

## Assessment of the Durability of Wet Night Visible Pavement Markings: Wet Visibility Project: Phase IV

**Perspective** Conventional pavement markings are difficult to see under dark, rainy conditions. The pavement marking industry has begun developing new marking materials that are more visible on wet roads at night. In this study, researchers at the Virginia Tech Transportation Institute (VTTI) investigated the durability of wet night visible pavement markings using some of the new materials.

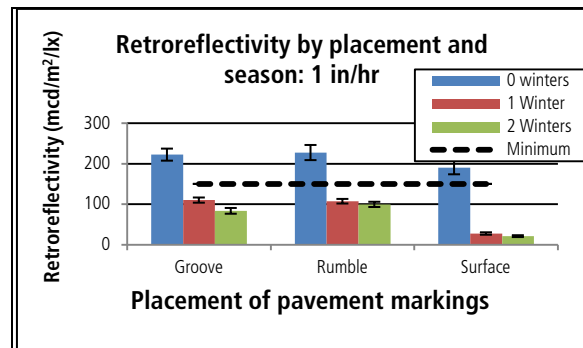
For each marking material studied, the researchers determined the traditional service life and a “wet night visibility” service life with respect to a minimum recommended brightness measure of 150 mcd/m<sup>2</sup>/lx under 1 in/hr of rain. In the context of a study period that started with a winter that was much more severe than usual, only one marking studied had a wet night visibility service life of more than 1 year. For some markings, it was as short as 3 months. It was found that placing markings in grooves and rumble strips improved the retroreflective performance (amount of light reflected back to drivers’ eyes) over the life of the marking compared to markings installed on the road surface.

**Background** At the request of VDOT’s Traffic Engineering Division, the Virginia Center for Transportation Innovation and Research (VCTIR) contracted with VTTI to conduct a multiphase research project to help develop a performance-based specification for the wet night visible pavement markings. Previous phases of this project examined the ability of motorists to detect pavement markings during wet night conditions. Those findings were used to develop performance measures for evaluating wet night retroreflectivity of pavement marking materials.

In the previous project phases, marking materials were placed only on Virginia’s Smart Road, managed by VTTI. In the current Phase IV study, VTTI placed six pavement markings using the wet night visible materials on U.S. 460 near

Blacksburg, Virginia, under traffic. The study evaluated the performance and durability of the pavement marking materials under the damaging impact of traffic, snowplow operations, and weather.

**Research and Recommendations** VTTI evaluated the markings using retroreflectivity and visibility measures and the responses of human research subjects as they detected the wet markings while driving in natural rain conditions. The numbers of snowplow crossings and chemical treatments were recorded. Markings were placed on the pavement surface, in a groove and in a rumble strip. Retroreflectivity was measured six times between May 2009 and April 2011. At the last measurement, the retroreflectivity of all markings in active rain conditions had dropped below the target minimum brightness of 150 mcd/m<sup>2</sup>/lx, but the markings still provided a benefit during dry conditions.



The study recommends that VDOT place pavement markings in grooves or rumble strips, with priority on high-speed and high-volume roadways. The pavement markings on U.S. 460 from this study were monitored through spring 2013. The results of this monitoring, along with additional cost/benefit analyses by VDOT and VCTIR staff, will assist VDOT in revising or developing policies and practices for the use and placement of pavement marking materials.

For the full report, see [VCTIR 12-R13](#). For more information about the research, contact Benjamin H. Cottrell, Jr., P.E., VCTIR associate principal research scientist, at [Ben.Cottrell@vdot.virginia.gov](mailto:Ben.Cottrell@vdot.virginia.gov).

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