



Project Summary

Texas Department of Transportation

0-5235: Determining Nighttime Driver Signing Needs

Background

Many agencies are looking for ways to determine which kind of retroreflective sheeting material they should use on their signs. Most, if not all, agencies look to the American Society for Testing and Materials (ASTM) specification D4956, Standard Specification for Retroreflective Sheeting for Traffic Control, for help. To their disappointment, however, they learn that ASTM D4956 does not provide useful information concerning the most applicable use of certain kinds of materials.

This project was intended to measure how nighttime drivers use traffic signs and then, using these data, recommend a specification based on the needs of nighttime drivers. The researchers used legibility and eye-tracking data to determine how nighttime drivers use signs as a function of brightness.

What the Researchers Did

The research was carried out in three phases. In the first phase, the researchers tested new equipment and the general experimental design to validate the proposed equipment usefulness and to explore possible metrics that could help establish a needs-based specification. The researchers focused on nighttime sign legibility and driver eye-tracking data as the metrics in Phase I.

In Phase II, the researchers focused on closed-course testing using internally illuminated signs to investigate the impact of different luminance profiles on sign legibility and driver eye-tracking. Using internally illuminated signs allowed the researchers to design luminance curves that were free from those produced by various retroreflective sheeting materials.

The study design for Phase III was developed from the findings of Phase I and Phase II, and this last effort focused on both closed-course and open-course efforts.

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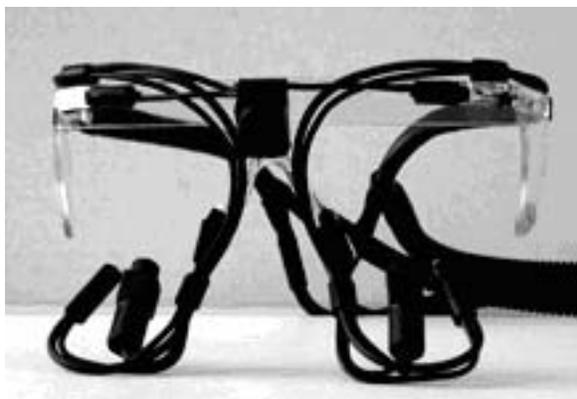
Project Completed: 2-28-09

What They Found

The researchers learned that there are several key distinctions that can be made in terms of how bright a sign is versus how it performs in terms of nighttime legibility. The luminance as a function of distance is important in relation to how the signs are used at nighttime. Much as horsepower or torque needs to be defined in terms of an engine's revolutions per minute to understand a vehicle's performance, the brightness of a sign (or the luminance) needs to be defined in terms of the distance between the vehicle and the sign in order to understand how drivers use and acquire information from signs at night. The researchers learned that both the total cumulative luminance as well as the distribution of luminance throughout key areas of an approach to a sign are important factors to consider when considering how drivers use signs at night.

What This Means

The researchers used the new findings to develop a recommended sign sheeting specification that provides a way for the Texas Department of Transportation to specify sign sheeting materials that effectively relate to nighttime driving performance.



Eye Tracker



Internally Illuminated Sign

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