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Highway Traffic Signs

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1. Introduction

Drivers need information about the roadway. Drivers acquire information visually – but sometimes what we can see is limited. It is the job of a roadway engineer to tell us what we cannot see. The principle way of doing this is with road signs. During the day road signs communicate through shape, color and text. At night, the information on a road sign is even more essential, and retroreflective materials give the driver the light that he needs.
The first part of this article will describe categories of road signs and the information they convey. The second part will discuss retroreflectivity and how it is necessary for safe nighttime driving.

2. Types of Road Signs and How to Distinguish

Road signs must be designed to convey as much information as possible in a very easy to understand package. This is essential since drivers should not spend much time reading signs – they need to focus on the driving task. One way to do this is to standardize colors and symbols. Drivers will then have experience and will interpret correctly any signs they encounter. To insure uniformity, all road signs in the United States are described by the Manual on Uniform Traffic Control Devices MUTCD[2]. Road signs are divided into several categories – based upon the kind of information that is being provided. An example of each type of sign is included below.

Regulatory Signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements.Examples provided – Stop sign and speed limit sign.

Warning Signs call attention to unexpected conditions on or adjacent to a highway or street and to situations that might not be readily apparent to road users. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations. Examples provided: Winding road ahead and road curves right ahead.

Guide Signs are essential to direct road users along streets and highways, to inform them of intersecting routes, to direct them to cities, towns, villages, or other important destinations… in the most simple, direct manner possible. Signs can either provide information about the current route being traveled, or provide information on how to change route. Examples provided: Expressway direction sign and US Highway route sign.

Service, Attraction or Recreation Signs are used to alert travelers as to the location of a desired service, or direction to a popular attraction that produces a significant volume of traffic. Examples provided: Gasoline available sign and camping sign.

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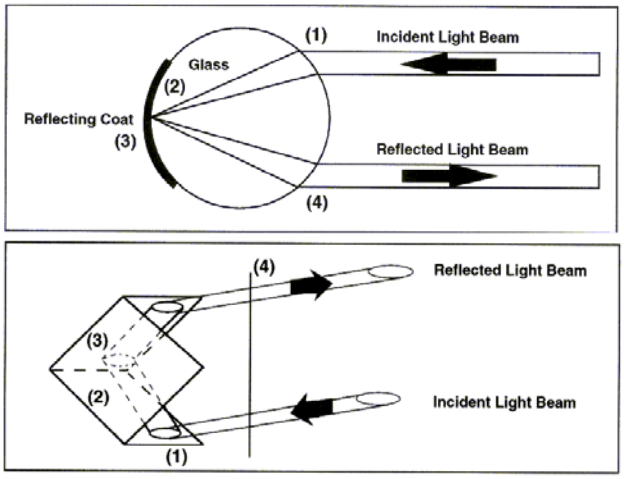
2 http://mutcd.fhwa.dot.gov/

Each category of sign has a different level of importance. Regulatory and Warning Signs are the most important for the driver to see – and may require immediate response. Navigation information is also vital, but may not result in a dangerous situation if the driver does not see the sign. And service and recreational signs are important for drivers unfamiliar with a particular area. Color-coding and the use of standardized symbols allow drivers to recognize signs from great distances. Red is reserved for the most important regulatory signs – signs that if ignored, may result in a serious accident. By making all of the warning signs yellow, a driver always knows that this is an important sign – even before the legend or symbol can be seen. Guide signs are similarly standardized, with white text on green background being used exclusively on high-speed expressways. The individual route markers rely on a specific shape or design to convey not only the number designation of the route, but also the authority – be it a federal, state or county roadway. Blues and browns are reserved for services and recreation.

3. Retroreflective Road Signs

If road signs are important during the day, they become even more important at night because the road signs may be the driver's only source of information about the roadway and their surroundings. In order to be seen at the same distance at night as during the day, signs must be bright. Before the introduction of retroreflective materials in the 1940's, external illumination was the only choice. Now, multiple grades of retroreflective materials exist, allowing signs to perform as well at night as during the day. And by using the car's headlights, the retroreflective signs are trouble and expense free once installed. Every road sign should use retroreflectivity to insure safe use at night.

The type of retroreflective material that should be used on a sign is dependent upon many factors including: the speed of the road way (which determines the distance from which the sign should be read), the amount of light that strikes the sign, the conspicuity of the sign, and others. There are two retroreflective technologies currently available: beaded and prismatic. Beaded materials use glass beads to focus, then reflect the light back in the incident direction. Prismatic materials use the three microscopic mirror surfaces of a prism to "bounce" the light back. Prismatic materials provide the highest level of brightness and performance, and extend the useful distance of road signs.



4. Summary

Road signs use visual information, like color and symbols to convey information quickly to the driver. Since the information must be processed quickly, standardization is essential to insure communication. At night, the information on a road sign must be bright enough to be read at the same distance as during the day. Retroreflective films provide the answer to safe nighttime driving.