

REDUCING LATE-NIGHT/EARLY-MORNING INTERSECTION CRASHES BY PROVIDING LIGHTING

INTRODUCTION

More than 40 percent of intersection fatalities occur during late-night/early-morning hours. Further, the crash fatality rate during late-night/early-morning is as much as three times greater than during the day¹. Research has shown that a primary reason for the high number of crashes is driver inability to see conflicting traffic and other road users. Research also demonstrates that the number and severity of crashes can be reduced by using simple enhancements such as providing overhead lighting to increase intersection visibility. The experience of Minnesota and Kentucky demonstrates how transportation agencies can improve intersection safety during late-night/early-morning with lighting enhancements.

Minnesota and Kentucky were concerned about the high number of crashes at some of their intersections during late-night/early-morning hours. Recognizing that poor visibility at intersections during late-night/early-morning hours can cause crashes, the States installed lighting at 55 intersections experiencing a high incidence of crashes. The crash reduction averages in this report reflect the average percent reduction per year based on the difference between the total number of “before” and “after” crashes, observed over a minimum duration of 6 years at each intersection, between 1996 - 2004. The “before” and “after” observation periods ranged between 36-48 months.

This article summarizes the results of three studies which examined lighting enhancements at 55 intersections in Minnesota and Kentucky that reduced crashes in rural and urban areas during late-night/early-morning hours. The three studies are described below.

SAFETY IMPROVEMENT RESULTS

1) Isebrand and McDonald², Minnesota, 2004

This study analyzed the effects of street lighting on crashes at 34 rural [stop-controlled](#) Minnesota intersections before and after installing lighting. The lighting installation dates ranged from 1985 to 2000 (Figure 1). The “before” and “after” observation period was for three years. **This treatment has proven effective in reducing late-night/early-morning crashes, and Minnesota experienced an average crash reduction of 27 percent and injury crash reduction of 41 percent at these intersections.**

2) Green et al.³, Kentucky, 2003

This “before and after” study in Kentucky analyzed the safety benefits associated with roadway lighting at nine urban and rural intersections. The lighting installation dates varied between 1998 and 2000. The observation period was 4 years prior to the lighting installation and 3 years after installation. **The analysis found that late-night/early-morning crashes were reduced by 45 percent after installing the lighting.**

¹Traffic Safety Facts, National Highway Traffic Safety Administration, 2008.

² Isebrand and McDonald. “Safety Impacts of Street Lighting at Isolated Rural Intersections, Part II, Year 1 Report,” MN/RC-2006-35, Minnesota Department of Transportation, December 2004

³ Green, E.R., Agent, K.R., Barrett, M.L., and Pigman, J.G., “Roadway Lighting and Driver Safety,” KTC-03-12/SPR247-02-IF, Kentucky Transportation Center, University of Kentucky and Federal Highway Administration, May 2003.

3) Preston and Schoenecker⁴, Minnesota, 1999

A “before and after” analysis for a sample of 12 [rural stop-controlled](#) intersections selected by Minnesota Department of Transportation (Mn/DOT) was conducted. The lighting installation dates ranged from 1987 to 1994. The “before” and “after” observation period was for three years. **The study resulted in a 25–40 percent reduction in overall nighttime crashes, as well as an 8-26 percent reduction in nighttime injury crashes.**

The Cost of Improved Safety

The States had no implementation issues with this countermeasure and the costs for implementing the enhancements were approximately \$1,500-2,500 for lighting upgrades, and approximately \$3,000- \$12,000 for new lighting installations (not high mast). The lighting installations can usually be implemented within 3 months (the studies did not provide any information on the time needed to install lighting at the treated intersections).

The enhanced countermeasure reduced overall late-night/early-morning crashes across these intersections by a weighted average of 35 percent.

As the article demonstrates, providing lighting can effectively improve safety and reduce traffic crashes and their resulting injuries and/or fatalities during late-night/early-morning hours-. For more detailed data and results on this success story and other proven intersection safety treatments from across the country, please see the following website: <http://safety.fhwa.dot.gov/intersection>. For more information, contact Ed Rice, Intersection Safety Team Leader, FHWA Office of Safety (ed.rice@dot.gov), or Susan Zarling, Office of Traffic Safety, Minnesota Department of Transportation (susan.zarling@state.mn.us).

⁴ Preston, H. and Schoenecker, T., “Safety Impacts of Street Lighting at Isolated Rural Intersections,” MN/RC-1999-17, Minnesota Department of Transportation, April 1999.

Figure 1: Typical Lighting at intersection (Photo courtesy of KLS [used with permission]).



OTHER OPTIONAL LIGHTING IMAGES
(Photos by April Armstrong [used with permission]).









Photo by April Armstrong used with permission.

OTHER OPTIONAL IMAGES:



