



# National Committee on Uniform Traffic Control Devices

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Item No.: 24A-TTC-05

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

**COMMITTEE / TASK FORCE:** Temporary Traffic Control TC  
**ITEM NUMBER:** 24A-TTC-05 (Previously Approved 20B-RW-03)  
**TOPIC:** Portable Changeable Message Signs and Arrow Boards  
**ORIGIN OF REQUEST:** Electronic Display Task Force  
**AFFECTED SECTIONS OF MUTCD:** Sections 6L.05 and 6L.06

After publication of the 2023 MUTCD, the NCUTCD rescinded all MUTCD prior recommendations. This proposed change is based on one of those prior recommendations.

### DEVELOPMENT HISTORY:

Previously Approved Recommendation 1/20/2021 (20B-RW-03)  
Approved by NCUTCD Council: 6/27/2024

*This is a proposal for recommended changes to the MUTCD that has been approved by the NCUTCD Council. This proposal does not represent a revision of the MUTCD and does not constitute official MUTCD standards, guidance, or options. It 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:

NCUTCD recommended changes to the MUTCD developed by the Electronic Display Traffic Control Task Force was sent to FHWA in January 2021 (20B-RW-03). The changes to Part 6 in the NCUTCD recommendation pertaining to Portable Changeable Message Signs and Arrow Boards were not incorporated into the 11<sup>th</sup> edition of the MUTCD. This proposal resubmits those proposed changes.

### DISCUSSION:

The proposed changes to Sections 6L.05 and 6L.06 eliminate unneeded redundancy with language in Section 2L and elsewhere in the manual. The proposed changes also eliminate language that is no longer relevant for portable changeable message sign and arrow board technologies currently available. Finally, the proposed changes strengthen the requirements for delineating portable changeable message sign and arrow board trailers.

### PROPOSED MUTCD CHANGES:

The following present the proposed changes to the 2023 MUTCD within the context of the 2023 MUTCD language. Proposed additions to the 2023 MUTCD are shown in blue underline and proposed deletions from the 2023 MUTCD are shown in ~~red strikethrough~~. Changes previously approved by NCUTCD Council (but not yet adopted by FHWA) are shown in green double underline for additions and ~~green double strikethrough~~ for deletions. In some cases,

37 background comments may be provided with the MUTCD text. These comments are indicated  
38 by [bracketed white text in shaded green].

39  
40 **PART 6 - TEMPORARY TRAFFIC CONTROL**

41  
42 **CHAPTER 6L. OTHER TTC ZONE TRAFFIC CONTROL DEVICES**

43  
44 **Section 6L.05 Portable Changeable Message Signs**

45 Support:

46 01 Portable changeable message signs (PCMS) are TTC devices installed for temporary use with the  
47 flexibility to display a variety of messages. In most cases, portable changeable message signs follow the  
48 same provisions for design and application as those given for [permanent](#) changeable message signs in  
49 Chapter 2L. The information in this Section describes situations where the provisions for portable  
50 changeable message signs differ from those given in Chapter 2L.

51 ~~02 Portable changeable message signs are used most frequently on high density urban freeways, but  
52 have applications on all types of highways where highway alignment, road user routing problems, or  
53 other pertinent conditions require advance warning and information.~~

54 03 Portable changeable message signs have a wide variety of applications in TTC zones including:  
55 roadway, lane, or ramp closures; incident management; width restriction information; speed control or  
56 reductions; advisories on work scheduling; road user management and diversion; warning of adverse  
57 conditions or special events; and other operational control.

58 04 The primary purpose of portable changeable message signs in TTC zones is to advise the road user  
59 of unexpected situations. Portable changeable message signs are particularly useful as they are capable  
60 of:

- 61 A. Conveying complex messages,
- 62 B. Displaying real time information about conditions ahead, and
- 63 C. Providing information to assist road users in making decisions prior to the point where actions  
64 must be taken.

65 05 Some typical applications include the following:

- 66 A. Where the speed of vehicular traffic is expected to drop substantially;
- 67 B. Where significant queuing and delays are expected;
- 68 C. Where adverse environmental conditions are present;
- 69 D. Where there are changes in alignment or surface conditions;
- 70 E. Where advance notice of ramp, lane, or roadway closures is needed;
- 71 F. Where crash or incident management is needed; and/or
- 72 G. Where changes in the road user pattern occur.

73 *Guidance:*

74 06 *The components of a portable changeable message sign should include: a message sign, control*  
75 *systems, a power source, and mounting and transporting equipment. The front face of the sign should be*  
76 *covered with a protective material.*

77 **Standard:**

78 07 **Portable changeable message signs shall comply with the applicable design and application**  
79 **principles established in Chapter 2A, Chapter 2L, and other provisions noted for specific signs.**  
80 **Portable changeable message signs shall display only traffic operational, regulatory, warning, and**  
81 **guidance information, and shall not be used for advertising messages.**

82 Support:  
83 08 Section 2L.02 contains information regarding overly simplistic or vague messages that is also  
84 applicable to portable changeable message signs.

85 **Standard:**  
86 ~~09—The colors used for legends on portable changeable message signs shall comply with those~~  
87 ~~shown in Table 2A-5.~~

88 Support:  
89 ~~10—Section 2L.04 contains information regarding the luminance, luminance contrast, and contrast~~  
90 ~~orientation that is also applicable to portable changeable message signs.~~

91 *Guidance:*  
92 ~~11—Portable changeable message signs should be visible from 1/2 mile under both day and night~~  
93 ~~conditions.~~

94 Support:  
95 ~~12—Section 2B.21 contains information regarding the design of portable changeable message signs that~~  
96 ~~are used to display speed limits that change based on operational conditions, or are used to display the~~  
97 ~~speed at which approaching drivers are traveling.~~

98 Option:  
99 12a A portable changeable message sign combined with speed detection capabilities may be used to  
100 display the speeds of approaching drivers as a message.

101 *Guidance:*  
102 ~~13—A portable changeable message sign should be limited to three lines of eight characters per line or~~  
103 ~~should consist of a full matrix display.~~  
104 14 *Except as provided in Paragraph 15, the letter height used for portable changeable message sign*  
105 *messages should ~~be a minimum of 18 inches~~ comply with provisions in Section 2L.04.*

106 Option:  
107 15 For portable changeable message signs mounted on service patrol trucks or other incident response  
108 vehicles, a letter height as short as 10 inches may be used. ~~Shorter letter sizes may also be used on a~~  
109 ~~portable changeable message sign used on low speed facilities provided that the message is legible from~~  
110 ~~at least 650 feet.~~  
111 ~~16—The portable changeable message sign may vary in size.~~

112 *Guidance:*  
113 ~~17—Messages on a portable changeable message sign should consist of no more than two phases, and a~~  
114 ~~phase should consist of no more than three lines of text. Each phase should be capable of being~~  
115 ~~understood by itself, regardless of the order in which it is read. Messages should be centered within each~~  
116 ~~line of legend. If more than one portable changeable message sign is simultaneously legible to road~~  
117 ~~users, then only one of the signs should display a sequential message at any given time.~~

118 Support:  
119 ~~18—Road users have difficulties in reading messages displayed in more than two phases on a typical~~  
120 ~~three line portable changeable message sign.~~

121 **Standard:**  
122 ~~19—Except when being used to simulate an Arrow Board display (see Section 6L.06), techniques of~~  
123 ~~message display such as animation, rapid flashing, dissolving, exploding, scrolling, travelling~~  
124 ~~horizontally or vertically across the face of the sign, or other dynamic elements shall not be used.~~

125 *Guidance:*  
126 20 *When a message is divided into two phases, the display time for each phase should be at least 2*  
127 *seconds, and the sum of the display times for both of the phases should be a maximum of 8 seconds.*  
128 21 *All messages should be designed with consideration given to the principles provided in this Section*  
129 *and also taking into account the following:*  
130 *A. The message should be as brief as possible and should contain three thoughts (with each*  
131 *thought preferably shown on its own line) that convey:*  
132 1. *The problem or situation that the road user will encounter ahead,*  
133 2. *The location of or distance to the problem or situation, and*  
134 3. *The recommended driver action.*  
135 *B. If more than two phases are needed to display a message, additional portable changeable*  
136 *message signs should be used. When multiple portable changeable message signs are needed, they*  
137 *should be placed on the same side of the roadway and they should be separated from each other by a*  
138 *distance of at least 1,000 feet on freeways and expressways, and by a distance of at least 500 feet on*  
139 *other types of highways.*

140 **Standard:**  
141 ~~22—When the word messages shown in Tables 1D-1 or 1D-2 need to be abbreviated on a portable~~  
142 ~~changeable message sign, the provisions described in Section 1D.08 shall be followed.~~  
143 ~~23—In order to maintain legibility, portable changeable message signs shall automatically adjust~~  
144 ~~their brightness under varying light conditions.~~  
145 24 **The control system shall include a display screen upon which messages can be reviewed before**  
146 **being displayed on the message sign. The control system shall be capable of maintaining memory**  
147 **when power is unavailable.**  
148 ~~25—Portable changeable message signs shall be equipped with a power source and a battery back-~~  
149 ~~up to provide continuous operation when failure of the primary power source occurs.~~  
150 26 **The mounting of portable changeable message signs on a trailer, a large truck, or a service**  
151 **patrol truck shall be such that the bottom of the message sign shall be a minimum of 7 feet above**  
152 **the roadway in urban areas and 5 feet above the roadway in rural areas when it is in the operating**  
153 **mode.**

154 *Guidance:*  
155 27 *Portable changeable message signs should be used as a supplement to and not as a substitute for*  
156 *conventional signs and pavement markings.*  
157 28 *When portable changeable message signs are used for route diversion, they should be placed far*  
158 *enough in advance of the diversion to allow road users ample opportunity to perform necessary lane*  
159 *changes, to adjust their speed, or to exit the affected highway.*  
160 29 *Portable changeable message signs should be sited and aligned to provide maximum legibility and*  
161 *to allow time for road users to respond appropriately to the portable changeable Message sign message.*  
162 30 *Portable changeable message signs should be placed off the shoulder of the roadway and behind a*  
163 *traffic barrier, if practical. Where a traffic barrier is not available to shield the portable changeable*  
164 *message sign, it should be placed off the shoulder and outside of the clear zone. If a portable changeable*  
165 *message sign has to be placed on the shoulder of the roadway or within the clear zone, it should be*  
166 *delineated with retroreflective TTC devices.*  
167 31 *When portable changeable message signs are used in TTC zones, they should display only TTC*  
168 *messages.*  
169 32 *When portable changeable message signs are not being used to display TTC messages, they should*  
170 *be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned*  
171 *away from traffic. If relocation or shielding is not practical, they should be delineated with*  
172 *retroreflective TTC devices.*

173 33 *Portable changeable message sign trailers should be delineated on a permanent basis by affixing*  
174 *retroreflective material, known as conspicuity material, in a continuous line ~~on the face of the trailer as~~*  
175 *~~seen by oncoming road users.~~ to all sides of the trailer that are visible to approaching traffic.*

176 Option:

177 33a Portable changeable message sign trailers may be delineated with TTC devices instead of affixing  
178 retroreflective material to the trailer sides.

## 179 **Section 6L.06 Arrow Boards**

180 **Standard:**

181 01 **An arrow board shall be a sign with a matrix of elements capable of either flashing or**  
182 **sequential displays. This sign shall provide additional warning and directional information to assist**  
183 **in merging and controlling road users through or around a TTC zone.**

184 *Guidance:*

185 02 *An arrow board in the arrow or chevron mode should be used to advise approaching traffic of a lane*  
186 *closure along major multi-lane roadways in situations involving heavy traffic volumes, high speeds,*  
187 *and/or limited sight distances, or at other locations and under other conditions where road users are less*  
188 *likely to expect such lane closures.*

189 03 *If used, an arrow board should be used in combination with appropriate signs, channelizing devices,*  
190 *or other TTC devices.*

191 04 *An arrow board should be placed on the shoulder of the roadway or, if practical, farther from the*  
192 *traveled lane. ~~It should be delineated with retroreflective TTC devices.~~ When an arrow board is not*  
193 *being used, it should be removed; if not removed, it should be shielded; ~~or if the previous two options are~~*  
194 *~~not feasible, it should be delineated with retroreflective TTC devices.~~*

195 04a Arrow board trailers should be delineated on a permanent basis by affixing retroreflective material,  
196 known as conspicuity material, in a continuous line to all sides of the trailer that are visible to  
197 approaching traffic.

198 Option:

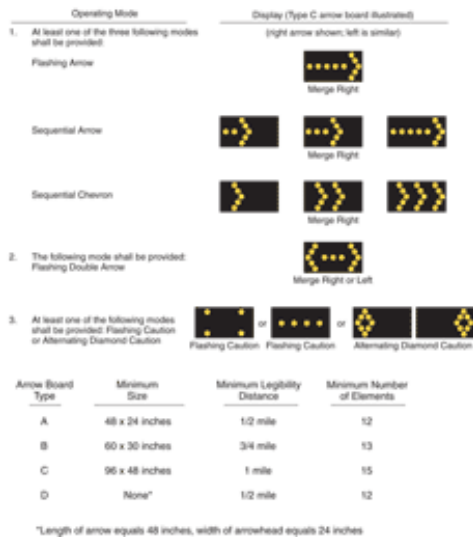
199 04b Arrow board trailers may be delineated with TTC devices instead of affixing retroreflective material  
200 to the trailer sides.

201 **Standard:**

202 05 **Arrow boards shall meet the minimum size, legibility distance, number of elements, and other**  
203 **specifications shown in Figure 6L-3.**

### Figure 6L-3 Advance Warning Arrow Board Display Specifications

Figure 6L-3. Advance Warning Arrow Board Display Specifications



205 **Support:**

206 06 Type A arrow boards are appropriate for use on low-speed urban streets. Type B arrow boards are  
207 appropriate for intermediate-speed facilities and for maintenance or mobile operations on high-speed  
208 roadways. Type C arrow boards are intended to be used on high-speed, high-volume motor vehicle traffic  
209 control projects. Type D arrow boards are intended for use on vehicles authorized by the State or local  
210 agency.

211 **Standard:**

212 07 Type A, B, and C arrow boards shall have solid rectangular appearances. A Type D arrow  
213 board shall conform to the shape of the arrow.

214 08 All arrow boards shall be finished in non-reflective black. The arrow board shall be mounted  
215 on a vehicle, a trailer, or other suitable support.

216 *Guidance:*

217 09 The minimum mounting height, measured vertically from the bottom of the board to the roadway  
218 below it or to the elevation of the near edge of the roadway, of an arrow board should be 7 feet , except  
219 on vehicle-mounted arrow boards, which should be as high as practical.

220 10 A vehicle-mounted arrow board should be provided with remote controls.

221 **Standard:**

222 11 Arrow board elements shall be capable of at least a 50 percent dimming from full brilliance.  
223 The dimmed mode shall be used for nighttime operation of arrow boards.

224 *Guidance:*

225 12 Full brilliance should be used for daytime operation of arrow boards.

226 **Standard:**

227 13 The arrow board shall have suitable elements capable of the various operating modes. The  
228 color presented by the elements shall be yellow.

229 *Guidance:*

230 14 If an arrow board consisting of a bulb matrix is used, the elements should be recess-mounted or  
231 equipped with an upper hood of not less than 180 degrees.

- 232 **Standard:**  
233 15 **The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals**  
234 **of 25 percent for each sequential phase. The flashing rate shall be not less than 25 or more than 40**  
235 **flashes per minute.**  
236 16 **An arrow board shall have the following three mode selections:**  
237 **A. A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode;**  
238 **B. A flashing Double Arrow mode; and**  
239 **C. A flashing Caution or Alternating Diamond mode.**  
240 17 **An arrow board in the arrow or chevron mode shall be used only for stationary or moving lane**  
241 **closures on multi-lane roadways.**  
242 18 **For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for**  
243 **temporarily closing one lane on a two-lane, two-way roadway, an arrow board shall be used only in**  
244 **the caution mode.**

245 *Guidance:*

- 246 19 *For a stationary lane closure, the arrow board should be located on the shoulder at the beginning of*  
247 *the merging taper.*  
248 20 *Where the shoulder is narrow, the arrow board should be located in the closed lane.*

249 **Standard:**

- 250 21 **When arrow boards are used to close multiple lanes, a separate arrow board shall be used for**  
251 **each closed lane.**

252 *Guidance:*

- 253 22 *When arrow boards are used to close multiple lanes, if the first arrow board is placed on the*  
254 *shoulder, the second arrow board should be placed in the first closed lane at the upstream end of the*  
255 *second merging taper (see Figure 6P-37). When the first arrow board is placed in the first closed lane,*  
256 *the second arrow board should be placed in the second closed lane at the downstream end of the second*  
257 *merging taper.*  
258 23 *For mobile operations where a lane is closed, the arrow board should be located to provide*  
259 *adequate separation from the work operation to allow for appropriate reaction by approaching drivers.*

260 **Standard:**

- 261 24 **A vehicle displaying an arrow board shall be equipped with high-intensity rotating, flashing,**  
262 **oscillating, or strobe lights.**  
263 25 **Arrow boards shall only be used to indicate a lane closure. Arrow boards shall not be used to**  
264 **indicate a lane shift.**

265 *Option:*

- 266 26 *A portable changeable message sign may be used to simulate an arrow board display.*