The Effects of Rear-Window Transmittance and Backup-Lamp Intensity on Backing Behavior

A dynamic field experiment was conducted, both during the day and at night, to examine the effects of rear-window transmittance and backup-lamp intensity on driver backing behavior (stopping distance, velocity, acceleration, and trial duration) toward a known stationary object. In addition, three years of crash data from the General Estimates System (GES) file were examined for backing crashes. Specific variables of interest in the GES data were driver age, ambient light condition, and the type of passenger vehicle involved (car versus minivan or sport utility vehicle).

The results of the field experiment indicate that drivers do not adjust their backing behavior to variations in the amount of available light, at least under conditions where there is little uncertainty regarding obstacles. However, drivers do appear to adjust their backing behavior as they grow older, for the most part driving more cautiously. Nevertheless, the crash data indicate that older drivers are still over-represented in backing crashes. Minivans and sport utility vehicles, which are much more likely to have rear-window tinting, are also over-represented in backing crashes.

Based on the crash data, despite the findings of the field experiment, it is suggested that older drivers might benefit from higher-transmittance windows, higher-intensity backup lamps, and rearward detection and warning devices. These same modifications might also benefit the drivers of minivans and sport utility vehicles.

Information about the Affiliation Program is available at http://www.umich.edu/~industry/.