

# ROADWAY SAFETY INSTITUTE

Advancing roadway safety with user-centered solutions

UTC Project Information	
Project Title	Field Implementation of Direction Rumble Strips for Deterring Wrong-Way Entries
University	Southern Illinois University
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Funding Source(s) and Amounts Provided (by each agency or organization)	Roadway Safety Institute (USDOT): \$88,934
Total Project Cost	\$88,934
Agency ID or Contract Number	UTC Grant Number: DTRT13-G-UTC35 CTS# 2018071
Start and End Dates	4/27/2018-7/31/2019
Brief Description of Research Project	<p><i>This project produced two final reports.</i></p> <p><i>Final report abstract for Luo:</i> This report presents evaluation results of directional rumble strips (DRS) designed to deter wrong-way (WW) freeway entries. Mathematical models have been built to identify high-risk locations of WWD. Based on the model, one off-ramp, exit 41 northbound on I-70 was found to have a WW entry probability of 55%. 96 hours of video data were recorded at the chosen off-ramp. Then one pattern of DRS (D3) was implemented on the chosen location with the help of the Illinois Department of Transportation (IDOT). Sound and vibration data were recorded and compared between RW and WW directions for speed ranging from 15 mph to 30 mph. Another 96 hours of video data were recorded after the implementation. The analysis of before and after implementation data showed that the DRS cannot reduce the probability of WWD, but it can warn WW drivers and reduce their speed, which will significantly reduce WWD accidents.</p> <p><i>Final report abstract for Zhou:</i> This report presents the field implementation results of three directional rumble strip (DRS) patterns designed to deter wrong-way (WW) freeway entries. Southbound off-ramps at Exits 208 and 284 on I-65 in Alabama were selected for implementation because they were ranked as high-risk locations by a network screening tool developed by Auburn University. Three patterns (D3, C, and E.1) were recommended for field implementation based on the results of</p>

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	<p>a previous project. Pattern D3 was installed at the off-ramp terminal near the stop bar or yield line. Pattern C was implemented at the segment between the terminal and ramp curve. Pattern E.1 was placed on the tangent part before the ramp curve. WW incident and traffic speed data before and after the implementation were collected using cameras and magnetic sensors, respectively. Field driving tests were conducted to collect sound and vibration data at various speed categories for both RW and WW directions. Before and after studies evaluated the effectiveness of the DRS patterns in reducing wrong way driver (WWD) incidents and traffic speeds on off-ramps. Sound and vibration analyses quantified the differences between right way (RW) and WW drivers' perceptions. Results showed that the number of WWD incidents and average driving distances were significantly reduced after implementing all of the DRS. The results confirmed that WWDs can perceive elevated sound and vibrations when passing the DRS. The DRS can also reduce the 85th percentile, mean, and standard deviations of off-ramp traffic speeds. A general guideline was developed for implementing different DRS to deter WW freeway entries.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p><i>Nothing to report.</i></p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p><i>Nothing to report.</i></p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project website</li> </ul>	<p><a href="http://www.roadwaysafety.umn.edu/research/search/projectdetail.html?id=2018071">http://www.roadwaysafety.umn.edu/research/search/projectdetail.html?id=2018071</a>  <a href="http://www.roadwaysafety.umn.edu/publications/researchreports/reportdetail.html?id=2848">http://www.roadwaysafety.umn.edu/publications/researchreports/reportdetail.html?id=2848</a>  <a href="http://www.roadwaysafety.umn.edu/publications/researchreports/reportdetail.html?id=2858">http://www.roadwaysafety.umn.edu/publications/researchreports/reportdetail.html?id=2858</a></p>

