

ILLINOIS TOLLWAY WRONG-WAY DRIVER PILOT PROJECT

October 16, 2019

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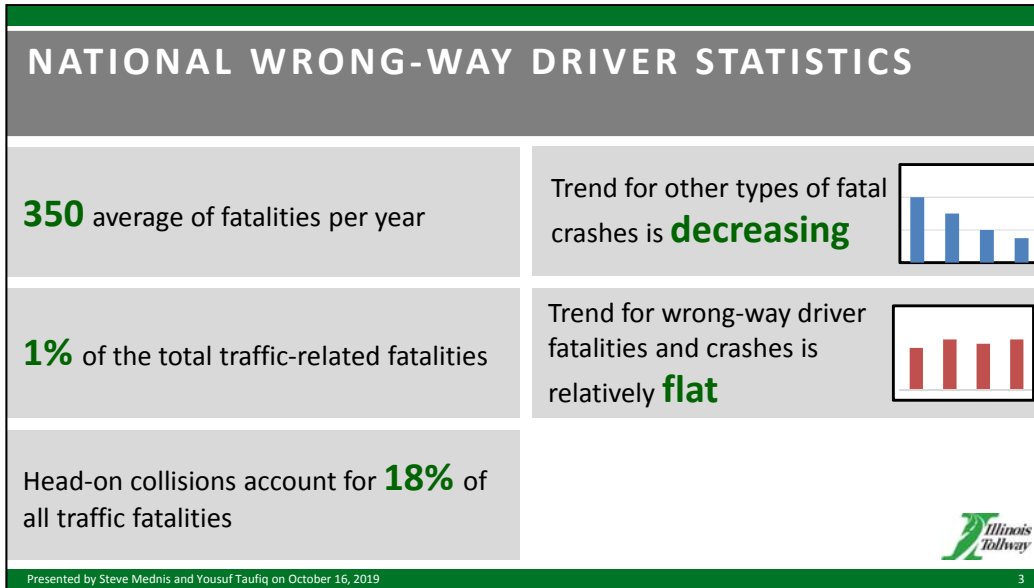
**INSERT RECENT VIDEO OF WRONG-WAY DRIVER INCIDENT CAUGHT
ON TAPE ON I-90**

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Our Chief Engineering Officer Paul Kovacs showed a preview of this video during the general session this morning.

Here's a look at the full incident.



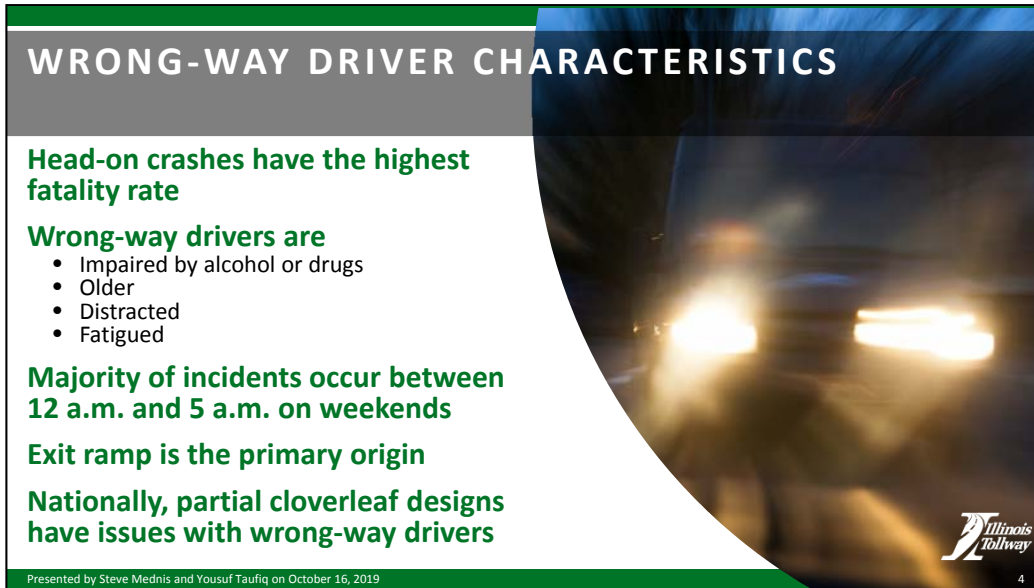
These are the basic facts about wrong-way driver incidents.

You see there's a decline in all other types of fatal incidents – this could be rear-end collisions, T-bone or side-impact collisions and rollovers.

Wrong-way driver incidents tend to be more severe and horrific due to the nature of them being head-on and at high speeds.

Illinois Tollway stat:

201 reported wrong-way driver incidents on the Tollway between 2017 and 2019



WRONG-WAY DRIVER CHARACTERISTICS

Head-on crashes have the highest fatality rate

Wrong-way drivers are

- Impaired by alcohol or drugs
- Older
- Distracted
- Fatigued

Majority of incidents occur between 12 a.m. and 5 a.m. on weekends

Exit ramp is the primary origin

Nationally, partial cloverleaf designs have issues with wrong-way drivers

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Illinois Tollway

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Here is the profile of a typical wrong-way driver incident...

Note: hard to say about partial cloverleaf as 30-40 percent self-correct so we don't identify them.

And of the 60-70 percent that are impaired, they often don't remember where they got on the highway or how.

WRONG-WAY DRIVER STATE OF MIND



30-40 percent are distracted

- Static countermeasures are sufficient to redirect
 - Wrong-way signage
 - Delineators
 - Pavement markings

60-70 percent are impaired or confused

- Static countermeasures have not proven effective
- May drive for miles going the wrong way
- Tend to drive in Lane 1

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Many of us have made a wrong turn or found ourselves going the wrong way but quickly we realize something isn't correct and make the needed adjustment.

For the 60-70 percent – they are so impaired they don't see any of the countermeasures NOR do they realize that they are driving the wrong way – other cars blinking lights at them, honking the horn, etc.

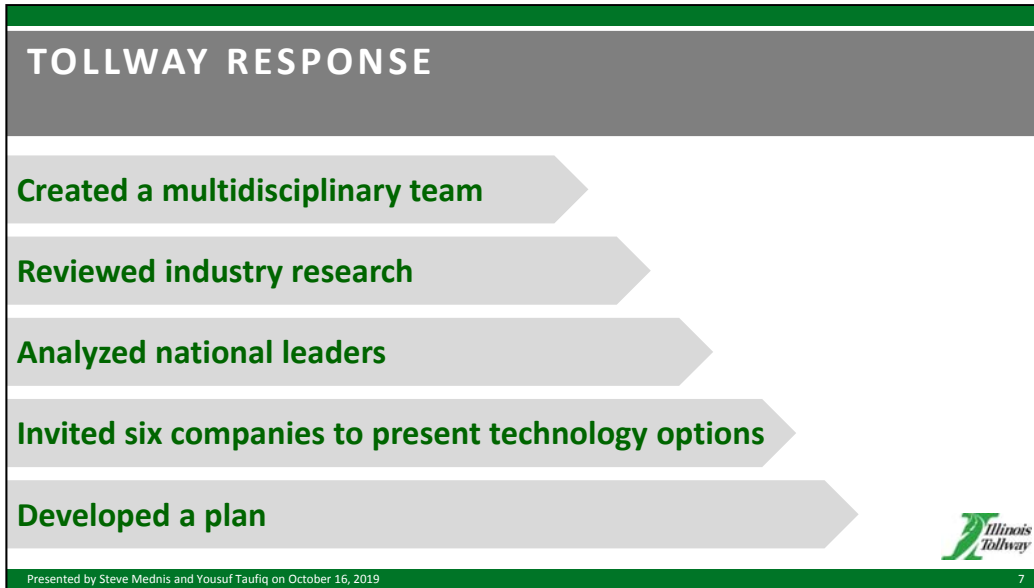
They tend to drive in Lane 1 (aka the passing lane) makes some of these accidents even more horrific as the rates of speeds are higher from the other cars driving toward the wrong-way driver.

WRONG-WAY DRIVER CRASHES



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Team:

M&O: Steve Mednis, Amarpal Matharu

TOC: Elyse Morgan

WSP: Jessie Carroll, Michelle Lavgine and Caroline Dillon

CDM Smith – Systemwide Traffic Technical and Trust Indenture Consultant

AZ: Installed large Wrong Way and Do Not Enter signs; large “right way” arrows with reflectors that glow red when wrong way vehicle traveling toward them; 90 thermal cameras to detect wrong-way drivers.

NOTE: AZ has seen 16 wrong-way driver fatalities as of August 2019 – the same as all of 2018. They are detecting them but how do you get them to, one, not drive wrong way in first place and, two, how to stop them when they do?

FL – Enhanced static signing – low-mounted, oversized, reflective strip; pavement markings – dotted lines for left turns, median nose painted yellow; using infrared cameras to detect wrong-way driving – stating that it is 94 percent accurate.

Texas – Using same system Tollway is – blinking static signs and radar system (Click 512 by WaveTronix) to detect wrong-way movement; they are using on one corridor to better measure the effects; have seen a decrease; note – static blinking signs from dusk to dawn on all ramps.

Based on best practices, we invited six companies to give demonstrations – included radar,

infrared cameras and thermal.

We evaluated Illinois Tollway capabilities to be good stewards of resources and based on that created a plan.

TOLLWAY PLAN



**Enhance
traditional
countermeasures**



**Pilot
technological
countermeasures**



**Evaluate
effectiveness**



**Create
systemwide
program**





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TECHNOLOGICAL COUNTERMEASURES

Wrong-Way Driver Pilot Project

- Used current Tollway technology
- Installed additional components

Selected location: Peace Road on the Reagan Memorial Tollway (I-88) in DeKalb

- Partial cloverleaf configuration
- Side-by-side exit and enter ramps
- Side street unchannelized and unlit



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The team considered multiple sites and identified seven potential ramps to test pilot.

Peace Road on I-88 was chosen because data indicated a higher frequency of reports of wrong-way movement than other locations.

It is a partial cloverleaf configuration – higher rate of reports.

Side-by-side exit and entrance ramps.

Under construction – we had access to it both to install and test the technology with the least amount of customer interruption.



Design approach



This view provides a nice perspective of the site configuration including:

Signs

Plaza itself

There are two CCTV cameras on the plaza tower

Detection was added at this site.

TECHNOLOGY OVERVIEW

① Existing microwave vehicle detector system identifies wrong-way driver

② Field wireless radio linked to wrong-way sign reads contact closure and activates wrong-way flashing signs

Wrong-way signs turn off per configured duration (estimated as 2 minutes)



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Decreased costs significantly – minimal purchases and software reconfiguration; if analysis determines we can better address problem by implementing a complete external system, then we will do so.

- Decided to use current Illinois Tollway equipment and technology
- Microwave vehicle detection detects wrong-way movement (Click 512)
- Detection activates flashing Wrong Way and Do Not Enter signs
- Immediate notification to Traffic Operations Center (TOC) and State Police
 - Visual verification through CCTV
 - Activation of dynamic message signs in vicinity alerting other drivers
 - Use CCTVs in vicinity to monitor situation and provide information to State Police

INSERT NIGHT TEST DASH CAM VIDEO

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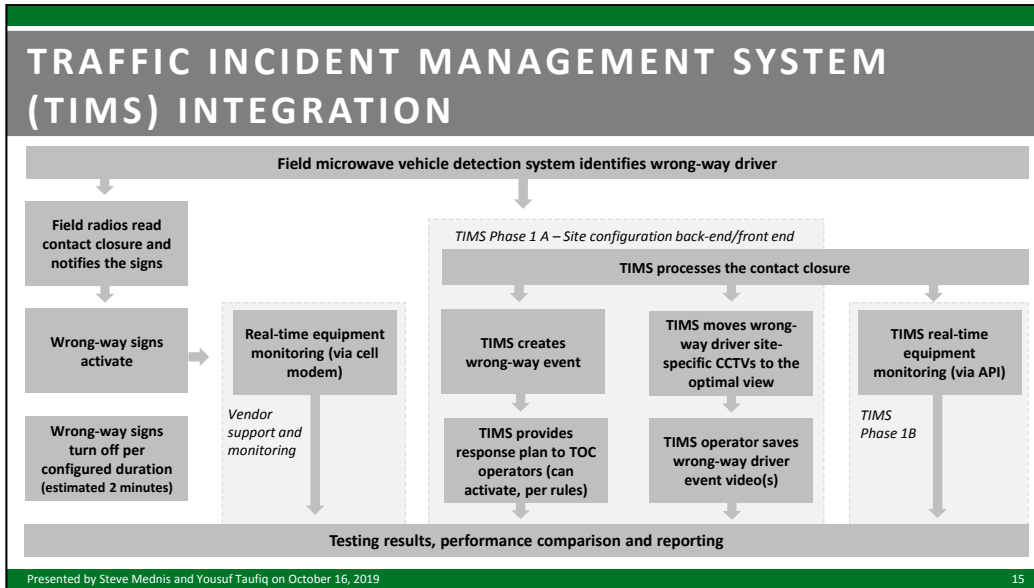
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Nighttime testing – minimize impact on customers.

Ran multiple types of vehicles.

Test vehicles run across left center and right edges of pavement to capture multiple potential errant driver types.

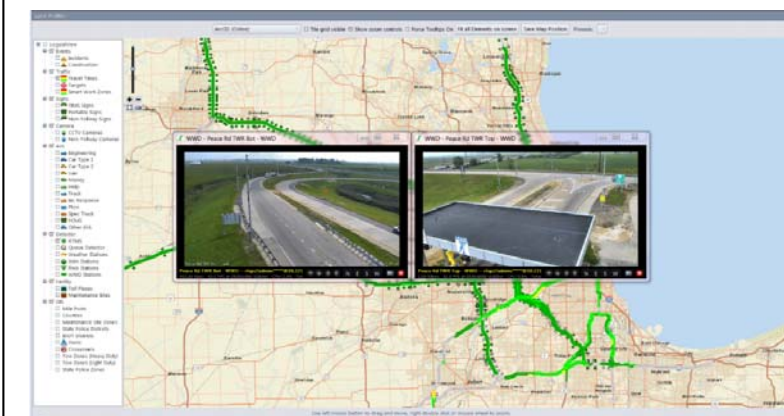
Wrong-way LED signs set for 10 seconds to allow for multiple test runs.



This diagram depicts the integration into the TIMS ATMS.

- Collaboration of the TOC with Parsons (system integrator) and TranSmart/EJM

TIMS NOTIFICATION OF WRONG-WAY EVENT



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TIMS operators receive pop up.

Able to capture driver; if not then adjust cameras near entry point to verify wrong-way driver exists.

Notify State Police.

Activate DMS – Potential Wrong Way Driver – use caution.

TIMS EVENT CREATION

The screenshot displays the TIMS Event Creation interface. On the left, there are panels for 'Confirmed (3)', 'Potential (34)', and 'Scheduled (188)' events. The main area shows event details for 'Event ID: 16170' with the type 'Wrong Way Driver'. The location is 'I-88 (Freeway)' with a map view showing the incident site. The event is categorized as 'Medium' impact and 'Wrong Way Driver' source. The 'Current Event Notes' section contains a note: 'Detected wrong way driver. ALARMED at station I-88 W 94.0'.

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WRONG-WAY DRIVER CONFIRMATION

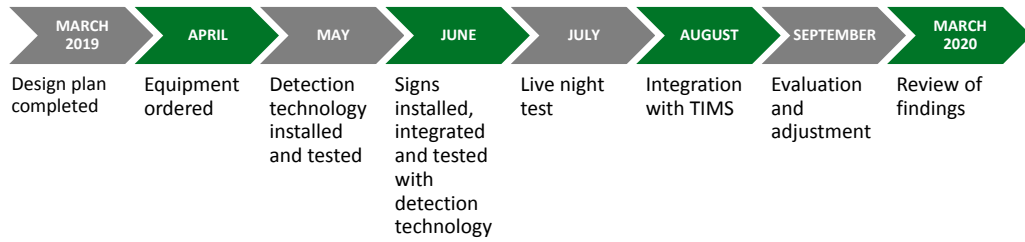


- 1. Illinois State Police receive report of wrong-way driver within 1-2 minutes of initial detection**
- 2. All on-duty Tollway Traffic Operations Center technicians locate wrong-way driver by adjusting cameras on system**
- 3. If wrong-way driver confirmed**
 - Vehicle is tracked by two or more TOC technicians
 - ISP are dispatched to intercept
 - Dynamic Message Sign messaging activated
- 4. Tollway and ISP continue collaboration to resolve incident**

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PILOT PROJECT TIMELINE



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PILOT PROJECT COSTS

Equipment – \$68,500

- Wrong-way sign upgrade
- Wavetronix Click 512 upgrade
- Camera upgrade

Design and installation – billed under existing contracts

- Meade (ITS Maintenance Contractor)
 - MVDS, sign and camera installation
 - Local testing and integration
- TranSmart/EJM
 - Design and analysis
 - TOC integration support with TIMS
 - Data collection



INITIAL RESULTS - INSERT WRONG-WAY DRIVER (RAMP) VIDEO

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Let's watch a wrong-way driver our system captured.

Note that approximately 45 seconds into the video we will see the motorist enter the ramp the wrong way.

We would not have imagined someone taking a hard left turn during daylight hours. Also, since he/she responded to the flashing wrong way signs and carefully turned around, we can assume he or she was probably more confused than impaired.

The early wins with this video are:

1. It validated that our WWD system works
 1. Detection picked up the driver's movement and the signs were activated
 2. The CCTV captured the image
 3. The TOC operators monitored the situation
 4. The driver responded to the flashing signs and turned
-
1. Are the current ones in the right places? Are additional countermeasures such as guidemarks on the pavement to the lane needed? What was the driver's view from that angle?
 2. Forces us to evaluate and consider enhancing our non-technology countermeasures at this ramp, as this driver's movement does not initially stand out as a 'likely' wrong way movement.

-Are the current signs in the optimal places?

-Should we add pavement markings?

-What was the driver's view from that angle? Was there a countermeasure that he or she missed, OR does one need to be adjusted or added?

We are increasing the safety on our roads by capturing this data and making changes.

NEXT STEPS

Pilot Evaluation

- Evaluate effectiveness of deployed countermeasures (static and dynamic)
- Evaluate other technology alternatives and effectiveness

Develop a systemwide approach

- Enhance static countermeasures
- Select a standardized technology approach
- Prioritize locations
- Develop design guidelines

Enhance operational and enforcement procedures



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Since wrong way-driving incidents are rare, might not have a lot of data; however, we know from other DOTs that these steps are effective

Evaluating delineators and pavement markings on ramps.

