

Farm Equipment - Motor Vehicle Crash Research & Outreach Activities



Farm Equipment/Motor Vehicle Crash
Prevention Conference
March 17-18, 2009



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FEMV Crash Reduction Challenges & Opportunities

(The Ramblings of a Rural
Transportation Safety Engineer)



Farm Equipment/Motor Vehicle Crash
Prevention Conference
March 17-18, 2009



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

PRESENTATION CONTENT

- Center for Excellence Rural Safety (CERS) Overview
 - Who We Are & What we Do
 - Two Recent Tools
- Defining the Issue
- FEMV Crash Reduction Challenges & Opportunities
- Conclusions



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

CENTER FOR RURAL SAFETY

- National Center in SAFETEA-LU (last Federal Highway Bill)
- Located: Humphrey Institute of Public Affairs – State and Local Policy Program (U. of Minn.)
- Mission: Facilitate and Focus on Research, Training, and Outreach related to Rural Transportation Safety



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

ACTIVITIES

- **Research:** Behavior, Technology, and Policy
- **Outreach:** Better Safety Decision-Making
- **Training:** Researcher, Practitioner, and Citizen Activities
- **Contribute/Coordinate:** Existing/Proposed National Rural Safety Programs/Projects



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

RESEARCH

- **Urban & Rural Traffic Safety Perceptions**
- **Rural Community EMS System Improvements**
- **Best Practices and Policy-Based Measure Index**
- **SafeRoadMaps Tool & County Partnerships**



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

Safe Road Maps
Envisioning Safer Roads

CERS Center for Excellence in Rural Safety

BETA Website

Home Maps Tutorials Data Resources Contact Us

Safe State Maps Safe Street Maps

Safety Policy

- Aggressive Driving Law
- Administrative License Suspension Law
- Primary Seat Belt Enforcement Law

Aggressive Driving Law

- No
- Yes

Administrative License Suspension Law

- No
- Yes

Primary Seat Belt Enforcement Law

- No
- Yes

Safety Profile

Minnesota, Rural Road, Non-Summer, Speeding, Alcohol Involved, No Restraint Used, Driver, Age 17 - 21, Male

Vermont, Rural Road, Non-Summer, Speeding, Alcohol Involved, No Restraint Used, Driver, Age 22 and Above, All Sexes

2006 FARS Map

Map Satellite Hybrid Terrain

Alabama

All Road Types

Rural Road

Urban Road

All Date Types

Summer

Non-Summer

All Speed Types

Speeding

Not Speeding

All Drinking Types

Alcohol Involved

Alcohol Not Involved

Not Reported

Unknown

All Restraint Types

No Restraint Used

Restraint Used

Unknown

All Person Types

Driver

Not a Driver

All Ages

Age 0 - 16

Age 17 - 21

Age 22 and Above

Age Unknown

MINNESOTA

CERS Center for Excellence in Rural Safety

OUTREACH AND TRAINING

- Annual Summer Institute (VA, 2009)
- Needs Assessment Stakeholder Groups
- Local/State Training
- Information Dissemination
 - Website (www.ruralsafety.umn.edu/)
 - Newsletter, Annual Report, etc.
- Journal/Magazine/Newsletter Articles
- Clearinghouse for Rural Highway Safety (<http://www.ruralhighwaysafety.org>)

CERS



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

UNIVERSITY OF MINNESOTA

Rural Highway Safety Clearinghouse

The Rural Highway Safety Clearinghouse is intended to be an easy-to-use starting point for information about safety on our nation's rural roads.

Have a resource to suggest? Please fill out this [submission form](#).

Find resources about safety on rural roads by topic

The "Four Es"	Other Topics
Education	Data & Statistics
Emergency Medical Services (EMS)	Driver Behavior
Enforcement	General Rural Transportation Safety
Engineering	Intelligent Transportation Systems (ITS)
	Laws & Regulations
	Planning
	Seat Belts
	Work-Zone Safety

View Organizations

View a listing of organizations related to rural transportation safety:

- Federal
- State
- Academic
- Non-profit

Additional information

- The National Transportation Library's digital collection of Rural and Agricultural Resources on Safety and Security.
- TRIS Online, a bibliographic database produced by the Transportation Research Board.

FEATURED

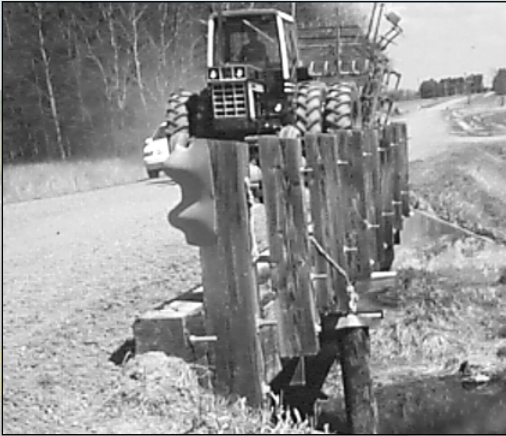
The U.S. Department of Transportation (USDOT) Rural Safety Initiative will help states and communities develop ways to eliminate the risks drivers face on America's rural roads and highlight available solutions and resources.

USDOT Rural Safety Initiative
Rural Safety Innovation Program

www.ruralhighwaysafety.org

CERS Center for Excellence in Rural Safety UNIVERSITY OF MINNESOTA

**DEFINING THE ISSUE:
RURAL ROADWAY SAFETY**



CERS Center for Excellence in Rural Safety UNIVERSITY OF MINNESOTA

RURAL SAFETY - GENERAL

- 23% of US Population is Rural, but 55% of Fatalities Occur There
- Rural Fatality Rate > 2 x Urban Fatality Rate (1/3 the travel)
- About 50% of Fatalities Occur on Two-Lane Rural Roadways
- About 66% of Rural Drivers Die at the Scene vs. 51% of Urban Drivers (2006)



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

CRASH CHARACTERISTICS

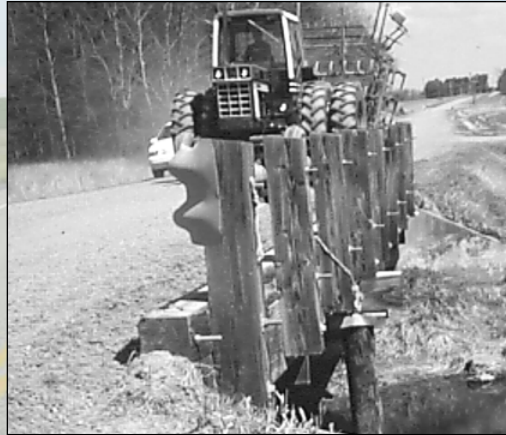
- Seat Belt Use (78% vs 84%)
- Alcohol-Impaired (58% Rural)
- Speed-Related (57% Rural)
- Roadway Departure (58% of Total)
 - Horiz. Curves (25% of Total, 75% Rural)
 - Over 80% of SV ROR Fatalities on 2-Lane Rural Undivided Roadways (1999)
- Intersection Conflict (21% of Total)



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

DEFINING THE ISSUE: FEMV CRASHES

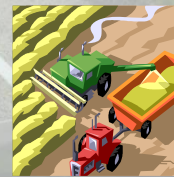


Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

SURVEY QUESTIONS

- Have you completed any research projects about FEMV crash reduction methods or outreach education that attempts to change behaviors?
- Do you do any data summaries to measure this issue?
- Any other comments?



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

RESPONSES

- **Important Issue, but Focused on Eliminating Certain Types of Significant Crashes (i.e., Fatalities)**
- **Growers Indicated it was #1 Safety Hazard, Did Survey, Couple of Projects, Articles/Reports, & Poster**
- **Data Summaries, Annual Press Release, and Farm Bureau Cooperation**
- **No “Farm-Related” Code in Crash Report**



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

THE SCENARIO

- **Many Miles of Hilly Rural Roadway**
- **Lack of High Quality Design – Vert. Curve Design and Intersection Sight Distance**
- **Add in “Residential” Traffic with Aggressive & Distracted Commuters**
- **Mix in Young Permitted Drivers with Cell Phones and Texting**
- **Combine Larger Farms with More Travel that May Occur during Morning Commute**
- **Result - “Perfect Storm” Mixture for a Rural Safety Issue**



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FEMV CRASH DATA



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

TRADITIONAL APPROACH

- **Step 1: Collect & Plot Data**
 - **Condition Diagram** (Geometry, Sight Distance, Traffic Control, etc.)
 - **Collision Diagram**
- **Step 2: Consider the Data Crash Patterns and Potential Source(s) of Problems**
- **Step 3: Pick Potential Improvement(s)**
- **Step 4: Monitor Effectiveness**



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

TOTAL FATALITIES

- **Total Fatalities in the U.S.**
 - 42,708 (2006)
 - 41,059 (2007)
- **Total U.S. Fatalities on Farm Equipment**
 - 46 + MV = 88 (2006)
 - 55 + MV = 102 (2007)
- **9 State Region: Fatalities on Farm Equip.**
 - 12 + MV = 30 (2006)
 - 14 + MV = 26 (2007)
 - Overall Approx. 25 Deaths, 500 Inj., 1,100 Crashes



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FATALITY RATES

- **Total U.S. Fatality Rates**
 - 1.42 per 100 million VMT (2006)
 - 1.36 per 100 million VMT (2007)
- **Urban & Rural U.S. Fatality Rates**
 - Urban: 0.93 per 100 million VMT (2006)
 - Rural: 2.25 per 100 million VMT (2006)
- **9 State Region: Rural Rate – 2.05 per 100 million VMT (2002-2006 Average)**
- **FEMV Crash & Fatality Rate?**



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

CRASH CHARACTERISTICS

- Rear-End, Left-Turn &/or Sideswipe/Angle, and Head-On
- High-Speed, Dry, & Daylight (Dusk/Dawn)
- Volume or Exposure Related
- Exposure Varies by Activity Type, Time, and Location (e.g., Seasonal Peaks, Day-to-Day, etc.)



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

OTHER CHARACTERISTICS

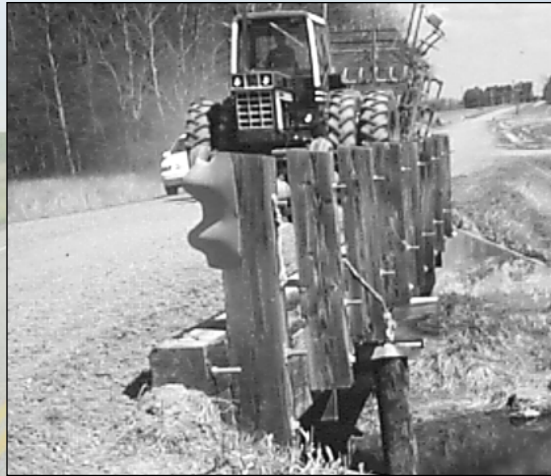
- Gender
- Alcohol-Related Convictions
- Driver Age
- Driver Status
- Roadway Surface and Alignment
- Other Road Users/Use
- Research Varies in Some Cases



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FEMV CRASH REDUCTION CHALLENGE #1



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

DATA ISSUES (1)

- “Significance” of Issue Depends on Measure Used (Total, Rate, Per Capita, % of Farm/Ag Incidents, etc.)
- National Focus/Goals on Fatality and/or Major Injury Reduction
- Some States – FEMV Crash is an “Other” on Crash Reports
- National Model Minimum Uniform Crash Criteria (MMUCC) includes Farm Equipment as “Other”



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

DATA ISSUES (2)

- PDO Crash Reporting Thresholds
- Lack of Crash Data & “Hot Spots” Typical along Rural Roadways
- Often Requires “Proactive”, Non-Data-Based, Approach



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

TWO APPROACHES

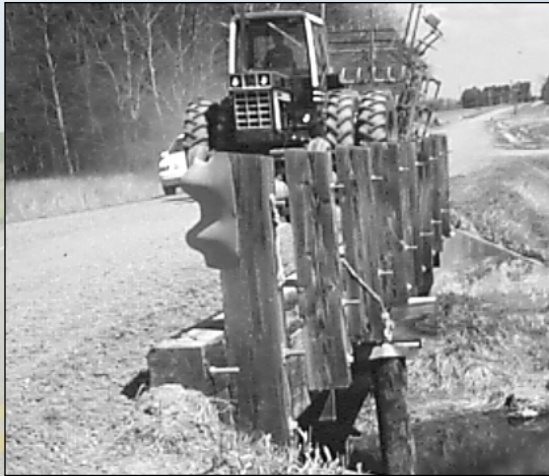
- Reactive Approach (Traditional)
 - Data-Based: Crashes Occur
 - Focus: “Hot Spots”
- Proactive Approach (New)
 - Identify Locations with Potential for Safety Problems (Before a Crash)
 - Supported by Data from Similar Locations if Possible
 - Focus: Prioritization, Plans, and the System



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FEMV CRASH REDUCTION CHALLENGE #2



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

INCIDENT VARIATION

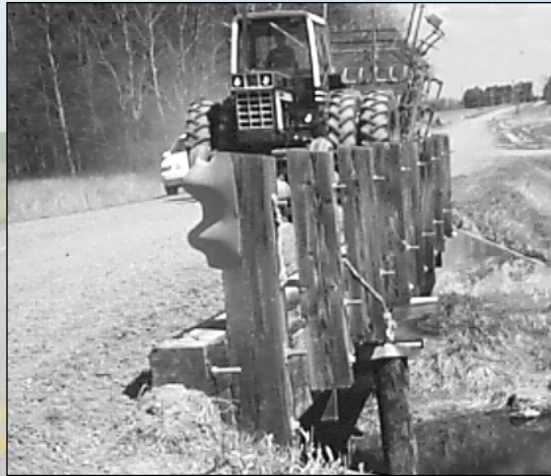
- **FEMV Crash Components**
 - Day-to-Day Activities
 - Regularly Occurring Activities, but not Day-to-Day
 - Seasonal Activities & Peaks
 - Maneuvers, Equipment, Laws, etc.
 - Traffic Volumes, Speed, & Trip Length
- **Potential Crash Reduction Measures Need to Vary**



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FEMV CRASH REDUCTION CHALLENGE #3



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

MULTI-JURISDICTIONAL

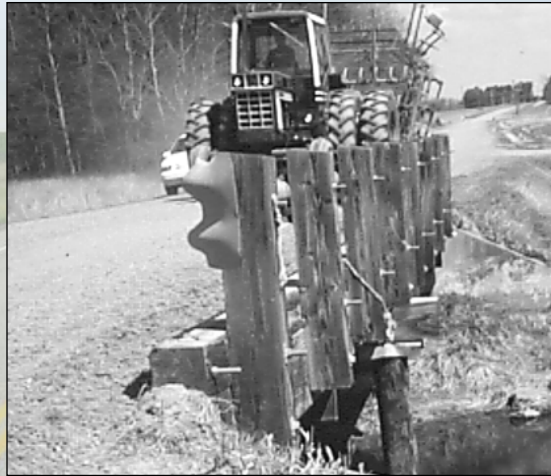
- Multiple Disciplines & Organizations Involved
- Multiple or Combined Responses Needed (The 4 “E”s)
 - Education
 - Enforcement
 - Emergency Response
 - Engineering



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

FEMV CRASH REDUCTION OPPORTUNITIES



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

THREE OF THE “E”s

- **Education**
 - Seat Belt Use/Speeding/Alcohol
 - Novice/All Driver Education/Licensing
 - News Releases, Public Information, etc.
 - Lighting/Signing/Reflector Use
- **Enforcement (& Policy)**
 - Focused Speed-Related Activities
 - On-Vehicle Requirement Consistency
 - Importance of Reporting Location, etc.
- **Emergency Response**
 - Communications
 - Access



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

4TH “E” - ENGINEERING

- Super 2 and 2 + 1 Cross Sections
- Proactive “Spot” Cross Section or “Intersection” Improvements
- Signing Applications
 - Permanent & Temporary
 - New Reflectivity Requirements for On-Road Signs
 - Consistent/Proper Use of On-Vehicle Signing, Lighting, Turn Signals, and Reflectors
- In-Vehicle and Other Technologies



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

PROACTIVE INSERTION

- Safety Conscious Planning
- Strategic Highway Safety Plans
- Road Safety Audits
- Roadway Projects:
Resurfacing, Rehabilitation, &
Reconstruction
- Context Sensitive Roadway
Design



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

CONCLUSIONS (1)

- Need Better Crash Data
- Emphasize Importance of Detailed Crash Reports (e.g., Location)
- Adjust Model Minimum Uniform Crash Criteria (MMUCC)
- Consistency in Lighting, Signing, Reflectors, and/or Licensing Policy and Application
- MUTCD Applicability (Overall & New Reflectivity Requirements)?



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

CONCLUSIONS (2)

- Driver's Education & Public Information Adjustments
- Use of Current Passive/Active Restraints and Collision Avoidance Technologies
- Proactive Involvement in Roadway Development Process
- Physical and/or Time-Sensitive Spot & Segment Improvements
- Not Just a Rural or Farm Problem



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA

DISCUSSION/QUESTIONS



Center for Excellence in Rural Safety

UNIVERSITY OF MINNESOTA