Access Management to Reduce Wrong-Way (WWD) Driving on Alabama Divided Highways

Beijia Zhang[1], Huaguo Zhou[2]

Auburn University
Department of Civil Engineering

1. Ph.D. Graduate Student, Department of Civil Engineering, Auburn University, Auburn, AL 36849, Email: zzb0004@auburn.edu
2. Professor, Department of Civil Engineering, Auburn University, Auburn, AL 36849, Email: zhouhugo@auburn.edu

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INTRODUCTION

- **A divided highway** is considered as a highway with physical separation, and the side streets are its access points in this study.
- **WWD crashes** are more possible than other kinds crashes to result in fatal or incapacitating injuries. The majority of previous studies are focused on freeways instead of divided highways.
- **112 WWD crashes** were identified in Alabama divided highways from 2009 to 2013.
- **18 WWD crashes** were identified to have confirmed entry points.
- **TABLE 1 Types of WWD Entry on Alabama Divided Highways (2009-2013)**

Confirmed Entry Points for WWD Crashes	Number
Recorded Entry at Median Opening	8
Entry from Parking of Gas Station/ Business Area	6
Recorded Entry at Signalized Intersection	3
Entry by Undeliberate Lane Change (Distracted and DUI)	1

METHODOLOGY

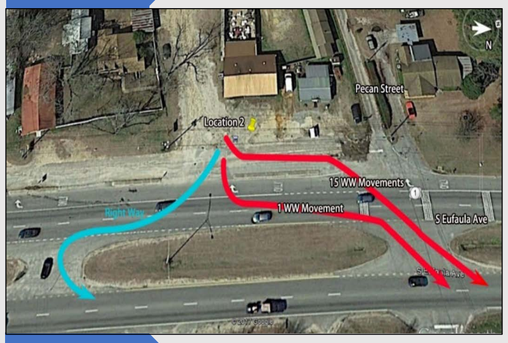
- **Study Location Selection**
  The most frequent entry points are median openings and parking lots of gas stations or business areas. 8 wrong way (WW) entries were selected for the case study.
- **Camera Installation**
  Researchers installed COUNTcam mounted on a road sign near the intersection.
- **48-hour Data**
  At each location from Friday afternoon to Sunday afternoon.
- **Data Analysis**
  The WWD activities were analyzed through the videos.
  Any **abnormal movements** were recorded and analyzed. The total number of WW movements at each location was calculated.
  The **geometric design features** of the study locations were collected.

Figure. Example of Camera Installation

FOUR CASE STUDIES IN ALABAMA

CASE 1 Driveways with a Close Median Opening

CASE 2 Poor Front Access Control



CASE 3 Lack of Backage Road Connection

CASE 4 Limit Sight Distance

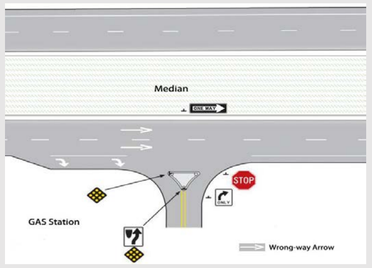
Source: Google map, screenshots of the videos.

COUNTERMEASURES

❖ Case 1 Driveways with a Close Median Opening

➢ Possible Reasons

1) Long weaving distance for alternative left turns
2) Traffic volume on side street (N College St.) is high and may block the exit to the side street from the gas station.



➢ Countermeasures

1) Provide a closer exclusive U-turn median opening for U-turns, and add a sign to show XX feet to the next U-turn median opening
2) Install Stop sign, Right Turn Only sign (R3-5R), and Keep Right Sign (R4-7) or No Left Turn (R3-2) at the driveway for the gas station, and add a One Way sign (R6-1) on the median facing to minor road traffic
3) Add WW pavement arrows on the divided highways
4) Add a right-in right-out channelization island

Figure. Improvements for Case 1

❖ Case 2 Poor Front Access Control

➢ Possible Reasons

The poor front access control at this location allows drivers to take a shortcut by going WW.

➢ Countermeasures

Improve access control on one way frontage road that is close to an intersection.

❖ Case 3 Lack of Backage Road Connection

➢ Possible Reasons

1) Drivers want to take a shortcut to go to the northbound of the highway.
2) During peak hour, the queue of the downstream intersection is too long to weave into most left lane to make a U-turn.

➢ Countermeasures

Recommend a backage road to provide alternative access connection between the business and residential areas.

❖ Case 4 Limit Sight Distance

➢ Possible Reasons

Limit sight distance caused by a large grade difference between two directional roadways.

➢ Countermeasures

1) Improve the sight distance by reducing grade diffidence or providing better signing or pavement markings.
2) Close the driveways or median openings that provide insufficient sight distance for turning vehicle drivers.