Wisconsin Manual on Uniform Traffic Control Devices

11th Edition Overview

Part 5 – Traffic Control Devices for Automated Vehicles

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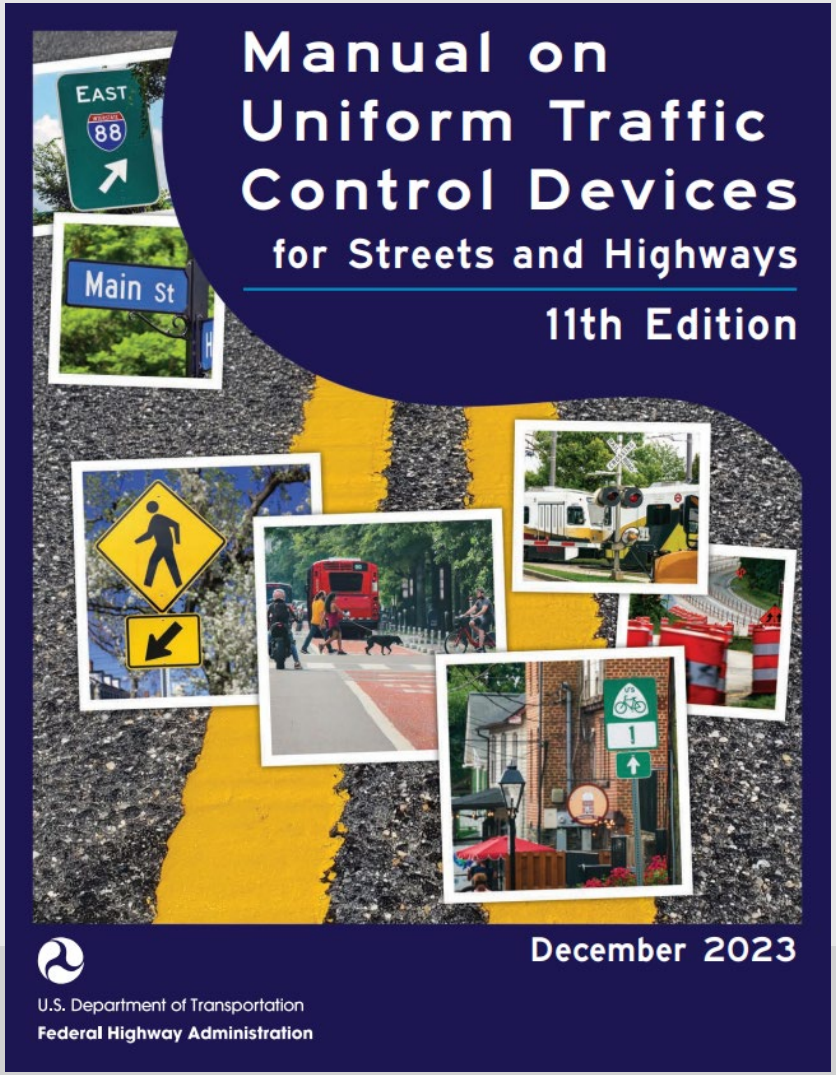
Manual on Uniform Traffic Control Devices

MUTCD \ˈem-yü-ˌtē-sē-dē\[1] *n* (ca. 1935): the national standard for traffic control devices on all roads open to public travel in the United States.

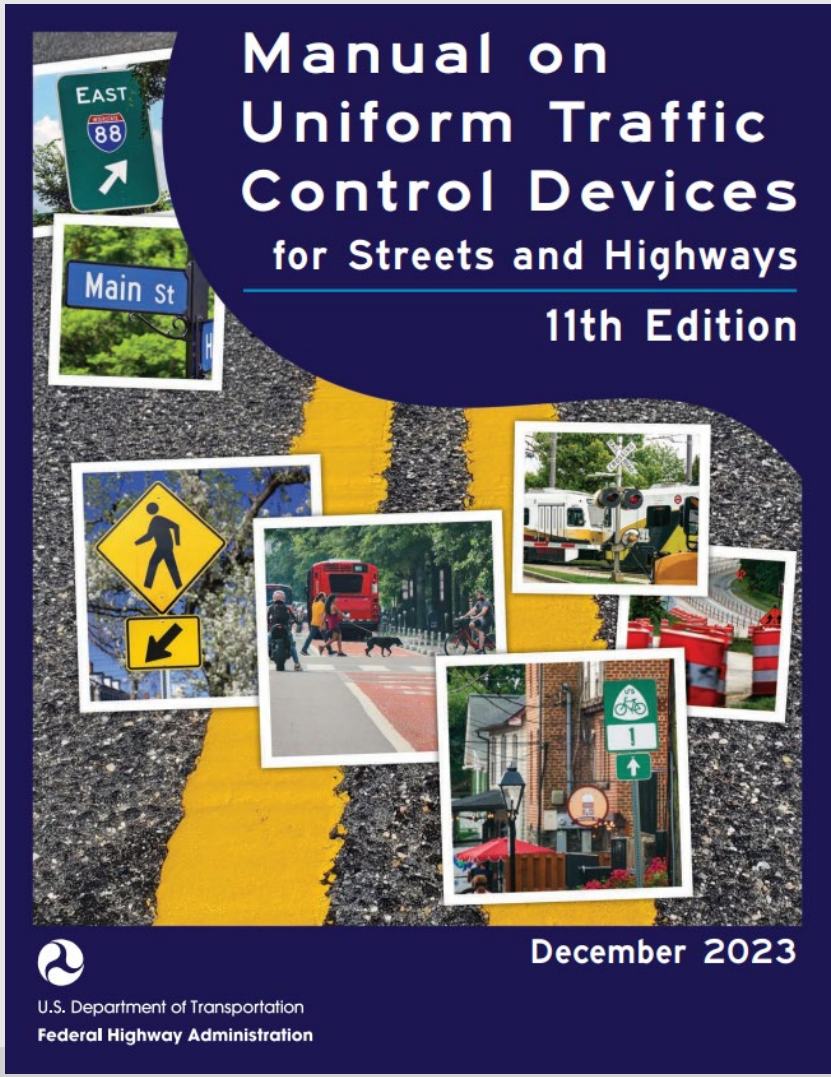
- Contains Standards and Guidelines for Traffic Control Devices
- Required for all Roadways Open to Public Travel – U.S. Code of Federal Regulations
- Essential to have nationwide consistency in traffic control standards



11th Edition of the MUTCD

- Wisconsin must adopt a state manual per State Statute 84.02(4).
- Local Units of Government must follow the manual, per State Statute 349.065
- Wisconsin Develops a State MUTCD (WMUTCD)

* State Supplements and State MUTCDs must be in **Substantial Conformance** w/ the National MUTCD



Development of the WMUTCD

Why Wisconsin Develops a State MUTCD

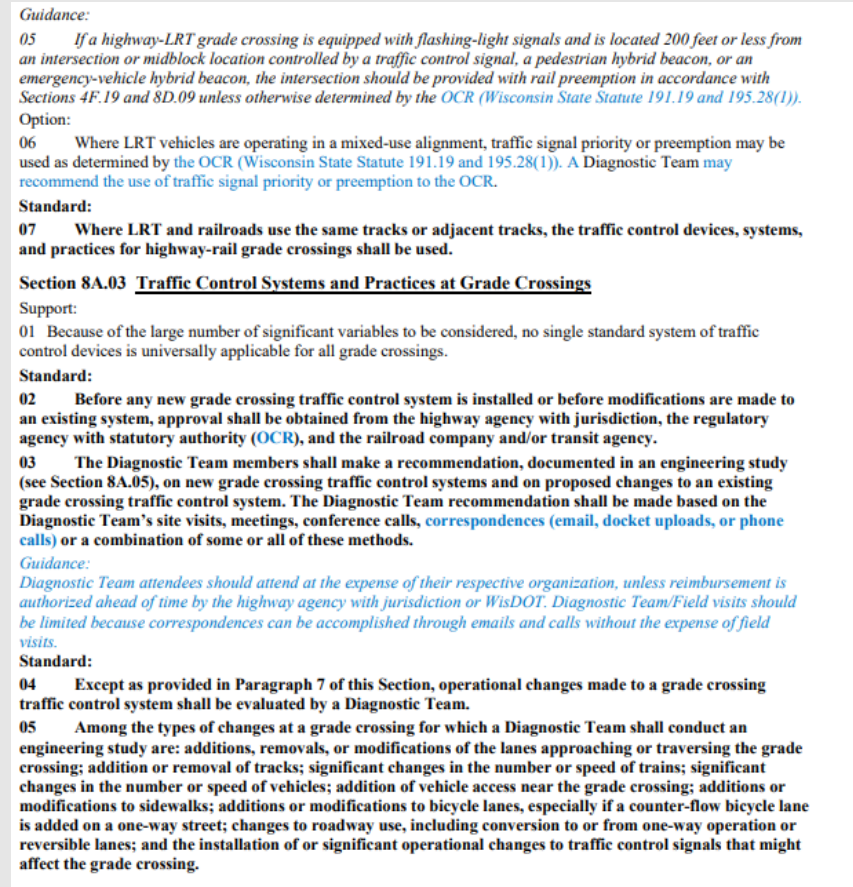
- Combines State Specific Standards, Guidelines and Statutory references with the Federal MUTCD language.
- Provide additional supporting information.
- Utilizing two separate documents (MUTCD and Supplement) is cumbersome for the practitioner.
- WisDOT officially combined the supplement and 2009 MUTCD in 2017.

Manual on Uniform Traffic Control Devices

Definitions of Headings

- **Standard:** required, mandatory, or specifically prohibited practice; “shall”; **bold text**
- **Guidance:** recommended practice, deviations allowed; “should”; *italicized*
- **Option:** statement of practice with no requirement or recommendation; “may”
- **Support:** informational statement, no degree of mandate

*WMUTCD-specific text is in blue



Guidance:

05 If a highway-LRT grade crossing is equipped with flashing-light signals and is located 200 feet or less from an intersection or midblock location controlled by a traffic control signal, a pedestrian hybrid beacon, or an emergency-vehicle hybrid beacon, the intersection should be provided with rail preemption in accordance with Sections 4F.19 and 8D.09 unless otherwise determined by the OCR (Wisconsin State Statute 191.19 and 195.28(1)).

Option:

06 Where LRT vehicles are operating in a mixed-use alignment, traffic signal priority or preemption may be used as determined by the OCR (Wisconsin State Statute 191.19 and 195.28(1)). A Diagnostic Team may recommend the use of traffic signal priority or preemption to the OCR.

Standard:

07 Where LRT and railroads use the same tracks or adjacent tracks, the traffic control devices, systems, and practices for highway-rail grade crossings shall be used.

Section 8A.03 Traffic Control Systems and Practices at Grade Crossings

Support:

01 Because of the large number of significant variables to be considered, no single standard system of traffic control devices is universally applicable for all grade crossings.

Standard:

02 Before any new grade crossing traffic control system is installed or before modifications are made to an existing system, approval shall be obtained from the highway agency with jurisdiction, the regulatory agency with statutory authority (OCR), and the railroad company and/or transit agency.

03 The Diagnostic Team members shall make a recommendation, documented in an engineering study (see Section 8A.05), on new grade crossing traffic control systems and on proposed changes to an existing grade crossing traffic control system. The Diagnostic Team recommendation shall be made based on the Diagnostic Team’s site visits, meetings, conference calls, correspondences (email, docket uploads, or phone calls) or a combination of some or all of these methods.

Guidance:

Diagnostic Team attendees should attend at the expense of their respective organization, unless reimbursement is authorized ahead of time by the highway agency with jurisdiction or WisDOT. Diagnostic Team/Field visits should be limited because correspondences can be accomplished through emails and calls without the expense of field visits.

Standard:

04 Except as provided in Paragraph 7 of this Section, operational changes made to a grade crossing traffic control system shall be evaluated by a Diagnostic Team.

05 Among the types of changes at a grade crossing for which a Diagnostic Team shall conduct an engineering study are: additions, removals, or modifications of the lanes approaching or traversing the grade crossing; addition or removal of tracks; significant changes in the number or speed of trains; significant changes in the number or speed of vehicles; addition of vehicle access near the grade crossing; additions or modifications to sidewalks; additions or modifications to bicycle lanes, especially if a counter-flow bicycle lane is added on a one-way street; changes to roadway use, including conversion to or from one-way operation or reversible lanes; and the installation of or significant operational changes to traffic control signals that might affect the grade crossing.

National Comittee on Uniform Traffic Control Devices

NCUTCD (www.ncutcd.org)

- National Committee on Uniform Traffic Control Devices, formed 1980
- Predecessor committees formed in 1931; wrote the 1935 - 1971 MUTCD editions
- Since 1971, committees have advised FHWA on MUTCD – initiating recommended changes, reviewing proposals, submitting comments on rulemakings

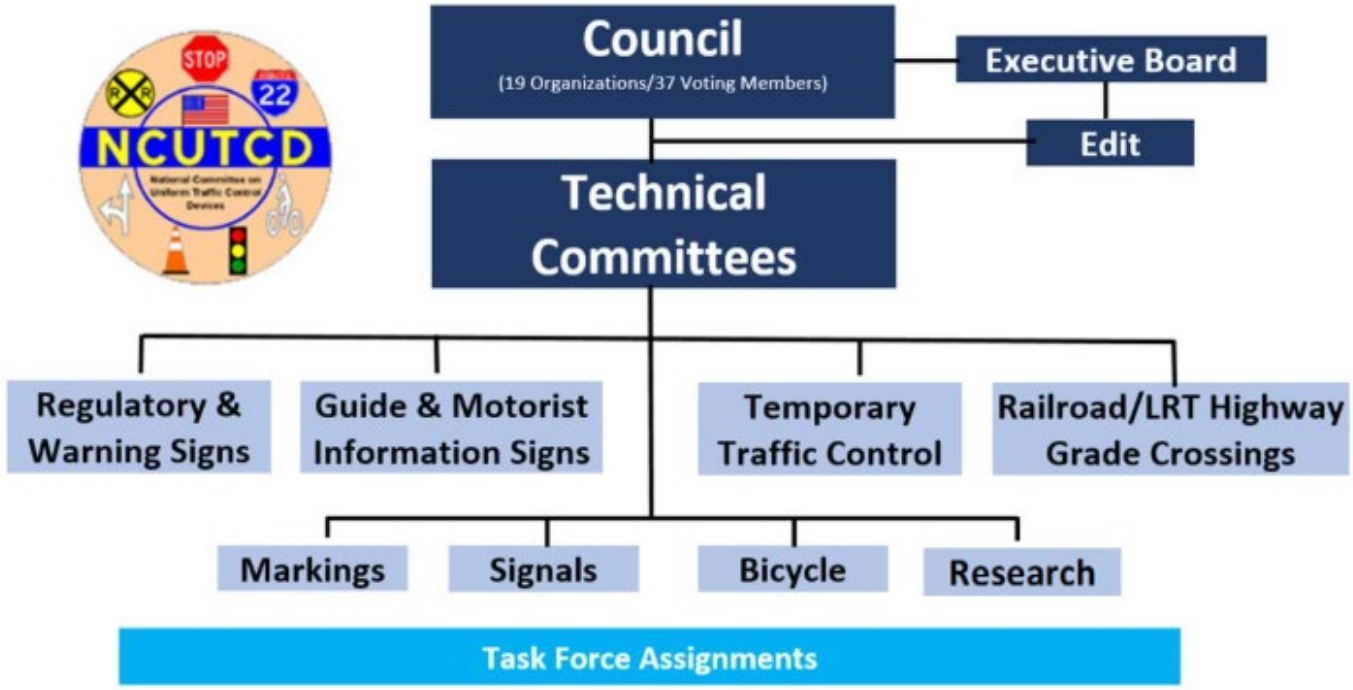
NCUTCD

- Focuses on standards and guidelines for traffic control devices
- Recommends proposed revisions to the MUTCD to FHWA (organization responsible for the Manual)
- Provides forum for professionals with diverse backgrounds to exchange information

NCUTCD Process

- Consensus-building process over time
- Utilize research/experimentation to improve existing devices or recommend new ones
- Procedure
  - *Technical Committee reviews completed research and/or experimentation*
  - *Draft proposal by technical committee*
  - *Review by sponsoring organizations*
  - *Revisions by technical committee*
  - *Discussed and voted on by Council*
  - *If approved, submitted to FHWA*

NCUTCD Organization



Part 5 Automated Vehicles

This Part is new for 11th Edition

- Describes different levels of vehicle automation (level 0 – level 5).
- Different sensor technology, including, but not limited to:

  Cameras, Radar, LiDAR, Ultrosonic and Infrared.

Part 5 Automated Vehicles

Reasoning for Automated Vehicle Section

- Provide guidance on how to design signs, pavement markings, and traffic control devices in a consistent and easy to read manner for various automated sensors.
- Agencies should adopt policies and practices to incorporate machine vision into their traffic control devices.

Part 5 Automated Vehicles

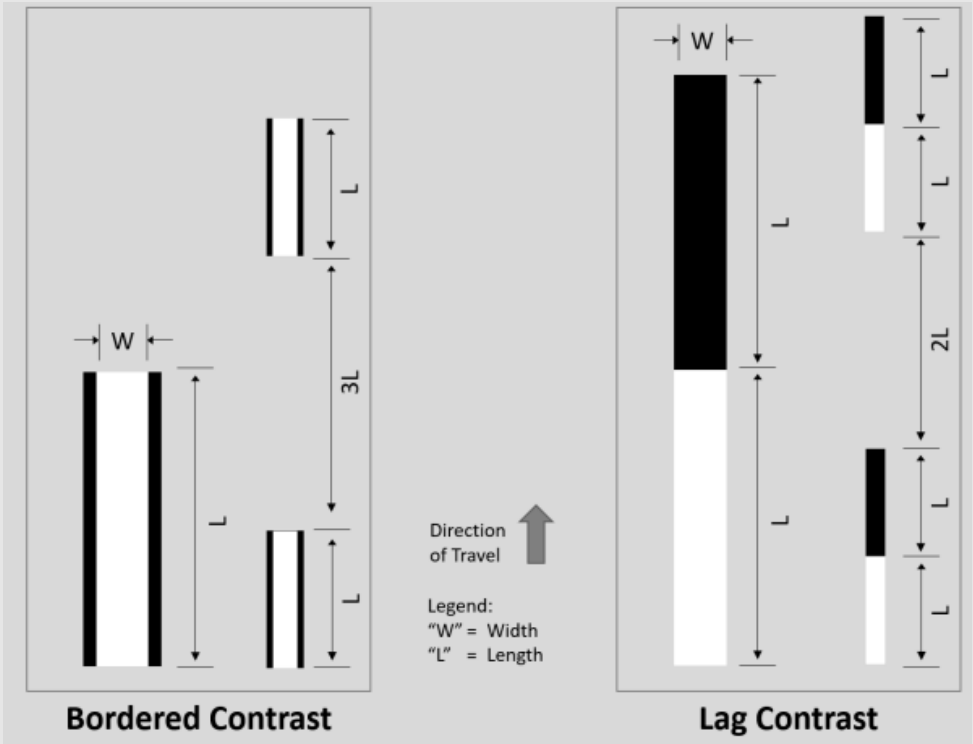
Signing Considerations

- New Standards allowing scanning graphics to be placed on signs. However, they shall not be visible to the human eye.
- Sign and information spreading important.
- Consistency in sign designs.

Part 5 Automated Vehicles

Marking Considerations

- Utilizing 6-Inch Pavement Markings.
- Dotted 6-Inch edgelines along entrance and exit ramps.
- Chevron markings in neutral areas of exit gores.
- Utilizing contrast pavement markings (black lag has better camera detection vs. bordered contrast).



Part 5 Automated Vehicles

Temporary Traffic Control Considerations

- Consistent type, spacing and mounting height of signs.
- Consistent use of END ROAD WORK sign.
- Utilizing 6-Inch Pavement Markings.
- Supplementing longitudinal markings with raised pavement markers.
- Full removal of unneeded markings.
- Pavement scarring, resulting from removed pavement markings can be a challenge…

Part 5 Automated Vehicles

Some final thoughts to consider…

- Guidance for Railroad Facilities.
- Guidance for Bicycle Facilities.
- Part 5 will grow over time. NCUTCD and FHWA working with Automated Vehicle OEM's on expanding language in Part 5.
- Importance of keeping up to date on the rapidly changing Automated Vehicle Technology and how it interacts with Traffic Devices.
- WisDOT is committed to reviewing our Traffic Devices to ensure they incorporate machine vision technology.