National Committee on
Uniform Traffic Control Devices

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Item Number: 26A-MKG-01

# NCUTCD PROPOSAL FOR CHANGES TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

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| **COMMITTEE / TASK FORCE:** | Markings Technical Committee |
| **ITEM NUMBER:** | 26A-MKG-01 |
| **TOPIC:** | Interim Approval for Orange Color as a Supplemental Marking |
| **ORIGIN OF REQUEST:** | Orange Marking MCTF |
| **AFFECTED SECTIONS OF MUTCD:** | 3A.03, 6J.02 |

**DEVELOPMENT HISTORY:**
Approved by Markings TC: ..... 01/08/2026
Approved by Temporary Traffic Control TC:..... 01/08/2026
Approved by NCUTCD Council: .....

*This is a proposed change to the MUTCD that has been developed by a technical committee, joint committee, or joint task force of the NCUTCD. The NCUTCD is distributing this to its sponsoring organizations for review and comment. Sponsor comments will be considered in revising the proposal prior to NCUTCD Council consideration. This proposal does not represent a revision of the MUTCD and does not constitute official MUTCD standards, guidance, options, or support. If approved by the NCUTCD Council, the recommended changes will be submitted to FHWA for consideration for inclusion in a future MUTCD revision. The MUTCD can be revised only through the federal rulemaking process.*

**SUMMARY:**
The purpose of this document is to request FHWA to issue an Interim Approval for the optional use of orange-colored pavement markings to supplement and enhance the conspicuity of yellow and white longitudinal lane markings installed in TTC zones.

**DISCUSSION:**
The Markings and Temporary Traffic Control TCs formed a multi-committee task force to review experimental applications of orange markings in temporary traffic control zones. They developed this Interim Approval request on the Optional Use of Orange Color for Supplemental Markings in Temporary Traffic Control Applications. The benefit of this enhanced conspicuity treatment is especially acute in the initial phase of TTC zone installation and at locations where multi-stage TTC zone installation and removal practices result in multiple “ghost” patterns. Other benefits from the use of supplemental orange treatments are situations in which pavement rejuvenation processes create false lane indicators, especially at night.

The Interim Approval is to be issued in accordance with Section 1B.07 Interim Approvals, of the 11th Edition of the Manual on Uniform Traffic Control Devices (MUTCD). Interim Approval allow interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of

use of an existing traffic control device, or a provision not specifically described in the *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)*.

This Interim Approval permits agencies to designate and use orange as a supplemental contrast pavement marking treatment in TTC zones. Interim Approval permits agencies to install orange supplemental contrast in conjunction with broken white lane lines, as part of a TTC zone. The installation of orange supplemental contrast broken lane line markings is permitted in a lag contrast pattern (see interim Figure1). The Interim Approval grants agencies that install solid white lane lines and/or a solid yellow edge line on the left-hand side of a TTC zone, the option to supplement these lane lines with orange solid longitudinal markings placed contiguous to the outside edges of the lines defining the temporary lane (see interim Figure 2). In multi-lane configurations where internal solid lane lines are installed, solid orange supplemental lane lines may be placed on the right-hand-side of the solid white internal longitudinal lane lines (see Interim Figure 3).

**Figure 1. Lag Bordered Pattern**

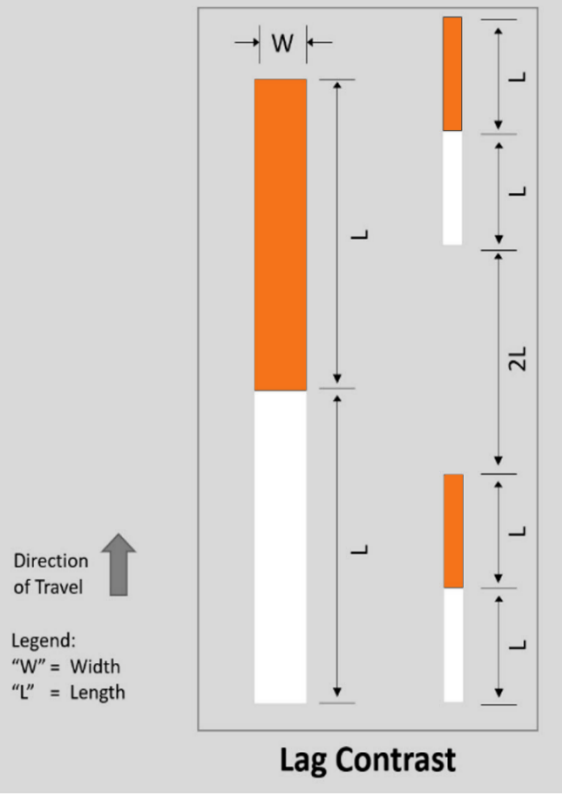
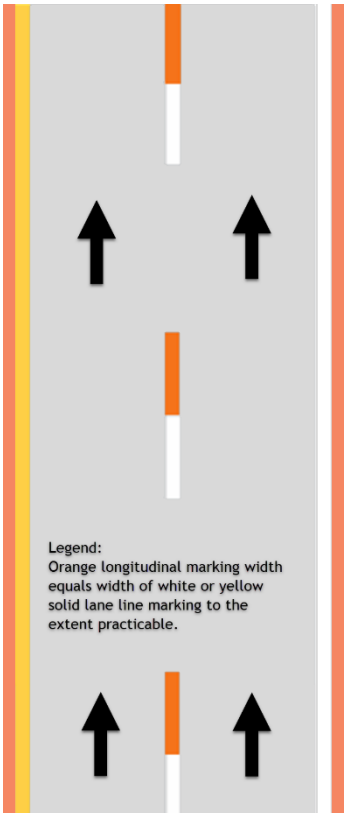



**Figure 2. Orange Contrast Solid Line**



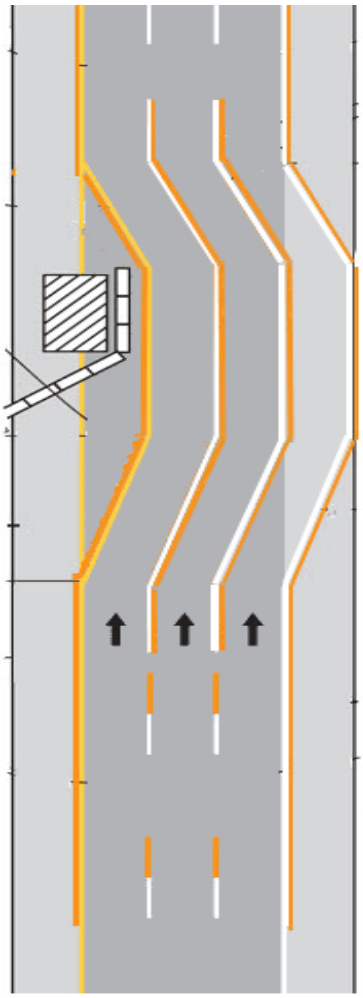

**Background:**

Congress granted the U.S. Secretary of Transportation authority to establish national standards for traffic control devices in the 1966 Highway Safety Act. The FHWA, as part of the 1971 MUTCD, officially designated orange as the color for roadway construction. A half-century later, U.S. motorists ubiquitously recognize and equate the color "orange" to signify a roadway work zone. Chapter 3A of the 11th MUTCD Edition contains provisions regarding pavement marking colors and permitted use. Yellow and white pavement markings are standard regulatory colors. Blue may be applied as a supplemental marking for parking spaces designated for use by disabled persons. Purple may be applied as a supplemental marking to identify toll plaza approach lanes. Chapter 3F contains provisions specifying how purple pavement markings may be used to supplement yellow and white longitudinal markings installed at toll plaza approach lanes. Black markings are permitted to enhance yellow or white markings and to provide contrast on light colored pavements.

In 2013, FHWA granted Wisconsin DOT permission to experiment with orange longitudinal pavement markings for use within temporary traffic control zones. The Wisconsin DOT experiment used orange as a stand-alone color. The experiment sought to determine if orange would improve conspicuity during winter months when snow and salt diminished motorist recognition of white lane markings. The Kentucky Transportation Cabinet and the North Texas Tollway Authority (NTTA) also were permitted to experiment with orange as a stand-alone TTC zone treatment. In 2020, Caltrans was granted permission to experiment with orange markings as a supplemental marking in TTC zones. Michigan DOT installed stand-alone orange markings in 2022 to permit evaluation by machine vision ADAS and AV technology developers. In 2023, Washington State DOT and Indiana DOT received permission to install orange markings as a supplemental marking.

Agencies across the United States are showing increased interest in using orange as a supplemental marking to increase work zone lane recognition. The experiments conducted by Michigan DOT determined that machine vision systems can recognize orange. Developers of more advanced ADAS and AV system technologies expressed a strong preference for orange as a supplemental marking, especially on highway applications. Human surveys and discussions with machine vision system developers affirm that the orange supplemental markings assist in recognizing TTC zone lane configurations and decreased the likelihood of confusion due to ghost markings or from crack seal treatments. In experiments where orange was used as a stand-alone treatment, respondents expressed concerns related to a lack of visibility at night.

**Figure 3. Temporary Multi-Lane TTC Lane Shift Orange Contrast**



**Research on Orange Marking Supplemental TTC Color:**

The NCUTCD supports issuing an Interim Approval for the use orange as a supplemental pavement marking treatment. The request is based on the results of experiments conducted by multiple agencies. Experiments of orange as a supplemental pavement marking demonstrated strong road user preference. Nearly 90% of motorists surveyed indicated that orange supplemental pavement markings increased awareness of the work zone. Large majorities of surveyed motorists indicated that orange supplemental markings increased awareness of their operational speed and improved their ability to stay within the TTC zone designated lane. Eight in 10 motorists surveyed in Indiana said that the orange supplemental marking was more visible than either the white or yellow markings.

Agencies that installed orange markings as a supplemental or contrast treatment reported a strong preference for orange marking benefits in the initial stages of TTC zone application. In multi-stage TTC zone highway situations, orange contrast treatments increased conspicuity and reduced motorist confusion often attributable to maintenance-related pavement treatments or from the installation and removal of previous temporary marking patterns. In Washington State, surveyed 85% of motorists responded that orange markings “increased their awareness” within the work zone. Nearly 90% of Washington State motorists surveyed, “wanted to see orange striping used more in work zones.”

The daytime and nighttime chromaticity requirements were developed based on independent material testing submitted to KTA by nine different material manufacturers. Accelerated weather testing in accordance with ASTM G154 – 23 Standard Practices for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Materials. Samples were exposed for a total of 144 hours with rotation after 72 hours. The daytime orange chromaticity requirements are identical to the orange color found in Table 1 to Appendix to Part 655, Subpart F-Daytime Color Specification Limits for Retroreflective Material with CIE 2o Standard Observer and 45/0 (0/45) Geometry and CIE Standard Illuminant D65. The Nighttime chromaticity requirements are designed to minimize color shift towards yellow.

The Interim Approval for the use of orange as a supplemental pavement marking does not create a new mandate compelling its use but allows agencies to install orange supplemental or contrast pavement marking treatments, pending official MUTCD rulemaking, to enhance the conspicuity of TTC zones.

**Conditions of Interim Approval:**

The FHWA is requested to issue a memorandum stating that FHWA grants Interim Approval to any jurisdiction that submits a written request to the Office of Transportation Operations for the optional use of orange supplemental contrast colored pavement markings. A State may request Interim Approval for all jurisdictions in that State. Jurisdictions using orange colored pavement markings under this Interim Approval must agree to comply with the technical conditions detailed below, maintain an inventory list of all locations where orange colored pavement markings are installed, and to comply with Item D in Paragraph 10 of Section 1B.07 of the MUTCD 11th Edition, which requires:

> "An agreement to restore the site(s) of the Interim Approval to a condition that complies with the provisions in this Manual within three months following the issuance of a Final Rule on this traffic control device; and terminate use of the device or application installed under the interim approval at any time that it determines significant safety concerns are directly or indirectly attributable to the device or application. The FHWA's Office of Transportation Operations has the right to terminate the Interim Approval at any time if there is an indication of safety concerns."

The use of orange lane markings as a supplemental contrast traffic control device with yellow or white markings should be optional and available for use within TTC zones as described in Section 6B.02 and as described above. Orange should receive interim approval for use as an approved standard supplemental color under Section 3A.03 Colors.

1. General Conditions:

The use of orange as a pavement marking supplemental color is optional. If an agency opts to use orange colored pavement markings under this Interim Approval, the following design and installation requirements shall apply, and shall take precedence over any conflicting provisions of the MUTCD.

2. Allowable Uses:

The use of orange pavement marking supplemental color is restricted to TTC zones installed on highways.

**Design of Orange Colored Pavement Markings:**

a. The daytime chromaticity coordinates[1] for the color used for orange road markings is as follows:

| 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.558 | 0.352 | 0.636 | 0.364 | 0.570 | 0.429 | 0.506 | 0.404 |

[1] Title 23, Chapter 1, Subchapter G, Table 1, Appendix to Part 655, Subpart F-Daytime Color Specification Limits for Retroreflective Material with CIE 2° Standard Observer and 45/0 (0/45) Geometry and CIE Standard Illuminant $D_{65}$.

b. The nighttime chromaticity coordinates[2] for the color used for orange road markings is as follows:

| 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.520 | 0.405 | 0.575 | 0.425 | 0.600 | 0.400 | 0.525 | 0.375 |

c. When used in conjunction with broken white lane lines in TTC zones, temporary orange colored pavement markings are to be installed as an orange contrast marking in a lag contrast pattern the same dimensions as the broken white lane line and placed immediately following each line segment (see interim Figure 1).
d. When used in a TTC lane defined by a solid white lane line on the right side and by a solid white lane line or solid yellow edge line on the left side, temporary orange solid longitudinal pavement markings are to be applied immediately adjacent to the outside edge of each line. The temporary orange pavement marking should follow the alignment of the white or yellow solid line, and match, to the extent practicable, the precise width (See interim Figure 2).
e. In multi-lane TTC zone configurations where solid white lane lines separate travel lanes, temporary orange longitudinal pavement markings should be placed adjacent to the right side of each solid white lane line (See interim Figure 3).
f. Orange colored pavement markings serve as a supplemental retroreflective traffic control device or as a contrast marking. When used as a contrast-marking, orange colored pavement markings may be retroreflective.

Additional Information:

- Effectiveness of Contrast Markings on Roadways and Orange Markings in Work Zones, Williamson, M., & Lin, P. (2023). (Joint Transportation Research Program Publication No. FHWA/IN/JTRP-2023/27); West Lafayette, IN: Purdue.
- Orange Supplemental ed Temporary Pavement Delineation in Construction Zones, Barbara Linke, Wilderich White, Kin Yen, Felicia Fashanu, Nathan Byrd, University of California, Davis (UCD), Department of Mechanical & Aerospace Engineering, 09/30/2023.
- Temporary Orange Contrast Markings Manual on Uniform Traffic Control Device Experimentation, Scott Davis, Steve Haapala, Fredrick Lintz, Emily Nathan, 10/2025.

[2] Title 23, Chapter 1, Subchapter G, Table 2 to Appendix Part 655, Subpart F-Nighttime Color Specification Limits for Retroreflective Material with CIE 2° Standard Observer and Observation Angle of 0.33°, Entrance Angle of + 5° and CIE Standard Illuminant A.