Gene Hawkins

May 14, 2021

Docket Management Facility
U.S. Department of Transportation
1200 New Jersey Ave. SE, West Building Ground Floor Room W12-140,
Washington, DC 20590-0001
Submitted through https://www.regulations.gov

RE: Docket FHWA-2020-0001, NPA for MUTCD

Dear Sir:

I submit the following comments in response to the Notice of Proposed Amendments (NPA) to the Manual on Uniform Traffic Control Devices (MUTCD).

I am a practicing traffic engineer with almost 40 years of experience as a faculty member at Texas A&M University, researcher at the Texas A&M Transportation Institute, consultant, public agency employee, and expert witness. Most of my professional experience and expertise is associated with traffic control devices. I am the current chair of the National Committee on Uniform Traffic Control Devices (NCUTCD) and a past chair of the Traffic Control Devices Committee of the Transportation Research Board (TRB). I have authored several published papers on the history of the MUTCD. The docket comments I offer represent my personal opinions and not those of any organization, including the ones listed above.

In general, I believe the NPA represents a significant improvement over the content of the 2009 MUTCD. After reviewing the docket comments, I strongly encourage FHWA and the USDOT to proceed to a final rule as quickly as possible and publish a new edition of the MUTCD. By the time the 11th edition of the MUTCD is published, the time between it and the previous edition will equal or exceed the time between any two prior editions. In an era of rapid change, this is too long. The MUTCD is too important a document to go 13 or more years without any substantial revisions to its content.

The current campaigns on behalf of multiple organizations to "reframe and rewrite" the MUTCD are misguided. Many of the issues addressed in the letters generated by these campaigns can be addressed through changes to the NPA language. Road users and the traffic engineering profession would be better served through the prompt publication of the 11th edition, with follow-up activity to identify critical issues that can be addressed in a future targeted revision or the 12th edition.

FHWA and the USDOT should commit to conducting regular rulemaking to keep the MUTCD up-to-date after publishing a final rule on the 11th edition. The current situation of having an MUTCD that has not been revised in 13 years should not be allowed to repeat itself. I recommend FHWA return to their prior desire to publish a new edition no less than every 7 years and that FHWA also do revisions between editions to address important advancements in traffic control devices that cannot wait for a new edition to be incorporated into the MUTCD.

Specific Comments on NPA Content

Except as indicated below, I support the changes that FHWA is proposing in the NPA. In some cases, the comments below provide specific support for proposed changes in the NPA. I believe that all of these recommendations listed below could be incorporated directly into a final rule as they do not represent a substantial change from the NPA. The need for a new MUTCD edition is of sufficient importance that I would prefer to see a final rule that does not address these recommendations rather than to require a supplemental notice to address any of these recommendations.

- In reviewing the NPA content in detail, I have found that the use of the letters I and O for chapter letters create confusion. I recommend that these letters not be used as the I is easily confused as a 1 and the O is confused as a 0. I also recommend not using the letter Q.
- The proposal to use all upper case letters for the name of traffic control devices is inappropriate. First of all, it violates normal writing standards. We don't capitalize proper names used in other contexts. In the past, the profession has used all uppercase to distinguish word message signs (all uppercase) from symbol signs (initial uppercase followed by lowercase). There are not that many word message signs that also have symbol versions. Changing all TCDs to all uppercase will create many discrepancies in how devices are labeled. Furthermore, it decreases the inefficiency of producing documentation due to the changes needed to type names plus the reduced efficiency of reading. Other than word message signs, few of the devices in the 2009 MUTCD use all uppercase.
- The transportation system throughout the U.S. represents a broad range of environments, conditions, weather, and road users. It is not feasible to expect a single document to be able to establish detailed criteria for all possible traffic control device conditions and uses. Rather, the purpose of the MUTCD should be to make sure that devices have the same meaning and appearance everywhere (the reason that the original MUTCD was created). Details regarding specific applications should provide sufficient flexibility to be applicable throughout the range of conditions in which they are used. FHWA has made some positive steps in the right direction in recognizing this, but the final rule should further increase the flexibility available to practitioners to address unique conditions.
- I am glad to see the language in Section 1A.01 that distinguishes between uniformity and consistency. This distinction is important in addressing where traffic control device flexibility can be provided and where it is not allowed. I recommend that A and B in this section be revised as indicated below. These distinctions will help to reestablish balance to the MUTCD by defining standards with no deviation allowed from engineering criteria (including standards, guidance, and options) that allow the use of engineering judgment to determine the best traffic control device decision.
    - A. Promote national uniformity in the meaning and appearance of traffic control devices. Uniformity represents situations where aspects should be identical in all applications with no variation allowed.

- B. Promote national consistency in the use, installation, and operation of traffic control devices. Consistency represents situations where some degree of variability and/or flexibility is allowed.

- Section 1A.05 Relation to Other Publications should be revised. I believe that there are two approaches to accomplishing the revision as indicated below:
  - Preferred: Delete all publications in this section that are not specifically referenced elsewhere in the MUTCD. There are an endless number of publications on traffic control devices, far beyond what can be listed in the MUTCD. Putting a publication in this section, while leaving out an equally useful publication, implies the unlisted document has lesser value. Documents that are not directly referenced in the MUTCD and included in this section could be listed on the MUTCD website on the Publications page.
  - Alternate: Divided this section into two sections. One section would be a list of publications that are referenced elsewhere in the MUTCD. The other section would be a list of publications that are not referenced in the MUTCD but that might have value to a qualified person making traffic control device decisions.
- In Section 1A.06 Uniform Vehicle Code – Rules of the Road, delete this section remove reference to the Uniform Vehicle Code (UVC) throughout the MUTCD. This document has not been updated since 2000 and the organization that used to maintain was dissolved some 20 years ago. The reality is that there no longer a current UVC. The MUTCD should not be referencing a 20+ year old document that is badly out-of-date and that does not address many current regulatory issues such as automated vehicles, emobility, and other recent advancements.
- As defined in 23 CFR 655.601, the MUTCD is the national standard for traffic control devices. It is not a road design manual or a policy manual as some have suggested. As the national standard for traffic control devices, the MUTCD should remain focused on traffic control device criteria. The FHWA should remove content from the MUTCD that represents traffic engineering and/or roadway design practices. Specifically, the following content should be removed from the MUTCD in the final rule:
  - The definition for Crashworthiness and NPA content related to crashworthiness go beyond a traffic control device standard as the supporting infrastructure is not a traffic control device. Selecting traffic control device supports is a traffic engineering practice and does not belong in the MUTCD. At best, the MUTCD should say nothing more than a statement such as "Agencies and other appropriate personnel should consider the crashworthiness of traffic control device support structures in determining how and where to install traffic control devices.
  - In Section 2B.21 Speed Limit Sign, remove all content related to how to determine or set a speed limit. Setting speed limits is a traffic engineering practice. It is not a traffic control device standard or criteria.
  - In Section 4F.17 Yellow Change and Red Clearance interval, remove the support statement referencing the ITE recommended practice for setting these intervals. As an alternative to removing this support statement, expand it to include all documents that contain procedures for determining these clearance intervals. Determining the length of the change and clearance intervals is a traffic engineering practice. There are multiple procedures for determining these intervals, in addition

the ITE procedure. The MUTCD should not be referencing a single procedure for a traffic engineering practice.

- Section 2C.59 Advisory Speed Plaque provides a good example of how a traffic engineering practice has been removed from the MUTCD. However, I would suggest that the language in the support statement be revised to include more than just the one reference document mentioned. Possible wording could be "The Traffic Control Devices Handbook or other established traffic engineering reference documents contain …"

- In Section 1B.02 State Adoption and Conformance, the addition of the standard stating that all supplemental documents shall be in substantial conformance to the National MUTCD has good intentions, but should be removed in the final rule.
- In Section 2A.07 Dimensions, the FHWA should remove the proposed new text that prohibits the use of sign sizes larger than the maximum. Using a larger sign size is one of the alternative treatments mentioned in the MUTCD and is an important part of the traffic engineer's toolbox. In some cases, a sign larger than the maximum may be needed to address the unique circumstances of a specific location in the field.
- The table for advance placement of warning signs (Table 2C-3 in Section 2C.04) needs to be reevaluated to ensure the accuracy of the values contained in the table. There have been errors in this table in the last three editions of the MUTCD (2000, 2003, and 2009). The FHWA needs to make sure that the values in this table are correct. Furthermore, this table should use reasonable assumptions, which the NPA table and 2009 MUTCD table do not. I have developed a spreadsheet for calculating the placement distances with both exact values and values rounded up to the nearest 5 foot increment. I can provide this spreadsheet to FHWA upon request. Specific issues that need to be addressed in providing advance placement guidelines include:
  - The advisory speeds should be listed in 5 mph increments, not 10 mph. The current table that lists them in 10 mph increments is not user friendly due to the inability to determine the placement distance for advisory speeds at 5 mph increments.
  - A consistent value should be used for the sign legibility distance, at least within a given condition (A or B). NPA Table 2C-3 uses a legibility distance of 0 feet for the stop condition whereas the 2009 MUTCD uses a value of 180 feet. There is no justification for assuming that someone stopping will not see a sign until they are next to it nor should the legibility distance be based on a word message sign as the NPA has removed the option to use word messages when a symbol version of the sign is available. Research on symbol sign legibility has shown that the Signal/Stop/Yield Ahead signs have a legibility that is equal to or greater than that of a Turn/Curve sign (see Figure 1 in Appendix A of this comment). These signs all have a legibility distance greater than about 500 feet (150 meters). Therefore, 250 feet would be a minimum value to use for the legibility distance for the stop condition. I recommend FHWA use 250 feet for the sign legibility distance for the stop condition and consider a longer legibility distance for all symbol signs in a future rulemaking effort.
  - The PRT time used for the various speeds in Condition A range from 13.7 to 14.5 seconds. A consistent PRT time of 14.5 seconds should be use for all speeds. When rounded up to the next 5 foot increment, the values shown in Appendix A

should be used in Table 2C-3. The changes in distance are most pronounced as speeds less than 40 mph and greater than 65 mph.

- The deceleration rate used for the stop condition should be 10.0 feet/second^2 to be consistent with the deceleration rate used for a stop at a traffic signal. The reality is that a lower deceleration rate (less than 10 ft/sec^2) should be used for speed reductions (not stop), but this change would best be addressed in a future revision to the MUTCD rather than in the final rule for the 11th edition.
- With the changes listed above, the distances in Table 2C-3 should be those shown in the table in Appendix A.

- In Section 3C.05 High Visibility Crosswalks, the support statement says that "High-visibility crosswalk markings are limited to the Longitudinal Bar, Perpendicular, and Double Paired designs." A support statement cannot establish a limitation on use. This statement needs to be changed from "are limited to" to "include" or the statement needs to be rewritten as a guidance statement.
- In Part 5 Automated Vehicles, I encourage FHWA to change all the language in this part to support language. Any language that is not a support statement should be contained in another part of the MUTCD as appropriate. Most practitioners will not send time in Part 5 once the final rule is published and would miss any traffic control device criteria contained in Part 5.

In closing, I want to thank FHWA for finally publishing the long-overdue NPA for a new MUTCD and encourage prompt movement toward a final rule as soon as possible. Ideally, FHWA will make some improvements to the NPA and publish the final rule. In my opinion, the U.S. would be better served by a final rule that reflects the NPA (no changes) than to wait another year or two for more proposed changes to the 2009 MUTCD. Look at the docket comments, make the reasonable changes, and publish the NPA. I support and endorse the 85+ docket submissions of the NCUTCD and encourage FHWA to incorporate them into the final rule to the greatest extent possible. As I have been throughout most of my career, I see a new edition of the MUTCD as the next step in a progression of continuous improvements to our system of traffic control devices. I am committed to continuing efforts to improve that system, and will begin developing my recommendations for the 12th edition of the MUTCD in the near future, even as FHWA works toward a final rule on the 11th edition.

Sincerely,

Gene Hawkins

Appendix A: Warning Sign Advance Placement Distances

Relative Legibility Distances of Symbol Warning Signs

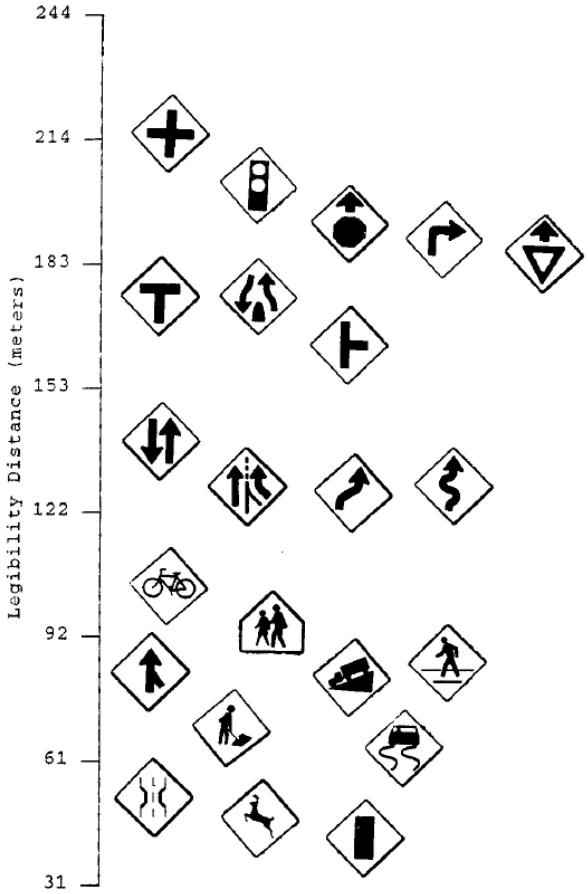

FIGURE 1: Symbol Sign Legibility Distance

Graphic from Legibility and Comprehension of Traffic Sign Symbols, Jeffrey F. Paniati, Proceedings of the Human Factors Society – 32nd Annual Meeting, 1988, https://journals.sagepub.com/doi/pdf/10.1518/107118188786762685.

Gene Hawkins' Recommendation on How Table 2C-3 Should Appear in the MUTCD

The following table shows the placement distances to the nearest foot that result from direct application of the stopping distance formula minus legibility distance using the assumptions shown below. The formula is:

Distance = 1.47×SL×PRT + 1.075×(SL2-AS2)/d – LD

Where:

SL=speed limit/posted speed
PRT=perception reaction time
AS=advisory speed
d=deceleration rate
LD=sign legibility distance

Calculated Distances Using Consistent Formulas																		
PRT	14.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
a	N/A	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Sign Legibility	180	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
	Conditon A	Condition B																
Posted or 85th Percentile Speed		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
20	246	-134	-136	-144	-158	-177	-201	-230	-265	-306	-351	-402	-459	-521	-588	-660	-738	-822
25	353	-91	-94	-102	-115	-134	-158	-188	-223	-263	-309	-360	-416	-478	-545	-618	-696	-779
30	459	-43	-46	-54	-67	-86	-110	-140	-175	-215	-261	-312	-368	-430	-497	-570	-648	-731
35	566	10	8	0	-14	-33	-57	-86	-121	-162	-207	-258	-315	-377	-444	-516	-594	-678
40	673	69	66	58	45	26	2	-28	-63	-103	-149	-200	-256	-318	-385	-458	-536	-619
45	779	133	130	122	109	90	66	36	1	-39	-85	-136	-192	-254	-321	-394	-472	-555
50	886	203	200	192	178	160	135	106	71	31	-15	-66	-123	-185	-252	-324	-402	-486
55	992	277	275	267	253	234	210	181	146	105	60	9	-48	-110	-177	-249	-327	-411
60	1099	358	355	347	333	315	290	261	226	186	140	89	32	-30	-97	-169	-247	-331
65	1205	443	440	432	419	400	376	346	311	271	225	174	118	56	-11	-84	-162	-245
70	1312	534	531	523	510	491	467	437	402	362	316	265	209	147	80	7	-71	-154
75	1419	630	628	620	606	587	563	534	499	458	413	362	305	243	176	104	26	-58
80	1525	732	729	721	708	689	665	635	600	560	514	463	407	345	278	205	127	44
85	1632	839	836	828	815	796	772	742	707	667	621	570	514	452	385	312	234	151

The following table represents the recommended placement distances that should appear in the 11th edition final rule, with values rounded up to the next 5 foot increment.

Recommended Appearance of the Table for the Next MUTCD Revision																		
	Conditon A	Condition B																
Posted or 85th Percentile Speed		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
20	250	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	X	X	X
25	355	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	X	X
30	460	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	X
35	570	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X
40	675	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X
45	780	135	135	125	110	100	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X
50	890	205	200	195	180	160	140	110	N/A	N/A	N/A	X	X	X	X	X	X	X
55	995	280	275	270	255	235	215	185	150	110	N/A	N/A	X	X	X	X	X	X
60	1100	360	355	350	335	315	295	265	230	190	140	100	N/A	X	X	X	X	X
65	1210	445	445	435	420	405	380	350	315	275	230	175	120	N/A	X	X	X	X
70	1315	535	535	525	510	495	470	440	405	365	320	270	210	150	100	X	X	X
75	1420	635	630	620	610	590	565	535	500	460	415	365	310	245	180	105	X	X
80	1530	735	730	725	710	690	665	640	605	560	515	465	410	345	280	210	130	X
85	1635	840	840	830	815	800	775	745	710	670	625	575	515	455	385	315	235	155

Notes:

Added columns for advisory speeds so that there are advisory speed for 5 mph increments instead of 10 mph increments

N/A indicates cells where the calculated value is 75 ft or less. This changes some 100 ft distances in the 2009 MUTCD to N/A.

Distance = 100 when calculated value is more than 75 but less than or equal to 100 ft

Changed the legibility distance for the stop condition from 0 ft used in the NPA to 250 ft (traffic control ahead signs are symbol signs with greater legibility)

Changed the deceleration rate for the stop condition from 11.2 to 10.0 ft/sec^2 to be consistent with the typical deceleration rate used for stopping at a traffic signal.

Values are rounded UP to the next 5 ft increment to be consistent with the practice used in the Green Book for SSD

X indicates cells where the advisory speed is equal or greater than the posted speed