



TMMA Policy Document (Approved: August 13, 2024)

The road marking industry is growing and changing rapidly. Policymakers are struggling to understand how best to prepare their road networks for automated vehicle technology. TMMA was initially organized by road marking material manufacturers to accelerate the adoption of policies and standards to support camera-based lane keeping technologies. The first set of proposed policies reflect that emphasis. TMMA's four key focus areas are automated vehicles, vulnerable road users, sustainability, and enforcing standards and specifications. Expect additional policies developed by our technical and government relations committees.

These policy proposals were developed to match the global focus on markings and machine vision. Everywhere automotive vehicles are sold, or automated freight operates, agencies will seek further guidance. Once basic principles are established, regional markets will need to determine when to adopt and how to prioritize. The policies related to the United States market are tailored to address the reauthorization of the U.S. federal-aid highway program which expires in November 2026.

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Introduction

The Traffic marking Manufacturers Alliance recognizes that the transportation industry operates under a wide variety of government structures posing unique policy challenges. TMMA's policies focus on technical issues for agencies seeking to prepare their roads to support machine vision-based driver assistance and automated driving technologies. The technical recommendations are largely derived from automotive industry briefings in response to U.S. Federal Highway Administration's request for information. TMMA thanks the National Committee on Uniform Traffic Control Devices (NCUTCD) for vetting many of the proposed changes and establishment of a connected and automated vehicle joint task force. These efforts directly led to the development of a new Part 5 within the U.S. Manual on Uniform Traffic Control Devices (MUTCD).

While there have been attempts to harmonize road network organization and standards like the global network found within the aviation and maritime industries, significant differences remain. TMMA was formed by companies committed to maximizing the value of automated driving technologies to create a safer, sustainable, and more efficient road network for all road users. These reauthorization policies will set the stage for better standardization and quality control.

TMMA's goal is to optimize the role of road markings so that vehicle cameras can "see" all pavement markings including lane lines, perceive pedestrian crossings, and identify designated bike lanes. Our first policy statement, "Automated Road Readiness – Road Markings," affirms our assertion that the first wave of camera-based infrastructure standards should benefit all road users. Every policy proposed has research demonstrating value to human drivers. They have also been vetted and supported by the automotive industry.

When agencies invest in road markings, that investment satisfies a national requirement or supplements safety, based on engineering judgement. A "safe system" approach to road marking treatments does not merely install the mandated markings. It seeks to apply and maintain supplemental marking treatments, like dedicated bike lanes or high-visibility crosswalks, so that all road user safety is enhanced. TMMA's policy titled: "Road Marking Minimum Performance Standards," seeks to remind agencies that it is not enough to install a treatment. These systems, when installed, must be maintained.

TMMA will continue to develop new policies designed to assist agencies in preparing for a bold new future. We stand ready to make that future a reality.

TMMA Policies
(Enacted August 13, 2024)

1. **Strategic Road Readiness Policy:** TMMA supports dedicating national and global funding programs designed to ensure lane markings are properly installed, monitored, and maintained, especially on roadways important to a nation’s economy, defense, and mobility.

2. **Automated Road Readiness - Road Markings.** TMMA supports national policies, programs, and funding mechanisms to ensure that road markings are installed and maintained for the safe operation of human drivers and machine vision technologies. Agencies preparing roadways for machine vision driving technologies should adopt the following minimum road marking performance standards:
 - **Standard “Normal” Marking Width:** A standardized longitudinal marking width of 150 millimeters (6 inches).
 - **Wide Markings (Gore):** A minimum of 250 millimeters (10 inches) and a maximum of 300 millimeters (12 inches) when paired with a Standard “Normal” line of 150 millimeters (6 inches).
 - Dotted edge line extensions installed along all exit and entrance ramps.
 - When agencies install contrast marking treatments for broken (skip) lane lines, a black lag pattern matching the dimensions of the broken lane line of the same width and length.
 - Agencies should require that contractors shifting lanes as a part of road maintenance install temporary markings that incorporate a designated contrast color. Colors currently in use as contrast in work zones are orange in North America and yellow in Europe.
 - Agencies should establish a pavement marking management system designed to ensure highway markings are maintained to provide proper lane localization information for computer vision-based systems. Agencies are encouraged to develop minimum performance criteria that ensure highway marking presence and visibility.
 - National and integrated trade markets including NAFTA, Mercosur and the European Union should develop joint agreements designating highway routes that will be maintained in accordance with minimum marking performance criteria.

3. **Road Marking Minimum Performance Standards.** In every country, standards require the installation of lane markings to provide guidance to motorists, designated safe space zones for pedestrian crossings, and the creation of a framework for bicycle lanes. Where national policy requires or encourages the installation of road markings, TMMA supports the establishment of uniform application, inspection, and maintenance standards to maintain designed safety levels of performance for all road users.

Examples include lane lines, edge lines, centerlines, and crosswalks at designated non-intersection locations.

TMMA supports using retroreflectivity as a baseline pavement marking maintenance standard. When markings are installed in areas where illumination is provided, agencies should develop new methods of monitoring marking condition. The use of automated camera system technologies designed to evaluate the structural integrity and presence of marking systems should be encouraged.

Agencies developing “safe system” roadway policies often install supplemental safety treatments. Examples include crosswalks at controlled intersections, designated bike lanes, the installation of high friction surfacing at intersections and curves, and the use of color lane surfaces in bike lanes, transit lanes and designated toll lane facilities. Agencies seeking a “safe system” approach should also develop a method to ensure that these treatments are well-maintained.

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United States IIJA Reauthorization

Strategic Road Readiness Initiative (SRRI)

(TMMA supports dedicated funding to ensure lane markings are properly installed, monitored, and maintained, especially on roadways important to a nation's economy, defense, and mobility.)

The United States' National Highway System is a network of 222,000 miles of roadways carrying roughly 55% of vehicle miles traveled. The NHS includes the Interstate Highway System, the Strategic Highway Network, major strategic highway network connectors and intermodal connectors, and both urban and rural principal arterials. The Federal-Aid Highway funded National Highway Performance Program invests approximately \$30 billion annually to maintain the condition and performance of the NHS. TMMA requests that Congress enact a new Strategic Road Readiness Initiative (SRRI) funded at \$2.3 billion annually to ensure that road markings on the NHS are properly installed and maintained in accordance with national standards and recommendations (11th Edition MUTCD Section 3A.05; Section 5B.02 Markings).

Background

The remainder of the 21st century will be shaped by countries that incorporate new microchip and logistics technologies to effectively compete in global markets. In 2022, the United States entered this economic arms race when Congress passed the Chips and Science Act, and the Infrastructure Investment and Jobs Act. These laws included major provisions designed to boost United States domestic chip manufacturing and its logistics and trade capabilities. While the CHIPS Act restored U.S. capacity to manufacture high-tech microchips, the IIJA included equally important language to prepare roadways for automating the U.S. freight network. It instructed the Federal Highway Administration to accelerate the release of an updated traffic control manual (MUTCD), establish minimum pavement marking visibility standards, and “support the safe testing of automated vehicle technology and any preparation necessary for the safe integration of automated vehicles onto public streets.”¹ It also contained language requiring FHWA to update the MUTCD every four years.

Last December, the FHWA released the 11th Edition of the MUTCD in which automated vehicles are defined as “technology that automates some or all aspects of the driving task to assist or replace the human vehicle operator.”² The 11th Edition also included a new section dedicated to automated vehicles in Part 5, with recommendations on how road agencies could begin preparing their roadway networks. Combined with the CHIPS Act, the message from Congress is clear, the United States will compete in a global economy dominated by advanced technology and automated vehicle and freight operating systems.

¹ Status of Rulemaking for the Eleventh Edition of the MUTCD, March 2, 2022.

² Manual on Uniform Traffic Control Devices, 11th Edition, 2023, Section 1C.02, Standard 03, 65. Driving Automation System.

Building on these provisions the next Federal-Aid Highway reauthorization needs to strengthen the NHPP to provide a “safe system” approach to automated logistics technologies, such as automated freight. Unlike traffic signs and signals, lane markings are on the road and prone to accelerated wear. In cold weather states, markings are often subject to snowplows. While agencies are countering these effects by installing grooved marking systems, markings require monitoring to ensure that federal maintenance standards are met.

TMMA’s proposal dedicates less than 10% of funds allocated for NHPP for the installation and maintenance of lane markings. Once States certify that NHS routes meet minimum visibility requirements, agencies are encouraged to establish minimum maintenance criteria for pedestrian, bike, and transit facility markings and color lane surfaces installed on the NHS. Once established, agencies are permitted to use SRRI funds to maintain these systems. SRRI funds should be exempt from current NHPP flex provisions.

Sustainable and Healthy Streets Initiative

(TMMA supports incorporating the Safe Streets and Roads for All Grant Program (SS4A) into a new Sustainable and Healthy Streets Initiative (SHSI).)

Background

The Infrastructure Investment and Jobs Act reframed federal policy beyond highways to “promote the safety, inclusion, and mobility of all users...”³ This change, found in Title 23, Section 109(d), is the authorizing legislation for the MUTCD. It is followed by language directing the Secretary of Transportation to release an updated MUTCD within 18 months and every subsequent four years.⁴

The IIJA amended the Highway Safety Improvement Program (HSIP) planning process. It required states to immediately develop a vulnerable road user (VRU) safety assessment. That safety assessment will now become an integral part of all Strategic Highway Safety Plans (SHSP). The IIJA created the SS4A grant program to assist local governments in developing systemic approaches to prevent deaths and serious roadway injuries. SS4A also provides funds to implement these plans.

TMMA supports the IIJA changes rebalancing the Federal Aid Highway Program’s focus. The IIJA has crafted a future in which the safety and efficiency needs of all road users in cities and towns may be discerned. TMMA proposes that Congress match IIJA’s vision with a permanent funding program designed to support U.S. cities and towns in implementing their comprehensive safety plans.

³ Section 11129. Standards. Manual on Uniform Traffic Control Devices, Public Law No. 117-58 (11/15/2021), Infrastructure Investment and Jobs Act (IIJA).

The Sustainable and Healthy Streets Initiative (SHSI), funded at \$5.5 billion annually, would permit local, regional, and Tribal communities to request grants designed to implement SS4A comprehensive safety plans or to install pedestrian and bicyclist safety improvements informed by a “safe system” approach. This program would permit agencies to focus on the latest innovations included in updated MUTCD editions. Unlike SS4A, SHSI would permit State agencies to enter into joint agreements with cities and towns and to allocate HSIP federal dollars or State funds to supplement local government resources. This change would expand the number of eligible applicants and project expertise available to local governments.

The Federal share payable for any part of an SHSI project that is also eligible under Title 23, Section 120(C), will be reimbursed at 100%. All other SHSI eligible projects are to be reimbursed at 80%. Funds expended under SHSI are not calculated against a State’s annual obligation limit and are not eligible for Title 23, Section 126 transferability.

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