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RESEARCH PROJECT TITLE

Improving Safety for Slow Moving Vehicles on Iowa's High-Speed Rural Roadways

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Slow Moving Vehicle Safety on Iowa's High-Speed Rural Roadways

tech transfer summary

Slow moving vehicles on Iowa's high-speed public roadways can present unique safety concerns.

Objectives

This project was designed to improve transportation safety for slow moving vehicles (SMVs) on Iowa's public roadway system.

Problem Statement

SMVs are generally defined as any vehicle that cannot maintain a constant speed of at least 25 mph, such as large farm equipment, construction vehicles, or horse-drawn buggies. These vehicles vary greatly in size, visibility, operating speeds (typically well below the posted speed), and maneuverability (usually based on driver experience).

Though the number of crashes involving SMVs is lower than the number of crashes involving other vehicle types, SMV crashes tend to be severe. A crash involving a slow moving agricultural vehicle is about five times more likely to result in a fatality than other crash types, and crashes involving horse-drawn vehicles tend to involve a high speed differential for the colliding vehicles and minimal safety protection for the horse-drawn vehicle occupants.



Car passing a farm vehicle on a high-speed roadway

Research

This project included a literature review that examined regional and national SMV crash statistics and laws across the United States, a crash study based on three years (2004 to 2006) of Iowa SMV crash data, and soliciting the concerns and recommendations of three SMV communities in Iowa: the Amish communities in Buchanan and Davis Counties and farmers in Marion County.

Crash Data and Mitigation Options

A total of 1,203 SMV crashes occurred from 2004 to 2006, with farm vehicles involved in 50%, construction/maintenance vehicles involved in 19%, and horse-drawn vehicles involved in 1%. The specific crash patterns for each of these SMV types differed by time of day, driver age, major cause, and other variables.

To improve the visibility of SMVs, devices such as a triangular SMV emblem with retroreflective tape or different configurations of flashing and static lights have been proposed. Additionally, warning signage has been installed in areas with potential safety issues. However, several studies have questioned the effectiveness of these devices.

Other existing strategies for improving SMV safety include a learner's permit requirement for young SMV drivers, public education campaigns, and roadway improvements such as widening shoulders, minimizing pavement edge drop-off, or installing pull-off lanes.

Suggestions from Slow Moving Vehicle Communities

Concerns specific to horse-drawn vehicle drivers:

- Shoulder width is inconsistent and/or insufficient to get out of the way of vehicular traffic.
- Speed of vehicle traffic and impatience or occasional hostility from local traffic can spook the horses.
- Rumble strips are hard on horses and buggies and add to the horses' unpredictability.
- Shoulder edge drop offs create a hard transition from road to shoulder.
- Large asphalt chunks are used for shoulder maintenance.

Concerns specific to farm vehicle operators:

- Farmers necessarily and regularly travel on 55 mph roads and sometimes along 65 mph expressways.
- Pulling over to let other motorists pass can put both drivers at risk due to obstacles in the shoulder, a soft shoulder, or limited maneuvering space.
- Passing vehicles often do not give enough clear distance away from farm equipment.
- With the increasing size of farm equipment, the space available for a passing maneuver is diminishing, and seeing around the SMV to select a safe passing gap is difficult.
- Flashing yellow lights placed on tractors seem to get a better reaction from motorists than the triangular SMV emblem.



Horse-drawn buggy on uneven shoulder

Recommendations

SMV safety on Iowa's high speed roadways should be based on an understanding of crash performance and input from SMV communities. A practical approach should include systematic identification of specific safety problems, local involvement and close coordination with the community, and identification of solutions.

Both agencies and SMV operators can take several steps to improve safety. Agencies can take the following steps:

- Identify roadways where SMVs mix with vehicular traffic
- Review and analyze routes with evident buggy traffic to identify problem areas
- Recognize that the needs and solutions for different SMV types vary greatly
- Consider the adequacy of existing roadway signage, lighting, grade, curvature, pavement treatments, shoulder treatments, and shoulder widths
- Identify short- and long-term needs and solutions
- Reach out to local groups to exchange ideas, share constraints, and plan for long-term solutions
- Coordinate activities among city, county, and state agencies to maintain consistent signage and roadway treatments and address SMV road users' safety
- Develop consistent safety campaign information for driver awareness and understanding

SMV operators can take the following steps:

- Go beyond minimal lighting and conspicuity requirements to alert motorists of the SMV's presence
- Notify agencies of SMV concerns regarding areas that offer minimal sight distance and no shoulder or ability to get out of the traveled lane
- Educate SMV operators about driving safely on the roadway and operating vehicles consistently