573-751-5678
Brian.Chandler@modot.mo.gov

John Schaefer
Senior Traffic Engineering Specialist
Missouri DOT – Traffic Division
573-751-2845
John.SchaeferJr@modot.mo.gov

John Miller
Transportation Management System Engineer
Missouri DOT – Planning Division
573-526-8053
John.P.Miller@modot.mo.gov

Michael Briggs
Transportation Planner
Mid-American Regional Council
816-701-8315
mbriggs@marc.org

Jacob Ray
Senior Traffic Engineering Specialist
Missouri DOT – Central District
573-526-6880
Jacob.Ray@modot.mo.gov

Iowa DOT

Tom Welch
State Transportation Safety Engineer
Iowa DOT
515-239-1267
Tom.Welch@dot.state.ia.us

Tim Simodynes
Traffic and Safety Engineer
Iowa DOT
515-239-1349
Timothy.Simodynes@dot.iowa.gov

Mary Stahlhut
Safety Management System (SMS) Coordinator
Iowa DOT
515-239-1169
Mary.Stahlhut@dot.state.ia.us

Michael Pawlovich
Traffic Safety and Crash Analysis Engineer
Iowa DOT
515-239-1428
Michael.Pawlovich@dot.state.ia.us

Tim Crouch
State Traffic Engineer
Iowa DOT
515-239-1513
Tim.Crouch@dot.state.ia.us

Joyce Emery
Program Manager
Iowa DOT
515-239-1016
Joyce.Emery@dot.state.ia.us

Iowa DOT (Cont.)

Kurtis Younkin
Traffic Operations Engineer
Iowa DOT
515-239-1184
Kurtis.Younkin@dot.state.ia.us

Troy Jerman
Senior Transportation Engineer
Iowa DOT
515-239-1470
troy.jerman@dot.state.ia.us

Dan Sprengeler
Work Zone Traffic Control Engineer
Iowa DOT
515-239-1823
Dan.Sprengeler@dot.state.ia.us

Mark Bortle
Traffic Safety/Automation Engineer
Iowa DOT
515-239-1587
mark.bortle@dot.state.ia.us

Stuart Anderson
Director, Systems Planning
Iowa DOT
515-233-7857
stuart.anderson@dot.state.ia.us

Amanda Martin
Transportation Planner
Iowa DOT
515-233-7857
amanda.martin@dot.state.ia.us

Jack Latterell
Safety Engineering Consultant
515-292-3714
JackLatt@aol.com

Deanna Maifield
Design Division
Iowa DOT
515-239-1571
deanna.maifield@dot.iowa.gov

Center for Transportation Research and Education (CTRE)

Tom McDonald
CTRE
Iowa State University
515-294-6384
tmcdonal@iastate.edu

Reg Souleyrette
CTRE
Iowa State University
515-294-5453
reg@iastate.edu

Zach Hans
Research Engineer
CTRE
515-294-2329
zhans@iastate.edu

Shauna Hallmark
Transportation Engineer
CTRE
515-294-5249
shallmar@iastate.edu

Josh Hochstein
Graduate Student
CTRE
jlhoax@iastate.edu

Tom Stout
Graduate Student
CTRE
515-294-7188
stouttom@iastate.edu

Minnesota DOT

Loren Hill
State Traffic Safety Engineer
Minnesota DOT
651-634-5100
loren.hill@dot.state.mn.us

Dan Brannan
Traffic Safety Specialist
Minnesota DOT
651-634-5102
daniel.brannan@dot.state.mn.us

Gary Dirlam
District Traffic Engineer
Minnesota DOT
218-828-2660
Gary.Dirlam@dot.state.mn.us

Jon Jackels
Pav. Marking, Work Zone & Product Eval. Engr.
Minnesota DOT
651-634-5428
jon.jackels@dot.state.mn.us

Marvin Sohlo
Work Zone Engineer
Minnesota DOT
651-634-5431
marv.sohlo@dot.state.mn.us

Maggi Chalkline
Pavement Marking Engineer
Minnesota DOT
651-634-5432
margaret.chalkline@dot.state.mn.us

Amr Jabr
District Traffic Engineer
Minnesota DOT
651-582-1412
amr.jabr@dot.state.mn.us

Sue Groth
Assistant State Traffic Engineer
Minnesota DOT
615-634-5269
sue.groth@dot.state.mn.us

Janelle Fowlds
District Traffic Engineer
Minnesota DOT
218-847-1540
Janelle.Fowlds@dot.state.mn.us

Brian Kary
Incident Management Engineer
Minnesota DOT
651-634-5268
brian.kary@dot.state.mn.us

Bernie Arseneau
State Traffic Engineer
Minnesota DOT
651-634-5251

3M Traffic Safety Systems Division

Dan Fischer
Govt. Transportation Safety Specialist
3M Traffic Safety Systems
314-436-7222
dwfischer@mmm.com

John Tobin
3M Traffic Safety Systems
651-733-7159
jntobin1@mmm.com