Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

0-6645: Guidelines for Continuous and Safety Roadway Lighting

Background

Roadway lighting is provided on selected highways to improve the visibility and safety of the nighttime driving environment. Roadway lighting is typically installed due to traffic volume warrants or safety criteria. The traffic volume lighting warrants are based on the average daily traffic (ADT), even though the lighting is used only during nighttime periods. During the late night and early morning hours, the hourly traffic volumes on a road can be less than 1 percent of the ADT, raising the question as to the benefits of keeping the roadway lighting on during such low-volume conditions. Turning off or reducing the lighting level during late-night periods is known as a lighting curfew. The potential benefits of implementing a lighting curfew include reduced energy consumption and the associated electrical cost for the agency responsible for the lighting plus reduced light pollution and spillover onto adjacent properties. Although lighting curfews are of interest to several agencies around the country, there has been little research to evaluate the benefits of lighting curfews, and there are no national guidelines on the subject. This research project evaluated the potential benefits of turning off roadway lighting on freeways during the late night and/or early morning hours. The researchers, in consultation with the Texas Department of Transportation (TxDOT) project advisors, decided to focus on freeways because of the prevalence and the accessibility of traffic volume and crash data to analyze the safety impacts of a lighting curfew.

What the Researchers Did

The research team evaluated the benefits of a freeway lighting curfew through the conduct of several research activities, the most significant of which included an evaluation of freeway crash records to evaluate the impact of turning off freeway lighting during some portions of the late-night and/or early-morning hours. Other activities included a visibility assessment at freeway locations in several cities, a detailed analysis of previous research and curfew practices at other agencies, and a benefit/cost assessment of the economic impacts of implementing a lighting curfew. The project originally intended to conduct a field experiment of the curfew guidelines, but this activity was not accomplished within the project time frame. Figure 1 illustrates the typical K factor (hourly volume/daily volume) on a freeway during the late-night and early-morning hours. Figure 2 illustrates the typical crash rates for the same situation.

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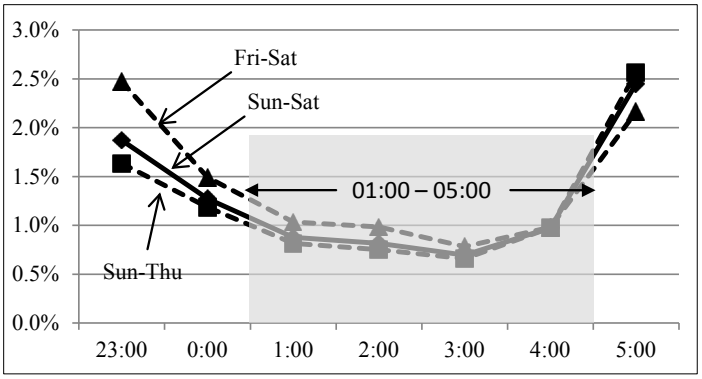

Figure 1. Change in K Factor throughout the Nighttime Hours.

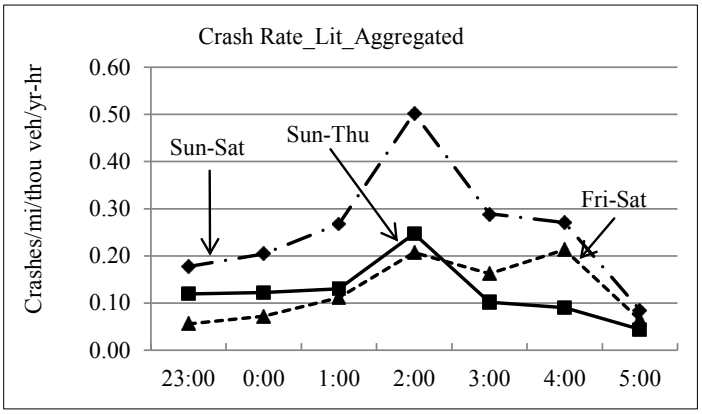

Figure 2. Hourly Crash Rates on Six-Lane Freeways.

What They Found

The research team recommends that freeway lighting curfews be limited to locations and time periods where the traffic volumes are 100 vehicles per hour per lane or less. Due to the potential impact of alcohol on traffic safety, initial implementation of lighting curfews should not begin before 2:00 a.m. or at all on Friday or Saturday nights. Lighting curfews should not include locations where lighting was installed with safety funds or on the basis of a safety study. Lighting curfews may also need to be suspended for unique situations such as special events, weather events, and evacuations.

What This Means

The results gained from this project provide a starting point for implementing and evaluating freeway lighting curfews. Future implementation of the lighting curfew guidelines should be gradual, with continuing monitoring of safety impacts.

For More Information

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