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**RESEARCH PROJECT TITLE**

Investigation of Wrong-Way Driving

**SPONSORS**

Iowa Department of Transportation  
(InTrans Project 17-623)

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A statewide and corridor-level analysis of wrong-way driving data provided insights into the nature and magnitude of their occurrence, particularly for at-grade intersections.

## Objective

The primary objective of this project was to investigate the nature and magnitude of wrong-way driving issues occurring in Iowa, including a corridor-level study of US 30 between Boone and Nevada.

## Problem Statement

Data collected by the Iowa Department of Transportation (DOT) on the prevalence of wrong-way driving in Iowa has the potential to address crashes and other safety concerns at at-grade intersections.

## Background

Wrong-way driving (WWD) is an area of high concern across the US, particularly due to the fact that crashes involving wrong-way drivers tend to be among the most severe crashes in terms of occupant injuries and resultant crash costs.

WWD is also a significant threat to traffic safety as the act exacerbates the crash and fatality risks among occupants in the wrong-way vehicle, as well as those of occupants in the vehicles traveling in the correct direction.

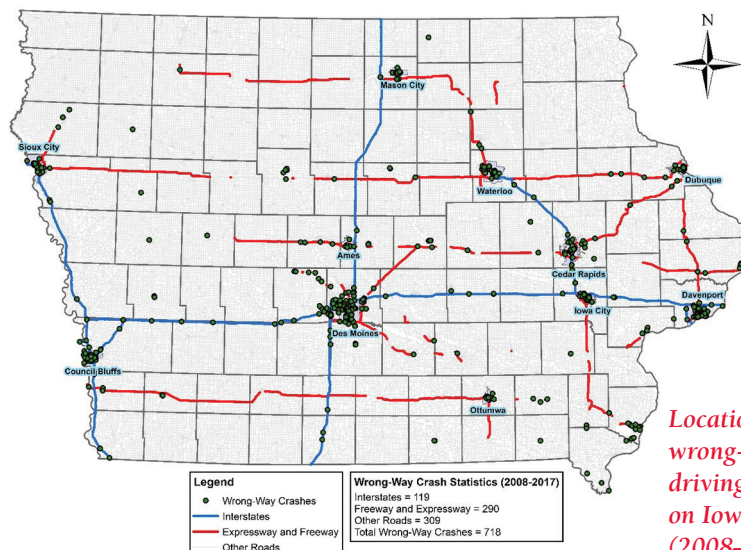
Most of the research to date has focused on high-speed divided highways, particularly interstate and full-access control freeways, both of which require grade separations. However, a particular concern in Iowa is the presence of expressways, where access from the crossroads occurs at-grade.

**CTRE**

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Locations of wrong-way driving crashes on Iowa roads (2008-2017)

## Project Description

The research team conducted a statewide analysis of WWD crash data to examine trends based on driver and roadway characteristics. In addition, the team did a corridor-level review to determine all WWD events that occurred along the US 30 corridor near Ames using data collected by the Iowa DOT.

The statewide analysis of current wrong-way crashes in Iowa involved extensive collection and integration of a diverse range of data, including roadway characteristics, traffic information, and historical weather measurements, among others. From the analysis, the team constructed a database of all wrong-way crashes.

The corridor-level study of US 30 between Boone and Nevada included data analysis from a plethora of video camera imagery and recorded 911 calls about wrong-way drivers. The team analyzed the data provided by the Iowa DOT about WWD incidents based upon various known characteristics that included information from law enforcement records.

## Key Findings

### Statewide Study

A total of 718 unique wrong-way crash events, 25 of them fatal, were reported from 2008 to 2017 in Iowa. Other findings included the following:

- Younger and older drivers had increased involvement in WWD crashes
- Male drivers were over-represented in the WWD crashes
- Impaired drivers accounted for 24% of all at-fault drivers involved in WWD crashes, which is higher than the rate of impairment in other types of crashes in Iowa for the same period
- WWD was also more likely among those who were driving alone (76%), which suggests passenger presence is likely to reduce the propensity for WWD events

### US 30 Corridor Study

A total of 87 incidents of WWD, although no crashes, occurred on the US 30 corridor between Boone and Nevada from 2014 to 2017. Other findings included the following:

- A majority of the WWD events occurred at-grade intersections
- Most of the WWD incidents occurred on Friday and Saturday
- A majority of the WWD incidents occurred from 9:00 p.m. to 5:00 a.m.

- Of the occurrences, 19 wrong-way drivers were stopped by a law enforcement officer
- WWD incidents with a 911 call traveled on average 3.03 miles and passed 9.31 vehicles, whereas incidents without a 911 call averaged 2.17 miles and passed 3.65 vehicles

## Recommendations

- Wider implementation of high-visibility pavement markings and traffic signs could help reduce the frequency of WWD
- Site-specific improvements, such as installing rumble strips and subtle changes to turning radii at ramps and median crossings, can also be considered at ramp entries and for at-grade intersections on divided highways
- Each site requires a different approach to mitigate the nature of the WWD events, and the solutions should consider practicality, large-scale applicability, and associated cost
- Traffic enforcement also can play several important roles, which include surveillance and monitoring of WWD events, in combatting Iowa's WWD issues
- Careful coordination between law enforcement agencies, local agencies, and the DOT can supplement available monitoring devices such as roadside sensors and cameras
- Educational programs that focus on the demographic groups most prone to WWD, as well as on problem behaviors such as impaired driving, can be broadcast on digital, electronic, and print media

## Implementation Readiness and Benefits

The results of this study offered important insights that provide motivation and a framework for further research in this area.

The Iowa DOT has begun installing treatments at various locations throughout the state in an effort to combat WWD. These countermeasures include increased installation of high-visibility signs and pavement markings, as well as geometric modifications to make wrong-way movements more difficult for drivers to execute.