16. Abstract

This study examined the differences in sign light between 1997 tungsten-halogen and 2004 HID low-beam headlamps manufactured for use on U.S. vehicles. The results indicate that the HIDs tended to deliver less light above the horizontal straight ahead and to the left of the vertical, and less light to the right of the vertical above about 1.5° up. The consequences of the changed beam pattern were analyzed in detail for three typical sign locations: center overhead, right shoulder, and left shoulder. The most frequent geometric conditions were modeled: a straight road, and very large-radius left and right curves, all with no vertical curvature. Viewing distances between 50 m and 300 m were considered.

The results imply that with current HID low beams, sign retroreflective efficiency would need to be increased to maintain the effectiveness that a given sign had a decade ago with tungsten-halogen low beams. This applies to overhead signs on straight roads and on very large-radius left and right curves, and to right and left shoulder-mounted signs on straight roads and on very large-radius left curves.