



2013 WRONG-WAY DRIVER ANALYSIS

23 JANUARY 2014

To: Sheriff David A. Clarke Jr.
Inspector Richard A. Schmidt

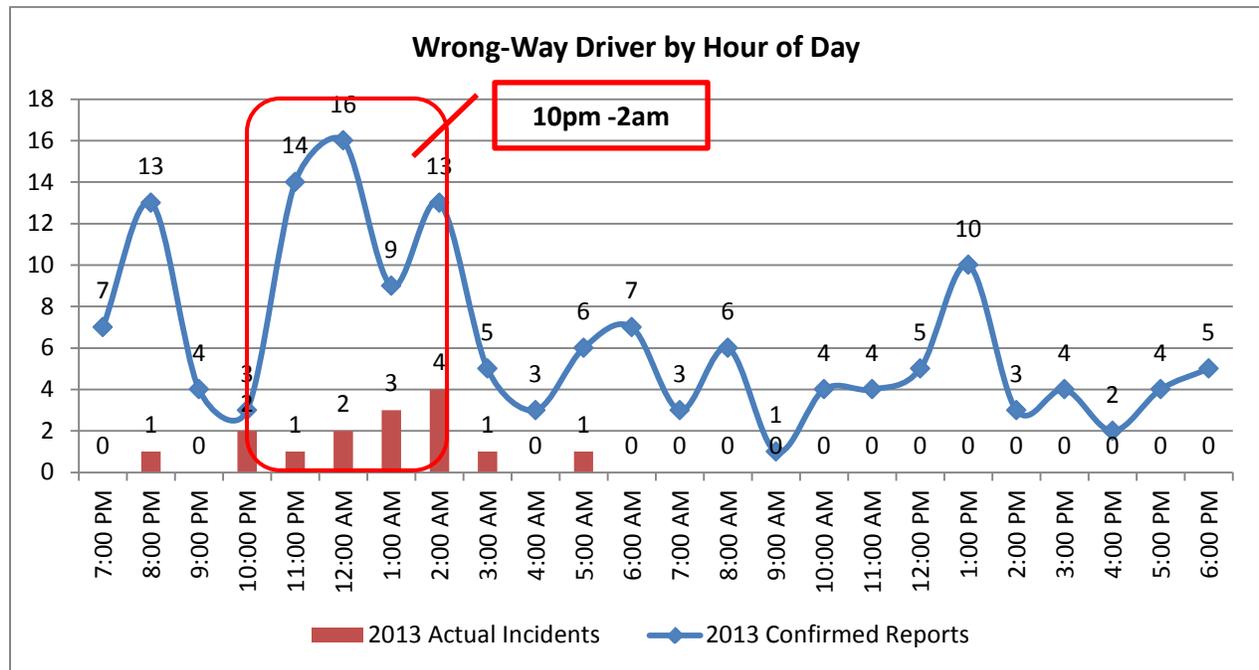
From: Law Enforcement Analytics Division

Re: Wrong-Way Driver Analysis

National Research

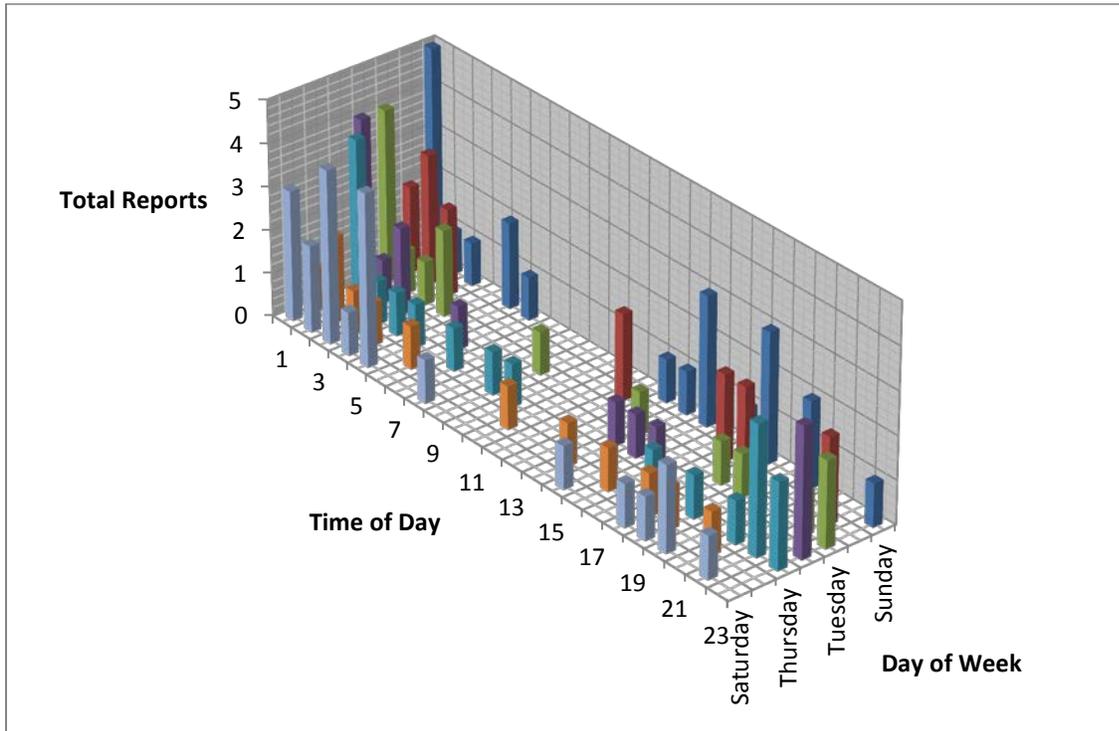
The National Transportation Safety Board (NTSB) has reported that more than half, and possibly as many as three-quarters, of wrong-way drivers are impaired by alcohol. More than half (59%) of those wrong-way drivers had a reported BAC of 0.15 or higher. The primary origin of wrong-way movement occurs when a driver enters from an exit ramp. Statistics also show that wrong-way collisions occur more frequently at night, generally between the hours of 6:00 p.m. and 6:00 a.m.

OWI-Related Wrong-Way Drivers on Milwaukee County Freeway System



3 February 2014

Based on confirmed reports and actual wrong-way driver incidents where the driver was apprehended, the highest frequency of wrong-way driver incidents are occurring between 10 pm and 2 am. Based on the following three-year (2011-2013) temporal analysis that compares time of day and day of week, there is a higher frequency of confirmed reports of wrong-way drivers between 10 pm and 2 am on Saturdays and Sundays. This correlates with drunken driving arrests and crashes.



Between January 1, 2013, and December 31, 2013, there have been 43 confirmed reports of wrong-way drivers on Milwaukee County’s Freeway System. The following table compares wrong-way driver statistics to 2012.

Category	2012	2013	%Chg
Number of Confirmed Reports	34	43	26%
Actual Wrong-Way Drivers Stopped	16	15	-6%
OWI-Related	12	14	17%
Confused/Elderly Driver	4	1	-75%

This information has been gathered by the Wisconsin State Traffic Operations Center (STOC) as well as the Traffic and Parking Control Company (TAPCO) wrong-way driver alert system. In 2013, 15 wrong-way drivers were stopped by Milwaukee County Sheriff’s deputies and other municipalities with the following findings:

14 - Arrested for Operating While Under the Influence (OWI)

- ❖ (72%) 10 - OWI 1st Offense
- ❖ (14%) 2 - OWI 2nd Offense
- ❖ (14%) 2 - OWI 3rd Offense

9 (64%) OWI related Wrong-Way Drivers resulted in crashes

- ❖ 6 (43%) – Property Damage Only Crashes
- ❖ 3 (21%) – Personal Injury Crashes

The average prohibited alcohol concentration was **0.19**.

Documented Lanes of Travel for Wrong-Way Drivers

This table shows the confirmed number of wrong-way drivers and their lane of travel for 2012 and 2013. In identifying the lanes of travel, documents show that most wrong-way drivers were traveling in lane 1. This would imply that those drivers are under the impression that they are driving in the slow lane of travel, which is usually the far right lane. Based on incidents reports, it isn't until they either crash, come across another motorist traveling in the correct direction or contact is made by law enforcement, that they realize they are traveling the wrong way.

Wrong-Way Lane of Travel	2012	2013
Ramp	1	3
Lane 1	5	6
Lane 2	2	1
Lane 3	0	0
Lane 4	0	0
Unspecified	8	5
Totals	16	15

1 – Confused Driver

Out-of-state (Texas) motorist was issued a citation for Driving the Wrong Way on Divided Hwy. While the remaining 28 reported wrong-way drivers had no police contact, they were confirmed by eyewitness reports as well as STOC/TAPCO alert system video surveillance.

Since 2011, there has been a consistent trend of OWI-related wrong-way drivers reported in Milwaukee County. In 2012, there were 11 OWI-related incidents that resulted in the arrest of wrong-way drivers. Although there has been a 25% increase in OWI arrests, the trend remains statistically unchanged from 2011 to 2013 (38 vs. 43). Analysis has identified that there is a lack of effective indicators and preventive measures at the entrance and exit ramps on the Milwaukee County freeway system.

Based on the data collected and analyzed, most of the wrong-way drivers that were stopped by law enforcement and arrested for OWI were either traveling southbound in the northbound lanes of travel or westbound in the eastbound lanes of travel. The highest rate of wrong-way driver incidents on the expressway occurred on westbound (southbound in northbound lanes) I-794 and eastbound (westbound in eastbound lanes) I-94. Analysis based on time of day, location of incident, and direction of travel (see map, page 5) suggests that wrong-way drivers are coming from the eastside/downtown area. Additionally, this was based on driver statements and location of incidents.

5 (35%) – W I-794

5 (35%) – E I-94

3 (21%) – N I-43

1 (9.5%) – N Hwy 145 (Confused Driver)

1 (9.5%) – Hwy 100 / N Mayfair Rd.

List of Entrance and Exit Ramps Included in the Analysis

- ❖ I-94 at South 76th St (temporary due to closure at 84th St.)
- ❖ I-94 at General Mitchell Blvd.
- ❖ Hwy 794 at Oklahoma Ave.
- ❖ I-794 at Lincoln Memorial Drive / Michigan Ave.
- ❖ I-794 at James Lovell
- ❖ I-794 at Carferry
- ❖ I-94 at 13th Street
- ❖ I-94 at 26th Street

Analysis of Entrance and Exit Ramps on Milwaukee County Freeway System

Many of the exit and entrance ramps parallel each other. Most of these ramps have minimal to no type of signs or significant markings, which makes it difficult to distinguish the entrance and exit ramps for the motoring public. These are a few of the ramps that have been identified as problematic for wrong-way drivers entering the expressway.

I-94 at South 76th St (temporary due to closure at 84th St.)

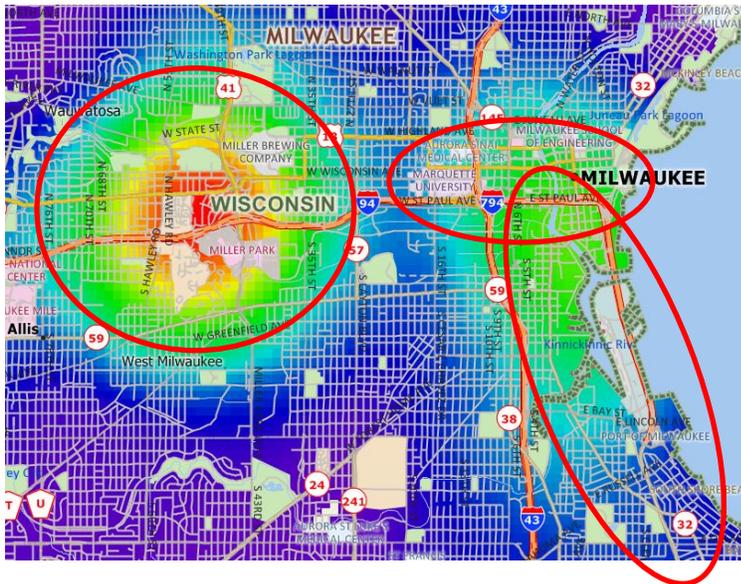


As seen in the above photograph, there are no “DO NOT ENTER” or “WRONG WAY” signs posted at this exit ramp.

I-94 at General Mitchell Blvd.



This shows an ineffective “DO NOT ENTER” sign, as it is poorly positioned in the median with an obstructed view for motorist. As a result of the on and off ramps being parallel to one another, additional signage would clearly define entry and exit points to the interstate.



Based on reports of wrong-way drivers, the density grid shown to the left correlates to areas that have been identified as having poor design and minimal / ineffective signage. The highest frequency is occurring in and around the downtown Milwaukee area along I-94 and I-794.

The following ramps have been identified as problem ramps that would contribute to vehicles traveling southbound in the northbound lanes of I-794 or westbound in the eastbound lanes of I-94.

Hwy 794 at Oklahoma Ave

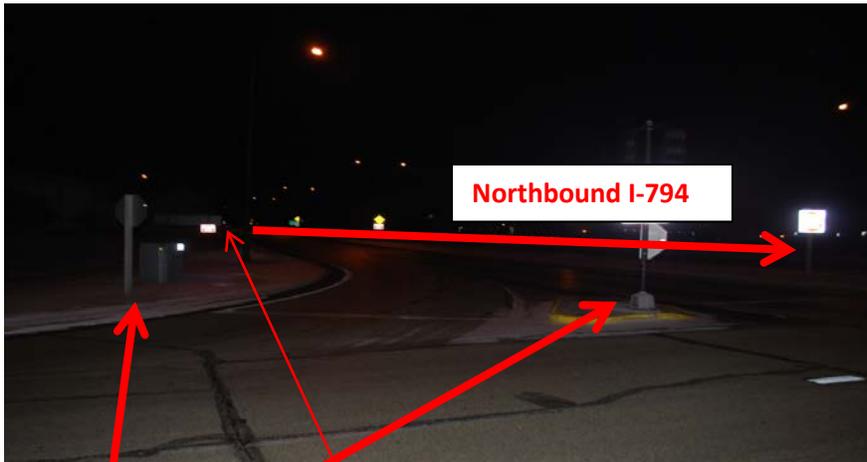


This ramp lacks a median divider separating the on and off ramps. Additionally, the off and on ramps are built parallel to one another. As you can see, the lane/travel markers have become faded. At night, reflective markers on the road way would assist drivers in maintaining the correct direction of travel.

Hwy 794 at Oklahoma Ave (Night vs. Day Photo)

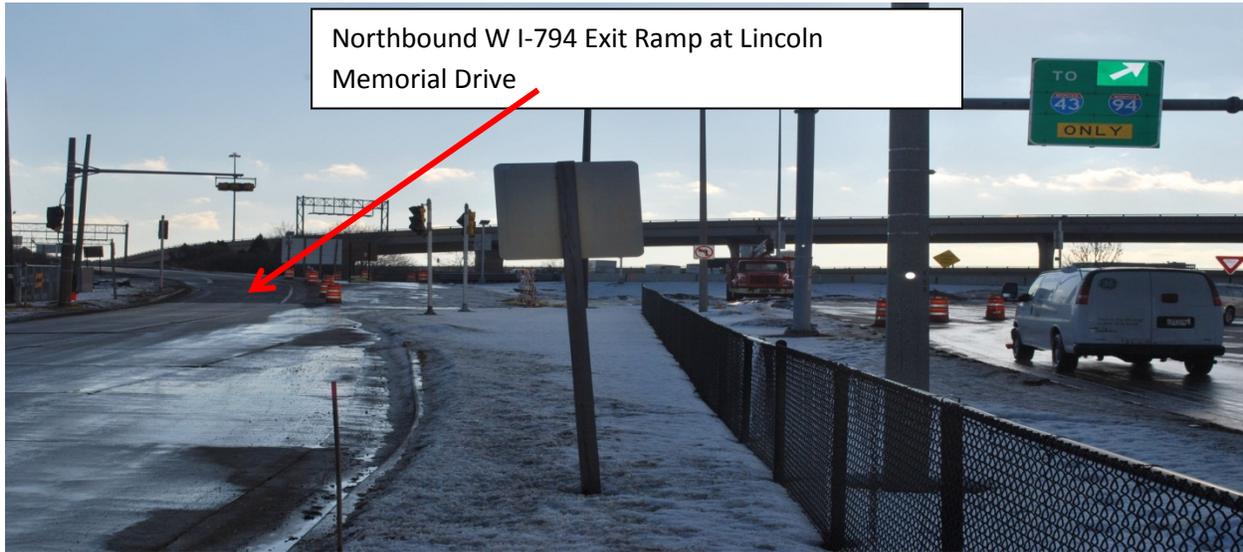


Hwy 794 at Oklahoma Ave (Night vs. Day Photo)

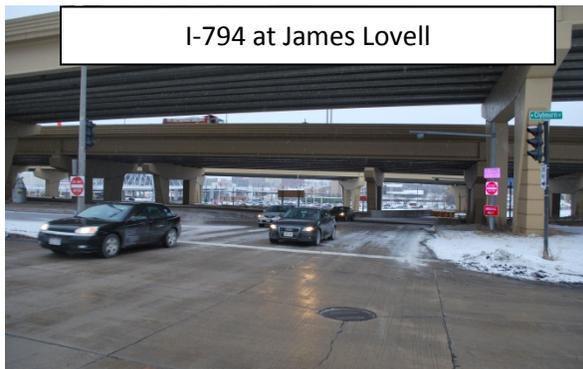
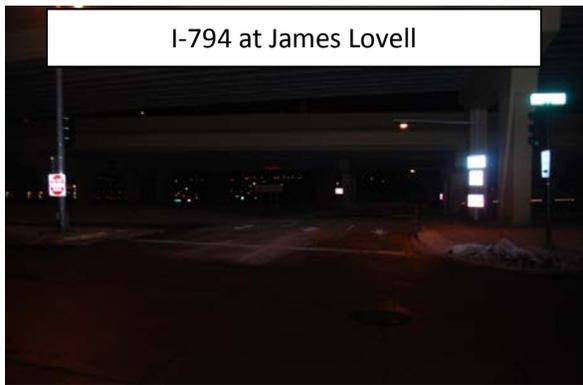


At the top of the two-way ramp, “DO NOT ENTER” and flashing “WRONG WAY” signs need to be installed at the mouth of the right-turn lane. The current WRONG WAY signs are placed too far down the road. These should also be double “DO NOT ENTER” and flashing “WRONG WAY” signs on both sides of the road. In addition, elephant tracks should be repainted in the intersection to direct vehicles into the proper lane of travel. The current ones have faded and are almost invisible at night or during inclement weather.

I-794 at Lincoln Memorial Drive / Michigan Ave.



Again, here we have an off ramp that has no “DO NOT ENTER” or “WRONG WAY” signs. There are also no reflective markers showing the correct direction of travel on the roadway. Due to ongoing construction on I-794, placing road signs would enable motorists to clearly distinguish entrance and exit ramps.



Installing double DO NOT ENTER and flashing WRONG WAY signage on both sides of the exit ramp can be seen at I-794 at James Lovell and I-794 at Carferry. Improved markings and elephant tracks in the intersections would also assist vehicles with maintaining the correct direction of travel.

I-94 at 13th Street (Night vs. Day Photos)



I-94 at 26th Street (Night vs. Day Photos)



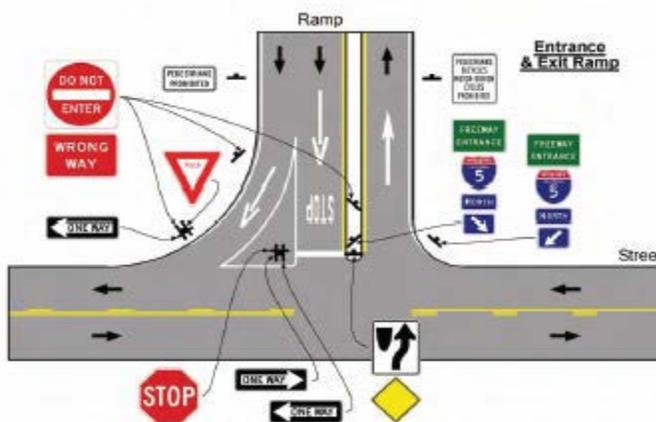
Faded, obscured “DO NOT ENTER” and “WRONG WAY” signs set at different heights hinder motorists from identifying that they are traveling the wrong way, especially those impaired by alcohol and/or drugs. Impaired drivers tend to focus on the road and the lines on the road to compensate for their impaired state.

Based on several research studies conducted by states across the country to prevent wrong-way driving incidents, the most effective in reducing wrong-way driving incidents were those that coupled early warning detection systems with preventive countermeasures. The following are preventive countermeasures used by the State of California, which has been leading the way in reducing wrong-way driving incidents.

“The **DO NOT ENTER** and **WRONG WAY** sign packages were lowered to 2 feet above the pavement in California in 1973. Lowering the height of **DO NOT ENTER** and **WRONG WAY** signs was found to be an effective countermeasure for preventing wrong-way drivers from entering highways. A lower mounting height was reported to make the signs more visible at night because lower signs are more directly in the path of a car’s headlights. A lower mounting height also makes the sign more visible to impaired and older drivers, who tend to look for visual cues from the pavement area (Leduc 2008). A lowered mounting height could also avoid sight restrictions (Cooner, Cothron, and Ranft 2004).”

- ❖ “Place the bottom of the **DO NOT ENTER** and **WRONG WAY** sign package 2 feet above the pavement.
- ❖ Mount **ONE WAY** arrows 1.5 feet above the pavement.
- ❖ Place at least one **DO NOT ENTER** and **WRONG WAY** sign package to fall within the area covered by a car’s headlights and visible to the driver from the decision point on each likely wrong-way approach.
- ❖ Install **FREEWAY ENTRANCE** signs as near to the on-ramp and cross-street intersection as possible.
- ❖ Do not use symbol-only right- or left-turn prohibition signs at ramps because of the risk that impaired drivers might misinterpret them as directional arrows; word signs may be used.”

Standard Signage



Standard Height



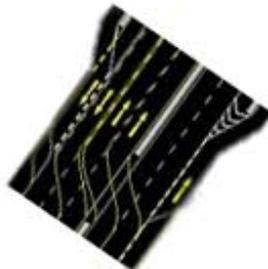
Conclusion

The Milwaukee County Sheriff's Office is continuing to work with the State Department of Transportation and traffic engineering firms in an effort to have additional signs placed in areas that have a high probability of motorists entering the freeway traveling the wrong direction. We would recommend the following:

- ❖ Constant flashing "Wrong Way" signs that flash between 6:00 pm and 6:00 am
- ❖ Lowering the height of "Do Not Enter" and "Wrong Way" signs
- ❖ Mounting "Do Not Enter" and "Wrong Way" signs on the same post, paired on both sides of the exit ramp (4 pairs – 2 at the mouth and 2 at the throat)



- ❖ Installing trailblazing (elephant tracks) lines and/or reflective markers that channel direction of travel



- ❖ Placing median barriers to separate exit and entrance ramps that parallel one another
- ❖ **Begin with exit / entrance ramps along southbound / westbound I-794 and eastbound I-94 from I-794.**