

Driving innovation in pavement markings

TMMA supports standardizing 'Lag/Shadow' contrast pattern



Indiana DOT's newly updated design manual features the inclusion of contrast markings for concrete on certain interstate segments.

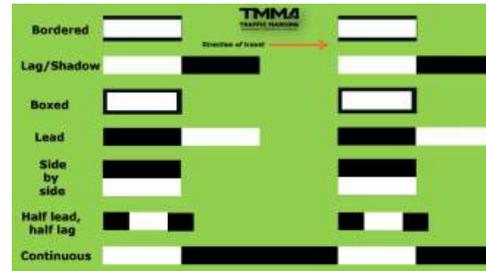
MT. OLIVE, N.C. - Nearly every day, blinding glare from the sun puts motorists at a high risk for a crash.

Sun glare, says the National Highway Safety Administration, causes about 9,000 car crashes each year in the U.S. Statistically, that makes sun glare on road surfaces the second most environmentally related reason for a car crash, right after slick wet roads.

Sun glare not only significantly reduces a motorist's ability to see and understand pavement markings, glare also impacts a self-driving vehicle's ability to see important pavement markings with its cameras that help keep the vehicle on its course.

To improve a pavement marking's visibility in adverse conditions, researchers started tackling the problem decades ago, experimenting with black paint to give pavement markings a distinctive contrast to make them more visible, especially on concrete surfaces.

The popularity and benefits of contrast pavement markings caught on and today motorists can see them on many roadways and across bridge decks in most U.S. states, in Canada and throughout much of Europe. The added contrast gives more clarity to the marking



TMMA supports the Lag/Shadow contrast pavement marking pattern that's already widely used by many DOTs. Experts say the Lag/Shadow pattern works best with self-driving vehicles whose lane-keeping cameras depend on clean, visible lane markings.



An Arkansas DOT Twitter/X post from earlier this year announced that state's contrast pavement marking campaign to "increase. safety and visibility."



that benefits the motorist as well as the cameras and navigation systems in autonomous, or self-driving vehicles.

ALREADY IN USE, MORE ON THE WAY

Although a specific contrast pavement marking pattern has not yet been standardized in the U.S. by the U.S. Dept. of Transportation, many state DOTs have experimented, installed, or have plans to install contrast pavement markings on their roadways.

A good example is California, where black contrast paint is being applied in areas where severe glare has been identified as a problem. Edge lines in that state are another target for black contrast paint to improve visibility.

This past spring, KTHV television in Little Rock, Arkansas reported the Arkansas DOT was placing contrast pavement markings on 380-miles of divided concrete highway across that state to benefit motorists as well as computer-vision vehicles.

"It's a low-cost solution to help safety as far as reducing accidents because the motorist and autonomous vehicles can help sense the lane lines better," said David Weston, assistant division head of maintenance for Arkansas DOT.

Weston also said, "Sometimes the white skip lines have a tendency to lack visibility due to sunlight glare during the day. This will help enhance those lane markings."

STANDARDIZATION: PREPARING FOR A SELF-DRIVING FUTURE

In preparation for the next reauthorization of America's highway bill, state DOTs are looking closely at their infrastructure assets. These agencies must prepare a national transportation system that seamlessly supports self-driving cars and e-trucks that will move billions of dollars of commerce throughout the network. TMMA's board of directors recently approved several critical transportation policies for the next highway bill that propose extensive use of pavement marking products and the technology that goes into them to support any future transportation system.

One of TMMA's new policies is a recommendation that the Lag/Shadow contrast pattern be adopted by all transportation agencies across the county. Not only is the pattern already widely favored by many DOTs who are deploying contrast pavement markings, the pattern is also the choice of automotive safety experts who say the pattern is most effective at keeping motorists on course.



New contrast pavement markings guide the way along a bridge deck in Dahlgren, Va.

New member welcome

TMMA extends a warm welcome to two new companies who have joined the association since the last issue of *The Centerline*.

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WJ Group Limited

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"The lag pattern in which the length and width of the marking equals the original white provides more material with which to recognize the pattern," said Andrew Whydell, chair of the Automotive Safety Council's Active Safety Committee. "This is especially helpful in conditions where the glare is creating a white out condition."

TMMA's policy on contrast markings also asks DOTs to use contrast on markings they temporarily install in roadway work zones. Several states, including California, Wisconsin, Texas and Kentucky as well as New Zealand and Canada have experimented with these new markings.

In a 2022 study released by the National Cooperative Highway Research Program, seven distinct contrast pavement marking patterns were reported as currently in use on roads in the U.S. The study revealed the Bordered, as well as the Lag/Shadow patterns, are the two most commonly used patterns by state DOTs by wide margins. TMMA President and CEO Rob Dingess said other patterns contain lesser amounts of pavement marking materials, making them an easy miss by motorists or a vehicle's camera.

"Other pattern options, like the bordered or boxed versions, do not offer enough 'pixels,' if you will, for a vehicle's cameras to adequately capture the information," Dingess said. "The other border patterns are too small."

Dingess said leveling the playing field through standardization using the Lag/Shadow pattern will ensure motorists and the vehicles they drive maintain high levels of pavement marking visibility on whatever road they travel.

"In addition to the immediate safety benefit for motorists, the Lag/Shadow pattern works best with self-driving vehicles whose lane keeping cameras depend on clear, visible lane markings," Dingess said. "Standardization of these important pavement markings will ensure safer roads from everyone and will unquestionably save lives."

Dingess said TMMA's marking materials manufacturers continue to work with U.S. and European automotive industries to help determine the most effective contrast patterns for motorists while improving the performance of an automobile's own computer vision technology.

(Approved in August by TMMA's board of directors, TMMA's new reauthorization policies will be released publicly over the next several months – Ed.)



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