

# ROADWAY SAFETY INSTITUTE

Advancing roadway safety with user-centered solutions

UTC Project Information	
Project Title	Lighting Levels for Isolated Intersections Leading to Safety Improvements
University	University of Minnesota
Principal Investigator	Christopher Edwards
PI Contact Information	<i>No longer with the University.</i>
Funding Source(s) and Amounts Provided (by each agency or organization)	Local Road Research Board (LRRB): \$47,085 Minnesota Department of Transportation: \$47,085
Total Project Cost	\$94,170
Agency ID or Contract Number	UTC Grant Number: DTRT13-G-UTC35 MnDOT contract 99008 work order 39 CTS# 2013012
Start and End Dates	07/31/2012 – 02/28/2015
Brief Description of Research Project	<p><i>Final report abstract:</i></p> <p>Roadway lighting provides a benefit in reducing nighttime crashes that lead to injuries and fatalities. A number of studies have linked the benefits of roadway lighting to a reduction in crash rates at night for a variety of roadway types including rural intersections. Assessing the effectiveness of intersection lighting has primarily relied upon crash database modeling comparing lighted intersections to unlighted intersections. The current research effort is intended to gather similar metrics for comparison but also to measure the quantity and quality of roadway lighting levels at isolated rural intersections to assess how these metrics impact nighttime crash rates. Sixty-three intersection locations were chosen for intersection lighting measurement from six different counties within Minnesota. Both lighted and unlighted intersections were measured for quantity of lighting using an illuminance meter data collection system mounted on the roof of a passenger vehicle. The data collection system utilized five separate illuminance meters and captured horizontal illuminance while driving through all 63 intersection locations. Following data collection, a series of negative binomial regression models were used to assess the horizontal lighting level in conjunction with the nighttime crash ratio, intersection configuration type, and proximity of an intersection to a curve in the roadway. The results showed that overall, average horizontal illuminance reduced nighttime crash rates by 9%, but for lighted intersections alone, the crash reduction factor was 20%. Furthermore, for unlighted intersections, average illuminance levels reduced nighttime crash ratios by 94%. Intersection configuration and proximity to curves also affected the nighttime crash ratios. The results of this effort are discussed in terms the impact of horizontal illuminance on crash rates. Additional items discussed include thresholds for</p>

Last updated (9/30/2019)



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	minimum and maximum lighting levels and future research investigating and validating these efforts.
Describe Implementation of Research Outcomes (or why not implemented)  Place Any Photos Here	<i>No data available; PI is no longer with the University.</i>
Impacts/Benefits of Implementation (actual, not anticipated)	<i>No data available; PI is no longer with the University.</i>
Web Links <ul style="list-style-type: none"><li>• Reports</li><li>• Project website</li></ul>	<a href="http://www.cts.umn.edu/Research/ProjectDetail.html?id=2013012">http://www.cts.umn.edu/Research/ProjectDetail.html?id=2013012</a> <a href="http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2402">http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2402</a>