Draft 20-Year Vision and Strategic Plan

for the

Manual on Uniform Traffic Control Devices

Approved by:

Edit Committee
National Committee on Uniform Traffic Control Devices

For Distribution to:
National Committee on Uniform Traffic Control Devices Sponsoring Organizations

Draft Version:
July 18, 2013

This version has not been approved by the
National Committee on Uniform Traffic Control Devices Council

This version does not represent an official position of the
National Committee on Uniform Traffic Control Devices

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DISCLAIMER

This draft document was developed through the efforts of the National Committee on Uniform Traffic Control Devices (NCUTCD). Some of the information used to develop this document was derived from National Cooperative Highway Research Program (NCHRP) Project 20-07, Task 323. The document is intended to foster discussion related to the future of the *Manual on Uniform Traffic Control Devices* (MUTCD). The current draft has not been approved by the NCUTCD. It represents a work in progress and is subject to change. This draft document should not be considered to represent an official position of the NCUTCD, the Transportation Research Board, the National Research Council, or the Federal Highway Administration (FHWA). Opinions and conclusions expressed or implied in this paper are not necessarily those of the NCUTCD, the Transportation Research Board, the National Research Council, the Federal Highway Administration, or the author(s).

Comments relating to the content of this draft document should be submitted to the MUTCD strategic planning website (http://mutcd.tamu.edu/comments) or through the NCUTCD review process. More information about submitting comments on the draft Vision and Strategic Plan (VSP) are provided on page 4.

ACKNOWLEDGMENTS

The long-range Vision and Strategic Plan for the MUTCD described in this document represents the culminating effort of several years of effort by volunteers associated with the NCUTCD and their interaction with staff from the FHWA. In addition, some of the information used to support the development of this strategic plan was provided through NCHRP Project 20-7, Task 323: Developing a Long-Range Strategic Plan for the MUTCD.

The individuals that participated in the NCUTCD task force and NCHRP project panel are listed below.

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- Rick Campbell
- Jerry Donaldson
- Gene Hawkins (chair)
- Tom Hicks
- Hari Kalla
- Ken Kobetsky
- John LaPlante
- Maurice Palumbo
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- Scott Wainwright
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NCHRP Project Panel

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The NCUTCD Edit Committee also devoted significant effort to revising and improving the long-range Vision and Strategic Plan. The NCUTCD Edit Committee members are listed below.

- Susan Aylesworth
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- John Dining
- Jon Esslinger
- Mike Hare
- Gene Hawkins (chair)
- Tom Hicks
- Ernie Huckaby
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- Jeff Tidaback
- Jon Upchurch
- Scott Wainwright

ABBREVIATIONS

The abbreviations listed below are used in this document.

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ATSSA	American Traffic Safety Services Association
CFR	Code of Federal Regulations
CSS	Context Sensitive Solutions
EC	NCUTCD Edit Committee
FHWA	Federal Highway Administration
FR	Final Rule (Federal Register notice)
html	Hypertext markup language
ITE	Institute of Transportation Engineers
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways
NCHRP	National Cooperative Highway Research Program
NCUTCD	National Committee on Uniform Traffic Control Devices
NHS	National Highway System
NPA	Notice of Proposed Amendments (Federal Register notice)
PDF	Portable Document Format
RFC	Request for Comments
SNPA	Supplemental Notice of Proposed Amendments (Federal Register notice)
TCD	Traffic Control Device
TTC	Temporary Traffic Control
USC	United States Code
UVC	Uniform Vehicle Code
VSP	MUTCD Vision and Strategic Plan

COMMENTS ON CURRENT DRAFT

The current draft of the vision and strategic plan was developed primarily by a single author with input from the NCUTCD task force and NCHRP panel and additional revisions by the NCUTCD Edit Committee. Because of the limited degree of review by a widespread audience, readers are reminded that it serves only as a starting point for discussion. Readers of this document are asked to keep the following items in mind as they review the document:

- This document is formatted for single-sided printing.
- This document has not been submitted to an editor for review.
- Yellow highlighting in this document identifies questions for which specific answers are sought from readers.
- This draft does not include extensive comments that were submitted to the FHWA docket related to splitting the MUTCD. Individuals that submitted comments to that docket or that know of docket comments pertinent to this Vision and Strategic Plan should offer those comments specifically through the comment process for this effort (see page 4 for information on making comments).
- More cross-references will be added in future drafts.

EXECUTIVE SUMMARY

TO BE DEVELOPED IN LATE FALL 2013.

CHAPTER 1:
INTRODUCTION

The *Manual on Uniform Traffic Control Devices* (MUTCD) is defined in the *Code of Federal Regulations* (CFR) as the national standard for all traffic control devices used in the United States on roads open to public travel (see Appendix A – Code of Federal Regulations 23 CFR 655).[1] First published in 1935, the MUTCD has evolved incrementally over 78 years and 10 editions to its current form as the 2009 MUTCD (see Appendix B – History and Growth of the MUTCD). The current MUTCD consists of 862 pages that provide information on the various activities related to traffic control devices.

While there are several alternatives, the most common process used today to develop new MUTCD content or to revise existing content is for the National Committee on Uniform Traffic Control Devices (NCUTCD) to develop proposed language and submit the recommendation to the Federal Highway Administration (FHWA) for consideration for inclusion in the next edition or revision of the MUTCD (see Appendix C – Revising the MUTCD and Appendix D – NCUTCD). In using this process, the task forces, technical committees, and Council of the NCUTCD tend to focus upon individual items that are intended to improve an existing device in the MUTCD or add a new device to the Manual. In general, there has been limited effort devoted to strategic development of coordinated MUTCD content and strategic efforts focused on identifying overarching guiding rules for developing and improving MUTCD content. Such coordination of content is typically provided by the FHWA MUTCD Team during the development of proposed and final rules on MUTCD content.

The publication of the proposed rule that eventually became the 2009 MUTCD created a need for conducting an overall evaluation of the MUTCD and its future, particularly the process used for developing content and revising the MUTCD. That Notice of Proposed Amendments (NPA) consisted of 68 pages identifying 512 significant changes with a 7 month comment period.[2] The NCUTCD faced many challenges associated with reviewing so many proposed changes in the review period, assessing the potential impacts of those individual changes on agencies, and developing a coordinated perspective of the overlapping impacts of all the changes taken as a whole. Upon the publication of the Final Rule (FR) for the 2009 MUTCD, the NCUTCD immediately identified several items in the new edition that created concern for the public agencies.[3] The two most significant were: 1) the change in the definition of a standard (a change that was not described in the NPA) and 2) the elimination of language that indicated the decision to use a traffic control device should be based on an engineering study or engineering judgment. Concerns expressed by the NCUTCD about some of the changes made between the NPA and the FR led to a conference call with the FHWA Administrator, Victor Mendez on January 11, 2011. During that conference call, the Administrator indicated that the MUTCD had become too complex and likened the document to the tax code. He further indicated that the document needed to be simplified. Revision 1 to the 2009 MUTCD addressed the two most significant concerns by reverting back to the 2003 MUTCD language for the definition of a standard and the

[1] See 23 CFR 655.603.
[2] The NPA can be accessed at http://www.gpo.gov/fdsys/pkg/FR-2008-01-02/pdf/E7-24863.pdf.
[3] The FR can be access at http://www.gpo.gov/fdsys/pkg/FR-2009-12-16/pdf/E9-28322.pdf.

use of engineering judgment, but many of the other changes to the 2009 MUTCD also created concerns among transportation agencies and reinforced the need for a comprehensive evaluation of the current MUTCD, its strengths, weaknesses, and future needs in order to develop a long-range vision and strategic plan.[1]

VISION AND STRATEGIC PLAN OBJECTIVES

The long-range VSP has been developed to meet the following objectives:

- Establish criteria for the type of content that is appropriate to include in the MUTCD.
- Identify the intended user(s) for whom MUTCD content should be prepared.
- Provide recommendations on the optimal structure and organization for the MUTCD.
- Provide recommendations for improving the manner by which MUTCD content is revised.
- Identify means for improving the ease of use of MUTCD content by the intended user.

STRUCTURE OF THE VSP DOCUMENT

This document presents the current draft of the long-range VSP for the MUTCD over a twenty year horizon. The remainder of this chapter provides details regarding the strategic planning process and opportunities for individuals and organizations to contribute to the process. The second chapter describes over 100 issues related to the past, present, and future of the MUTCD. These issues are presented as opinions, challenges, needs, and questions for several key areas. The third chapter presents the 20-year vision for the MUTCD and the fourth chapter offers a strategic plan for achieving that vision during the planning horizon. The remainder of the document presents references and many appendices that provide supporting detail for the statements in the chapters.

The issues, ideas, and items presented in the second, third, and fourth chapters are presented in a numbered list format for brevity and to improve readability. Items that have numbers less than 500 are ones that describe past and present issues associated with the MUTCD and are presented as opinions, challenges, needs, and questions. Items that have numbers between 500 and 800 represent the vision recommendations. Items that have numbers greater than 800 represent the strategic plan recommendations.

STATUS OF CURRENT VSP DOCUMENT

This document represents a work in progress and is presented in order to generate comments and discussion for a thorough dialogue on the critical issues associated with the MUTCD and the best way to address those issues. Individuals will likely agree with some content and disagree with other content. Although this document has been prepared to be as comprehensive as possible, individuals may find that issues important to them are not identified in the document. Individuals should take advantage of the dialogue and comment opportunities to improve the content of this VSP. Individuals should also understand that no decisions have been made regarding the future of the MUTCD at this time. As stated in the Disclaimer on page iv, this

[1] The FR for Revision 2 can be accessed at http://www.gpo.gov/fdsys/pkg/FR-2011-08-02/pdf/2011-19511.pdf.

document does not establish an official position of any of organization at this time. Any version of this VSP labeled with "draft" has not been approved by the NCUTCD Council. Approval by individual task forces or committees of the NCUTCD does not imply or represent approval by the NCUTCD Council or establish an official position of the NCUTCD.

The strength of this draft VSP is not in the current content, but that it represents a starting point for discussions. By identifying many, if not most, of the critical issues, and advancing an initial proposal to address those issues, it focuses attention on needs, challenges, and actions for discussion. By evaluating this draft through the NCUTCD review process, along with outreach efforts to other stakeholders, the strengths of the document can be agreed upon and the weaknesses identified and addressed.

PROCESS USED TO DEVELOP VISION AND STRATEGIC PLAN

There have been several attempts in the past to develop a strategic plan for the MUTCD, or to strategically consider the content or structure of the MUTCD. These efforts are listed below and citation information is included in the references in Chapter 5.

- A series of traffic control device workshops conducted by the Institute of Traffic Engineers (ITE) (now the Institute of Transportation Engineers) in 1965-1966 (ITE 1966).
- Several research projects sponsored by the FHWA in the mid- to late-1960s that supported the introduction of many new sign symbols for what eventually became the 1971 MUTCD (Markowitz, et.al 1968; Dietrich, et. al 1972; Jones, et. al 1972).
- A *Federal Register* notice published in 1983 asked for comments on an internal report entitled "A Study of Alternative Methods of Administering the National Standards for Uniform Traffic Control Devices" (Federal Register 1983).
- A *Federal Register* notice published in 1986 asked for comments on the need to reformat the MUTCD (Federal Register 1986). In response to this notice, the NCUTCD appointed a blue ribbon committee in 1989 to look at ways to improve the MUTCD. That committee developed the recommendations for MUTCD format that were eventually incorporated into the 2000 MUTCD.
- NCUTCD leaders met with FHWA MUTCD staff in Hanover, Maryland in August 2001 to discuss the future of the MUTCD and identify a list of action items.
- FHWA MUTCD staff met with NCUTCD leaders at the June 2005 NCUTCD meeting to discuss initiating an FHWA activity to develop a formal strategic plan for the MUTCD. This initial discussion led to a second meeting after the January 2006 NCUTCD meeting.
- The NCUTCD created an MUTCD strategic planning task force at the June 2009 meeting. The task force met for the first time at the January 2010 meeting and held additional meetings at most of the subsequent NCUTCD meetings.
- In April 2012, an NCHRP project provided the ability to gather additional information for use in developing the strategic plan.
- A *Federal Register* notice published in January 2013 asked for comments on the concept of splitting the MUTCD into two documents in order to streamline and simplify the MUTCD (Federal Register January 2013). In June 2013, the FHWA announced in

the *Federal Register* that efforts to streamline the MUTCD would be postponed until completion of the NCUTCD MUTCD strategic planning effort (Federal Register June 2013).

The resources provided by NCHRP Project 20-7, Task 323 allowed the expansion of the visioning and strategic planning effort to include presentations at various meetings of MUTCD stakeholders and the development of a website for posting presentations, white papers, the VSP document, and for collecting comments from individuals.

SUBMITTING COMMENTS ON DRAFT PLAN

Individuals who have thoughts, opinions, and contributions regarding the future of the MUTCD are encouraged to offer their comments for consideration. There are two options for submitting comments on this draft of the MUTCD VSP:

- Those that receive the VSP through the NCUTCD review and comment process can offer comments in the same manner that they do for other NCUTCD items that propose changes to the MUTCD. This is the preferred method for individuals that have the opportunity to comment through the NCUTCD process. Individuals that offer their comments through the NCUTCD review process should not submit the same comments to the website.
- Those that receive the VSP by any means other than the NCUTCD review process can submit comments through the comment page of the MUTCD strategic planning website.[1] Note the following regarding the comment process.
  - All comments are moderated by Gene Hawkins.
  - Anonymous comments will be rejected.
  - Comments related to specific technical content (such as suggestions related to the color of pavement markings) will be rejected. The MUTCD VSP is not addressing specific technical content.
  - Comments that relate to the VSP document and that have the proper identification for the individual will be posted for public viewing.
- The deadline for submitting comments through the MUTCD strategic planning website is October 15, 2013.

Individuals should follow the instructions below when submitting comments:

- Reviewer comments should be in the form of suggested changes to the language in this document. Be specific by indicating how you want the language to read. General comments such as "I don't agree with XXX" or "XXX needs to be expanded to address YYY" are difficult to incorporate into future revisions of this document. Comments that do not contain specific recommended changes to the language will be considered at a lower priority than comments containing recommended language changes.
- When making comments, reviewers should use the item number, and subitem number if appropriate, as a reference for the content in Chapters 2, 3, and 4 (i.e., item #23.c.i).

[1] The comment page is located at: http://mutcd.tamu.edu/comments.

For content in other chapters, reviewers should reference the document page number at the bottom of the page (not the PDF page number) and line number.

- Reviewers should not post comments until they have reviewed the entire document. For example, a reader's recommended change related to an item in Chapter 2 may be addressed in a vision recommendation in Chapter 3.

KEY DATES FOR DEVELOPMENT OF MUTCD VSP

The effort represented in this document began with the creation of a task force in June 2009. This task force first met during the NCUTCD meeting in January 2010. It met at subsequent NCUTCD meetings, but as with the earlier efforts, the overall scope of the undertaking proved to be challenging to address within the resources of such a small group. In April 2012, NCHRP Project 20-7, Task 323 was created to provide the task force chair with financial resources to provide staff time, establish a web presence for the effort, and promote the strategic planning effort with selected stakeholder organizations.

Table 1 identifies the current draft and each of the drafts of this document that have preceded the current draft, along with expected future drafts. The expected dates for future drafts are subject to change based on review comments and the need for additional changes to the document. The draft VSP will be updated at various times and new versions will be posted on the VSP website.[1]

Table 1. Past, Current, and Expected Future Drafts

Draft Date	Description	Developed/ Approved by	Action Taken or Expected Action
June 12, 2013	Preliminary Draft	Gene Hawkins	Distributed to NCUTCD Edit Committee, NCUTCD Council members, SCOTE members, and posted on VSP website
July 18, 2013	Review Draft	Edit Committee	Distributed to NCUTCD sponsors for review and comment (late August) and also posted on VSP website (mid-July)
December 2013*	Council Draft	Edit Committee	Revisions made to Review Draft to reflect sponsor comments and to then be presented to NCUTCD Council at January 2014 meeting
January 2014*	NCUTCD Approved VSP	NCUTCD	Version approved by NCUTCD Council and to be submitted to FHWA

Note: *Expected date of action.

[1] All drafts of this document will be posted at http://mutcd.tamu.edu/vision-and-strategic-plan.

CHAPTER 2:
MUTCD OPINIONS, CHALLENGES, NEEDS, AND QUESTIONS

The first step in developing a long-range vision for the MUTCD is to identify a wide range of items related to various topics associated with the MUTCD and traffic control devices. The identification of these items provides a platform that serves to establish the content of the elements that are included in the vision and the direction for those elements. This chapter presents a comprehensive list of items that are divided into the general categories listed below. The items are numbered consecutively throughout the document so that they can be easily cross-referenced between items and in the vision and strategic plan.

- Traffic Control Devices as Independent Elements
- MUTCD as an Authoritative Reference Document
- MUTCD Structure and Organization
- MUTCD Content
- MUTCD Use and Users
- MUTCD Administration
- Influence of Previous MUTCD Editions on Current Practice
- Influence of Technology on Devices and the MUTCD

Within each general category, the numbered items are divided into four groups: opinions, challenges, needs, and questions. These groups are defined below. Items in the opinions and challenges groups generally lead to items in the needs and questions groups. Items in the needs and questions groups are generally related to items that are part of the long-range vision or strategic plan. A cross-reference is provided when an item relates to another item in a different category. Cross-references are not provided for items within the same category. References to items with numbers greater than 500 represent items that are part of the vision and references to items with numbers greater than 800 are part of the strategic plan.

- **Opinions:** Statements that express a comment, belief, or judgment regarding the status of an MUTCD or traffic control device issue. As used in this document, opinions may range from statements of fact upon which there will be universal agreement (or nearly so) to controversial statements upon which there may be limited agreement. Opinions typically relate to a need and/or question associated with that item.
- **Challenges:** Statements that indicate a difficulty or obstacle in some form as it relates to an issue regarding the MUTCD or traffic control devices. Challenges typically create a need and/or question associated with that item.
- **Needs:** Statements that indicate a lack of something wanted or deemed necessary.
- **Questions:** Interrogative statements that indicate a problem for discussion. Questions may indicate uncertainty that should be discussed as part of the refinement of the vision and strategic plan.

TRAFFIC CONTROL DEVICES AS INDEPENDENT ELEMENTS

Before addressing items related to the MUTCD, it is appropriate to address items that are associated with traffic control devices in general with specific relation to how devices are incorporated into the MUTCD. The items identified in this heading are independent of any MUTCD content.

Opinions

1. Traffic control devices are all signs, signals, markings, channelizing devices or other devices that use colors, shapes, symbols, words, sounds and/or tactile information for the primary purpose of communicating a regulatory, warning, or guidance message to road users on a highway, pedestrian facility, bikeway, pathway, or private road open to public travel.
    a. Infrastructure elements that restrict the road user's travel paths or vehicle speeds, such as curbs, speed humps, chicanes, channelization, and other raised roadway surfaces, are not traffic control devices.
    b. Operational devices associated with the application of traffic control strategies and traffic control devices, such as in-vehicle electronics, fencing, roadway lighting, barriers, and attenuation devices are not traffic control devices.
    c. Note: this definition is the one that was approved by the NCUTCD at the June 2011 meeting and submitted to the FHWA for inclusion in a future edition of the MUTCD.
2. Traffic control devices are an essential element of the roadway infrastructure and have a significant impact on the safety, mobility, and effectiveness of the roadway.
3. The current system of traffic control devices in this nation has achieved a relatively high level of uniformity and consistency.
4. The activities associated with traffic control devices include the following:
    a. Meaning: The process of defining the meaning of a specific device and the expected road user response to the device.
    b. Appearance/Design: The process of establishing the general physical characteristics of a specific device as it appears to the road user. These characteristics include color, shape, legend, and the relative position and layout of individual elements.
        i. These characteristics can also include acoustic and tactile features.
    c. Application/Use: The process of making a decision to use a specific device at a specific location and the manner and criteria by which such a decision is made given the specific circumstances at that location.
    d. Installation/Location: The process of determining the proper position for a device and providing appropriate visibility and usability for the device. Considerations related to installation include height, lateral distance (offset), longitudinal distance from a reference point, and distance from other devices. Installation also includes addressing the visibility of a device. In addition to height, lateral distance, and longitudinal distance, visibility incorporates size, conspicuity, and contrast with the environmental background. The physical activity of installing a device is not an activity for MUTCD content purposes.

e. Operation: The process of establishing how the physical characteristics of a device change over a relatively short period of time to impact the movement of traffic. Most traffic control devices are static and do not have an operational aspect. However, some devices do operate (such as signals and changeable message signs). Operation does not include gradual deterioration over an extended period of time of physical characteristics due to aging, weathering, or other factors.
f. Maintenance: The process of monitoring the features of a device and its performance and taking appropriate actions so that it will function in the intended manner throughout the life of the device and be replaced at the end of its useful life.
    i. The minimum sign retroreflectivity criteria are an example of numerical or other performance measurement based maintenance criteria in the MUTCD.
g. Removal: The process of determining when to remove a specific device from service.

5. Traffic control devices placed on public roadways are usually the responsibility of public agencies.
    a. Most public agencies have processes in place for performing the activities associated with traffic control devices.
    b. Some aspects of traffic control device activities for public agencies may be contracted to consultants or others to perform.
    c. Traffic control devices placed in railroad right-of-way may appear to be traffic control devices on public roads but might actually be the responsibility of the railroads.
6. Traffic control devices placed on privately-owned roadways are the responsibility of the property owner.
    a. Prior to 2006, the CFR or MUTCD did not specifically address whether the MUTCD was applicable to privately-owned roads open to public travel.
    b. A 2006 revision to 23 CFR 655.603 extended the application of the MUTCD to privately-owned roads open to public travel.
    c. The 2006 CFR language defining privately-owned roads open to public travel was incorporated into the MUTCD in the 2009 edition.
        i. Some states did not adopt the private property requirement when it was added to the CFR in 2006, although all states have now adopted the 2009 MUTCD or equivalent, which contains the same provisions.
    d. Many private property owners with roads open to public travel do not have staff or expertise to make traffic control device decisions.
7. The use of traffic control devices is based on a balance of one or more of the following factors:
    a. Promoting safety.
    b. Promoting mobility (operational efficiency).
    c. Providing for orderly movement of all road users.
    d. Accommodating the needs of road user groups?.
    e. Optimizing expenditures of public funds.
8. Advancements will lead to improved traffic control devices in the future (see Appendix E – Future of Traffic Control Devices).

a. Current types of traffic control devices are expected to be a part of the roadway infrastructure for at least twenty years.
    i. Some high-volume roadways of the future may provide advanced capabilities that reduce the need for traffic control devices on those roads.
    ii. The resources needed to provide advanced technologies will limit the ability to implement such application on lower classification roadways, meaning that current types of traffic control devices will continue to be needed on those roadways.
b. Possible areas of traffic control device improvements in the future include:
    i. Roadside traffic control devices that send active messages to vehicles.
    ii. In-vehicle displays that supplement the messages of roadside traffic control devices.
    iii. Automated road systems that may eliminate the need for traffic control devices on those roads.
    iv. Automated vehicles that rely on traffic control devices for vehicle guidance (lane keeping) and vehicle right-of-way.
    v. Enhancements to nighttime visibility (i.e., luminescent materials and LEDs or other light sources in signs and markings),
    vi. Traffic control device operation associated with vehicle position (vehicles sending position and speed information to smart traffic control devices and/or signal controllers).
    vii. Active notification of violations,
    viii. Use of traffic control devices to dynamically manage pavement space,
    ix. Active warning of intermittent hazards, and
    x. Possible reduction in use of traditional guide signs due to in-vehicle navigation systems.

Challenges

9. The high level of variability in field conditions makes it challenging to establish universal traffic control device standards that apply across all situations.
10. There is a wide range of users on the nation's roadways. The characteristics of these road users can vary from jurisdiction to jurisdiction and even within a jurisdiction (see Appendix F – Target Group of Road Users).
    a. It is challenging to provide traffic control devices treatments that will meet the needs of all potential road users at all times of the day and night.
11. Many smaller public agencies and private property owners do not have traffic engineering staff for performing traffic control device activities.
12. It is difficult to predict the expected advancements in traffic control devices over the next twenty years.
13. The process of balancing safety, mobility (efficiency), cost-effectiveness, and other factors in making traffic control device decisions is difficult and may sometimes require solutions that are not optimal with respect to one or more of these needs.
14. Many parts of the MUTCD do not provide a list of factors that should be considered in using traffic control devices in general. It does provide lists of factors to consider for selected specific devices in certain situations.

Needs

15. There needs to be a uniform and consistent system of traffic control devices throughout the nation.
    a. A uniform/consistent system of traffic control devices can be provided only if there is a national authoritative reference document that describes traffic control device principles.
16. Agencies and other responsible officials or organizations need an authoritative reference document to guide them in making decisions relative to the various traffic control device activities.
17. There may be a need to redefine uniformity so that there is a distinction between uniformity and consistency.
    a. A specific traffic control device needs to have an identical meaning and general appearance regardless of where it is used. There can be no deviation from requirements related to meaning and appearance.
        i. This represents the concept of uniformity.
    b. A specific traffic control device needs to be used, located, operated, maintained, and removed in a consistent manner regardless of where it is used. There may be a need to vary from the requirements for any of these to accommodate local conditions.
        i. This represents the concept of consistency.
        ii. Decision makers need to have flexibility when making decisions regarding the use, location, operation, maintenance, and removal of traffic control devices.
18. There is a need to identify the specific factors that should be considered when using traffic control devices.
    a. What is the proper balance between traffic control device use and other agency transportation and non-transportation demands for public resources?

Questions

19. What types, groups, and/or characteristics of road users should be accommodated by traffic control devices?
20. Should smaller public agencies and private property owners be expected to acquire traffic engineering expertise to make traffic control device decisions?

MUTCD AS AN AUTHORITATIVE REFERENCE DOCUMENT

The MUTCD was originally developed to provide uniformity to the wide variations in traffic control devices that were used around the nation in the 1920s and early 1930s. Since the publication of the first edition in 1935, the MUTCD has grown in stature and impact. The items in this section address the presence of the MUTCD as the primary reference document for traffic control devices.

Opinions

21. The MUTCD, as it currently exists, is important for the following reasons:
    a. It provides a national basis for promoting uniformity and consistency in traffic control devices.
    b. It is a key, if not the key, traffic/transportation engineering reference document.
    c. It is the only transportation engineering document that is specifically identified in federal code as a national standard.
    d. It is the only document that requires compliance on the basis of federal and state law and/or regulation on all roads open to public travel regardless of classification or ownership.
22. The MUTCD is the national standard for all traffic control devices used on roads open to public travel.
    a. It is defined as such in the 23 CFR 655.603 (see Appendix A – Code of Federal Regulations 23 CFR 655).
        i. Its definition as such makes it a legal document.
        ii. It can be revised or changed only through the federal rulemaking process (see Appendix C – Revising the MUTCD).
    b. Changes to 23 CFR 655.603 in 2006 and to the MUTCD in 2009 (Section 1A.13) require privately owned roads open to public travel to comply with MUTCD provisions.
23. The MUTCD is available on the FHWA website in Portable Document Format (PDF) and in hypertext markup language (html) formats.
    a. The official version of the MUTCD is the PDF version.
    b. The PDF version of the MUTCD can be downloaded for free by anyone.
        i. Of the significant transportation engineering reference documents, it is the only one that is available as an electronic document at no charge.
    c. A printed version of the MUTCD is available from several organizations, independent of the federal government.
        i. The federal government does not print the current MUTCD as it did with every edition prior to the 2000 MUTCD.
24. While federal and state law requires compliance with the MUTCD, there is no formal mechanism in place to enforce compliance.
25. Compliance with MUTCD principles is motivated by one or more of the following:
    a. A desire to promote safety of road users.
    b. A desire to provide mobility for road users.
    c. A desire to meet the needs of specific road user groups.
    d. A desire to be consistent with national and/or state traffic control device practices.
    e. A desire to reduce exposure to tort liability lawsuits.
    f. A desire to avoid the potential loss of federal transportation funding (particularly applicable to state transportation agencies).
26. The MUTCD has matured into a document that provides extensive and detailed principles regarding traffic control devices (see Appendix B – History and Growth of the MUTCD).
27. The concept of traffic control device uniformity has evolved over the life of the MUTCD. Prior to the first MUTCD (1935), there was significant variability in the

meaning, design, application, and operation of traffic control devices. The MUTCD was originally created to provide basic uniformity of key traffic control device features (see Appendix B – Evolution of MUTCD).

a. The early MUTCD addressed a limited number of traffic control devices.
b. The 1935 MUTCD presented traffic control device principles using the shall, should, and may language used in the current MUTCD.
c. As the MUTCD has grown in size, complexity, and level of mandate, the concept of uniformity has expanded to include all traffic control device activities.

28. The MUTCD has been owned and administered by the FHWA since shortly after the publication of the 1971 edition (ownership is addressed in the MUTCD Administration heading).
29. Title II of the Americans with Disabilities Act (ADA) requires that state and local governments ensure that persons with disabilities have access to the pedestrian routes in the public right of way.
    a. Title II applies to the programs and activities of state and local governmental entities.
    b. The Department of Justice is the federal agency with responsibility for issuing regulations implementing the requirements of Title II of the ADA and for coordinating federal agency compliance activities with respect to those requirements.
        i. Regulation (or regulatory notices) having implications for traffic control devices are published through the U.S. Architectural and Transportation Barriers Compliance Board (US Access Board).
        ii. The US Access Board has published two proposed rules addressing shared use paths on public rights-of-way.
            - A notice of proposed rulemaking was published in the Federal Register on July 26, 2011.
            - A supplemental notice of proposed rulemaking was published in the Federal Register on February 13, 2013.
    c. The Department of Justice and the Department of Transportation share responsibility for enforcing the requirements of Title II of the ADA with respect to the public right of way, including streets, roads, and highways.

Challenges

30. The purpose of the MUTCD has never been stated in the MUTCD. The 2009 MUTCD contains the following statement that defines the purpose of traffic control devices:
    a. "The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets, highways, bikeways, and private roads open to public travel throughout the Nation." (Section 1A.01, Paragraph 1).
    b. This statement implies that the purpose of the MUTCD is the same, but it does not specifically so state.

c. The language in 23 CFR 655.601 states that the purpose of the section is to prescribe the policies and procedures of the FHWA to obtain basic uniformity of traffic control devices on all streets and highways.

31. The definition of the MUTCD in federal code as a national standard creates a legal standard that often becomes an issue in or the focus of tort liability lawsuits against agencies and property owners.
    a. This is appropriate when the agency or property owner has failed to meet the standard out of negligence or unreasonable variation from the standard, but this is a concern when the variance by the agency or property owner was insignificant (a technicality) or done with the best interests of road users in mind.
32. While the CFR requires each state to have an MUTCD that substantially conforms to the national MUTCD, it is difficult to establish absolute conformity to a national standard for all aspects of traffic control devices when there are state-to-state variations in traffic laws, state MUTCDs and supplements, engineering practice laws, and tort liability laws, all of which can have an impact on traffic control device practices.
    a. Traffic laws are established by individual states, not by the federal government.
        i. There are differences between state traffic laws regarding the meaning of some traffic control devices or traffic movements that are related to traffic control devices. Examples include:
            - Yellow signal indication: permissive versus restrictive definition.
            - Solid yellow line: Long versus short no passing zone definition. (Question: We are looking for input to identify if there are any states that still have the long zone definition of a no passing zone.)
            - Yellow crosswalk lines: for school crossings in California and in Arizona.
            - Left turn on red from a one-way street to another one-way street.
        ii. The Uniform Vehicle Code (UVC) is no longer maintained as a national recommendation for traffic laws.
            - The National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) has disbanded and is no longer a viable entity.
            - It is difficult to establish national traffic control device principles when there are no recommended national traffic laws related to those devices.
    b. Some states have a state MUTCD and other states have a state MUTCD supplement that is a companion to the national MUTCD.
        i. Some states are required to have state MUTCDs or supplements by state legislative mandate, while other states create their own MUTCDs or supplements purely for convenience and/or to promulgate their particular state policies.
        ii. State manuals and supplements are required by the CFR to be in substantial conformance with the national MUTCD.
        iii. State manuals and state supplements may contain additional devices and additional provisions.
        iv. Question: We are looking for input from readers that describe significant differences, if any, between state MUTCDs or state supplements and the national MUTCD.

c. The laws related to the practice of engineering can vary between the states. These differences can have an impact on engineering decisions regarding traffic control devices.
    i. Some states may require an engineer's seal/stamp on a traffic control plan where other states may not require such.
    ii. Question: We are looking for input from readers regarding differences in state engineering laws as they relate to traffic control devices.
d. Tort liability laws vary from state to state.
    i. Question: We are looking for input from readers regarding how tort liability laws in individual states impact decision making regarding traffic control devices.

33. It is not feasible to expect a traffic control device document to provide detailed principles that will address all aspects of traffic control devices in all applications that can occur in practice. The range of differences between states and local jurisdictions, rural and urban areas, high and low speed roads, and the unique characteristics of a given site make it difficult, if not impossible, to provide inviolable standards that are applicable in all circumstances.
34. Daily use of the MUTCD is transitioning from primarily use of the printed version to use of various forms of an electronic version.
    a. Electronic versions can be viewed on:
        i. Desktop computers in PDF and html formats.
        ii. Tablets in PDF and html formats, plus as an app.
        iii. On smart phones in PDF and html formats, plus as an app.
    b. Use of the electronic versions of the MUTCD is likely to increase in the future.
    c. Electronic versions of the MUTCD provide greater opportunity for tools that aid in finding and using the content in the MUTCD.
35. Because the MUTCD is available for free there is a desire among some to include additional information in the document so that that information will reach a wider audience. If not monitored and controlled, this increases the size and complexity of the document.
36. The inclusion of requirements and recommendations, without labeling them as such, in typical application figures makes it difficult for practitioners to distinguish required, recommended, and desirable practice in such illustrations.
37. The federal government has specific procedures related to rulemaking and how regulations (such as those for traffic control devices) are subject to rulemaking.
    a. Laws are passed by Congress and the United States Code (USC) is the codification of those laws. The Code of Federal Regulations (CFR) is the codification of regulations adopted by the responsible agencies to administer the laws passed by Congress.
    b. The sections of the Code related to rulemaking are in 5 USC 551-553.[1]
    c. Federal rulemaking is used to establish regulations and requirements.
        i. As it relates to the MUTCD, rulemaking is used to establish the MUTCD, and the provisions contained therein, as a national standard for traffic control devices used on roads open to public travel.

[1] 5 USC 551-553 can be accessed at http://www.gpo.gov/fdsys/granule/USCODE-2011-title5/USCODE-2011-title5-partI-chap5-subchapII-sec551/content-detail.html.

d. The Office of Management and Budget Agency Good Guidances (AGG) Memorandum provides information on the development of significant guidance documents (federal documents that provide guidance but that are not standards with the force of law established by rulemaking).[1]
    i. This document states that guidance documents cannot contain requirements (shall or must).
    ii. If the MUTCD were divided into volumes, then all shall and must language would be in the volume(s) that are subject to rulemaking.

38. The U.S. Access Board can develop guidelines that, if adopted as federal regulations by appropriate agencies, can impact the use of traffic control devices and how they are regulated in the MUTCD.
39. A majority of the docket responses to the FHWA Request for Comments (RFC) on splitting the MUTCD indicate a desire to maintain the MUTCD as a single document.
    a. Out of 169 unique letters received, 92 percent were either against splitting the MUTCD into two separate documents or recommended postponing any action to split the manual pending results from this strategic planning effort.
40. Some of the docket responses to the FHWA RFC on splitting the MUTCD indicate a desire to reduce the amount of content in the MUTCD that is subject to rulemaking.
    a. To maintain the MUTCD as a single document but apply rulemaking processes to only a portion of the content in the MUTCD (as opposed to rulemaking on all content in the MUTCD), would be a significant change from how the MUTCD and other federal regulations have been handled. Changing the related policies and procedures will require high-level discussions within the federal government.
    b. If it were decided to divide the MUTCD into volumes to limit the material subject to rulemaking, the content in the non-rulemaking portion of the MUTCD would be considered a "guidance document" as defined by the OMB AGG memo, which requires that guidance documents not contain requirements (shall or must).

Needs

41. There is a need for one or more national reference documents that establish requirements, recommendations, and basic principles for traffic control devices.
    a. If provided in one document (assumed to continue as the MUTCD), there is a need to limit the amount of material that can be included in the document. Such limits could be established by:
        i. Revising the CFR so that only standard statements are defined as national standards.
        ii. Removing content that relates to activities such as maintenance and removal, possibly other activities.
    b. If separated into multiple documents, there is a need to define the purpose of each document and the appropriate content for each document.
42. There needs to be a dialog within the MUTCD user community on the advantages and disadvantages of changing the MUTCD rulemaking process so that rulemaking could be applied only to a portion of the MUTCD. If the MUTCD user community concludes that it is desirable to change the rulemaking process, then there needs to be

[1] This memo can be accessed at http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2007/m07-07.pdf.

a dialog with high level policymakers in the FHWA to explain the merits of changing the MUTCD rulemaking process and to explore the options for doing so.

43. There is a need to provide sufficient flexibility in the national MUTCD to accommodate differences in traffic laws, engineering practice laws, and tort liability laws. This flexibility should also be provided and allowed so that engineers can consider local needs in a manner consistent with the concept of CSS.
44. There may be a need to separate MUTCD content by the level of mandate. Possible mandate levels include (see item 533):
    a. Uniform standard (required) traffic control device provisions that cannot be modified, revised, or exempted under any conditions.
    b. Consistent standard (required) traffic control device provisions that establish a general range of required criteria or that may be modified, revised, or exempted in limited cases, such as at a specific site with conditions where meeting the standard is impossible or impractical.. Deviations from a consistent provision require an engineering study.
    c. Guidance (recommended) traffic control device provisions that indicate recommended courses of action, but which can be revised, modified, or exempted for a variety of reasons. Deviations from recommended provisions can be based on engineering judgment or engineering study.
    d. Option (optional) traffic control device provisions that indicate allowable deviations from a required or recommended provision. Use of an optional provision does not require the use of engineering judgment or engineering study.
    e. Preference (preferred) traffic control device provisions that indicate a desirable course of action, but which carry no requirement, recommendation, or mandate. Deviations from preferred practice can be based on engineering judgment.
    f. Support (background) information that can explain the basis for specific provisions, cite external content that may be of value, or other information that has no level of mandate.
    g. Some of the content suggested above may not be appropriate for the MUTCD or for the regulatory element of the MUTCD.
45. Because the UVC is no longer maintained, there is a need for a national document that defines the meaning of traffic control devices and the traffic laws related to devices.
46. There is a need to establish a set of guiding rules (procedures) that will serve as a guidepost for future development/refinement of the MUTCD.
47. There is a need to reexamine the definition of substantial conformance as contained in 23 CFR 655.
    a. State MUTCDs and supplements provide states with the ability to use traffic control device principles that have been proven effective in previous practice.

Questions

48. What is the function of the MUTCD? Should it be to provide:
    a. A manual of requirements only?
    b. A manual of requirements and recommendations?
    c. A manual with requirements, recommendations, and options?
    d. A general reference similar to a textbook or other technical document?

49. What is the relative priority between safety, mobility (efficiency), cost-effectiveness, and other factors when making a decision regarding the use of a traffic control device?
    a. How do these factors impact decisions when there are competing needs within one factor, i.e., safety needs of trucks versus safety needs of bicycles when making a specific traffic control device decision?
50. What is the intended meaning of the term "uniformity?" What is the relationship between the concept of uniformity and the level of mandate associated with traffic control device activities?
51. Can the MUTCD be maintained as a single document, but with only a portion of the MUTCD structure defined as a national standard in the CFR?

MUTCD STRUCTURE AND ORGANIZATION

As described in Appendix B – History and Growth of the MUTCD, the MUTCD has grown in size (number of pages) and structure (number of parts and chapters) since 1935. The structure of the original 1935 MUTCD was changed in the 1948 edition. The MUTCD structure expanded with each succeeding edition, with significant expansions, restructuring, and/or reformatting occurring with the 1971 and 2000 editions. The items in this section address issues related to the structure and organization of MUTCD content, but do not address content issues (content is addressed in the next heading).

Opinions

52. The current structure of the MUTCD is based on the type of device and the specialized application of devices.
    a. Type of device content is the material that provides principles for individual devices. This is the content in Parts 2-4.
    b. Specialized application content is the material that provides principles for the coordinated use of various devices in a single type of application. This is the content in Parts 5-9.
53. The current structure has been the basic structure of the MUTCD since the 1971 edition. This structure uses a "stovepipe" structure based on "Parts." The coordination within the MUTCD regarding the use of related devices at a single location is often limited. An MUTCD user that is trying to make decisions regarding aspects of traffic control devices used at a specific location needs to reference many different portions of the MUTCD to determine the optimal combination of devices and device features.
54. The division of content into Standards, Guidance, Options, and Support has implications on MUTCD use:
    a. Separation clarifies the level of mandate associated with specific content.
    b. Separation makes it more difficult to prepare content that reads well.
55. In January 2013, the FHWA published an RFC in the *Federal Register* (Federal Register 2013) that asked several questions related to dividing the MUTCD into two documents in order to streamline and simplify MUTCD content.
    a. Responses to the docket fell into two primary categories:
        i. Those that felt there needed to be a more comprehensive evaluation of MUTCD issues before splitting the document.

ii. Those that felt all of the content in the current MUTCD needed to be maintained in the MUTCD.

Challenges

56. The MUTCD is challenging to read and apply.
    a. The division of content into headings (Standard, Guidance, Option, and Support) interrupts the flow of material.
    b. The stovepipe structure of the device content can make it more difficult to coordinate the use of different types of devices used at a single location.
        i. Factors related to the use of a device or devices at a given field location are often distributed throughout the MUTCD.
        ii. MUTCD illustrations typically do not show all of the devices that are used at the location being illustrated but focus primarily on the devices related to the part/chapter that the illustration is related to.
        iii. The 2009 MUTCD has improved the integration of various content from different portions of the MUTCD.

Needs

57. There is a need to evaluate the purpose and content of the MUTCD and develop a long-term plan for the format and content of the document.
58. There is a need to provide better integration and/or coordination of traffic control devices that might be used at a given location or for common application. Examples of application information that might be added include:
    a. Intersection control (possibly separate urban and rural intersections). This application would include:
        i. All signing used on the approaches and departures to the intersection, including regulatory, warning, and guide signs plus the appropriate sequence and spacing of the signs.
        ii. All marking locations as they relate to signing and right-of-way control including longitudinal lines, stop/yield lines, crosswalks, and arrows.
        iii. Traffic signal issues as they relate to the signing and marking aspects of the intersection.
        iv. Coordination of these factors as a function of different geometric arrangements (for example, differences between a single intersection or two intersections at a divided highway).
    b. Lane reductions, lane transitions, and lane drops for permanent installations (possibly separate urban and rural intersections).
    c. Pedestrian and bicycle treatments that involve combinations of devices at a specific type of location.
    d. The use of electronic communication media may provide an effective means of coordinating or linking related MUTCD content.
59. There is a need to improve the structure and organization of the MUTCD to make it easier for the intended user to use content in an effective manner.

Questions

60. What is the optimal organizational structure for the MUTCD?
61. How should specific content be formatted?
62. Can MUTCD content be coordinated or integrated in a more effective manner?

MUTCD CONTENT

The heart of the MUTCD is the content itself, which provides practitioners with principles for the appropriate use of traffic control devices. This vision and strategic planning effort is not addressing specific technical content or the need for specific technical content in the future. However, the items in this section describe issues where the content of the MUTCD impacts its use.

Opinions

63. The MUTCD is a large and complex document. The current edition has 862 pages that are organized in 841 sections in 68 chapters among 9 parts. There is also an introduction and two appendices.
    a. Between the 1935 and the 1988 editions, the MUTCD grew at an average rate of 2 percent per year for the 53 years between these editions.
    b. The 2000 and later MUTCDs use a larger page size. The size of the document increased significantly between 1988 and 2000.
    c. The 2003 and 2009 editions have fewer pages than the 2000 edition due to smaller font size, smaller margins, and reduced line spacing.
    d. The 2009 MUTCD grew at an average rate of 2.3 percent per year from the 2003 edition.
    e. If a growth rate of 2.3 percent per year is maintained through the planning horizon of this strategic planning effort, the MUTCD of 2033 would have slightly less than 1500 pages. It would have slightly less than 1400 pages at the growth rate of 2 percent per year that was consistent with editions up to 1988.
64. MUTCD is encompassing more and more information with each succeeding edition. The growth is due to:
    a. Broadening subject matter.
    b. Greater detail regarding individual devices.
    c. Increased content related to devices that are not traffic control devices or content that describes traffic engineering practices related to traffic control devices, but that are not traffic control device principles.
    d. Inclusion of additional background information so that less experienced users can use the MUTCD.
    e. Increases in new technology.
    f. Changes in U.S. laws.
    g. The 2000 MUTCD and later editions included more information concerning ADA requirements.

65. There have been limited efforts to consider MUTCD content in a strategic manner.
    a. MUTCD content has developed piecemeal over time. Changes and/or additions are generally developed by focusing on a specific device or series of devices. The coordination of content between various sections of the MUTCD can be limited in some cases.
    b. There is no set of guidelines or rules that provide a basis for evaluating whether conceptual content should be included in the MUTCD.
    c. There is a large number of groups and individuals that impact decisions on MUTCD content. While the FHWA and the NCUTCD have significant roles in developing content, the final form of that content is influenced by docket comments.
66. Some MUTCD content is presented in a manner such that there is no decision to be made. Other MUTCD content is presented in a manner to guide the practitioner in making the most appropriate decision regarding a particular device or combination of devices.
67. MUTCD content addresses the various activities associated with the use of traffic control devices (meaning, appearance, use, installation, operation, maintenance, and removal).
    a. The level of mandate that is appropriate for a traffic control device principle is likely a function of which of these activities the principle is related to.
68. Some of the content in the 2009 MUTCD has created concerns among transportation agencies. Examples include the following issues:
    a. A greater degree of specificity regarding traffic control device use that reduces the ability to exercise engineering judgment in decisions regarding traffic control devices. This is evidenced by a large increase in the use of the word "shall" between the 2003 and 2009 editions of the MUTCD (see Appendix B – History and Growth of the MUTCD for the growth in the words shall, should, and may between 2003 and 2009).
    b. A concern that the costs of implementing the changes in the 2009 MUTCD were not adequately considered by FHWA in developing the proposed language.
    c. Changes were made to the MUTCD in the final rule that were significant, but which the public was not provided an opportunity to comment on.
    d. A general increase in the size and level of detail in the MUTCD that makes it more difficult to use.

Challenges

69. The size of the MUTCD can make it challenging to use and to coordinate related content within the document.
    a. The expected growth in the MUTCD (based on the growth of previous editions) will cause the MUTCD to approach 1500 pages in size and make it even more complex, cumbersome, and challenging to use and coordinate the content in the manual.
70. The desire to avoid tort liability risks generates a demand for more specific MUTCD language/content, which can result in reduced flexibility to make engineering decisions.

Needs

71. There is a need to reduce the complexity of the MUTCD by taking one or more of the following actions:
    a. Eliminate content from the MUTCD. It would be up to other organizations and/or individual authors whether to include that information in their respective documents. Examples of content that could be eliminated include:
        i. Content that does not specifically address a specific activity associated with a traffic control device. Current MUTCD content related to barriers and floodlights are examples.
        ii. Content that describes a traffic engineering practice that has some association with a traffic control device. The current MUTCD content that describes how to determine a speed limit is an example of such content.
        iii. Content that carries a lower level of mandate related to traffic control devices.
    b. Move content to another MUTCD-related document that would be maintained by the FHWA or another recognized organization.
    c. Provide better coordination of related content within the MUTCD so that users can more easily identify traffic control device principles associated with a given application and/or location. Better coordination might be achieved through one or more of the following:
        i. Hyperlinks between related content. Such hyperlinks need to do more than just provide cross-reference to other content, but provide a means of identifying all related MUTCD criteria associated with a specific application, location, or need.
        ii. Use of "smart tags" to identify application information for specific devices.
        iii. Addition of artificial intelligence logic to MUTCD content so that users can be guided through decision making steps associated with traffic control devices.
    d. Revise the format/organization of the MUTCD in a manner that makes it easier for practitioners to find and use applicable content. The MUTCD organization could be based on one or more of the following divisions:
        i. By type of activity.
        ii. By level of mandate.
        iii. By MUTCD user. For many situations, the type of activity and type of MUTCD user would overlap each other. For example, MUTCD content related to installation issues is often used by field personnel.
        iv. By elements of the MUTCD that are subject to federal regulations. With this concept, some part of the MUTCD would not be included in the CFR definition as a national standard. This content could also be revised without formal rulemaking.
            - This option would require revising the CFR.
    e. Redefine the levels of mandate that are in the current MUTCD (see item 533).
        i. Divide current standards into uniform standards and consistent standards
            - Uniform standards cannot be modified or revised.

- Consistent standards can be deviated from on the basis of an engineering study at a specific site where it is impossible or impracticable to meet the standard.

ii. Divide current guidance into recommended practices and preferred practices.
- Recommended practices would retain the same definition used in the current MUTCD.
- A statement of preferred practice would not indicate any level of mandate (requirement or recommendation) but would identify a preferred method for addressing a need. The preferred practice category is needed because of the significant gap that exists between guidance and option statements. In some states, should statements can be considered equal to shall statements and do not necessarily provide the intended flexibility associated with should statements. Currently, there is no way to indicate that an action is desirable or preferred without associating it with a form of mandate. Another example is where the MUTCD provides several options for installing a TCD but one of those options is clearly preferred over the others in certain or all situations.

iii. Maintain options and support as they are in the current MUTCD.

72. Regardless of how the complexity of the MUTCD is reduced, there is a need to coordinate related content within the MUTCD (see item 538.a).
    a. Users should be able to identify all information in the MUTCD related to the activities of a given device
73. There is a need to better evaluate the impacts and effectiveness of new MUTCD standards that have not been widely used by agencies before adding them to the MUTCD.

Questions

74. What type of content should be included in the MUTCD?
75. What is the best option for reducing the complexity of the MUTCD?

MUTCD USE AND USERS

All streets, highways, and other related transportation facilities have traffic control devices to promote safety and efficiency. The activities associated with those traffic control devices are conducted by a wide range of individuals with a range of backgrounds and training in traffic control devices. The items in this section address the current and future users of the MUTCD and how the user groups impact other aspects of MUTCD structure, content, and administration.

Opinions

76. Because it is available for free to anyone, the MUTCD is read by a wider variety of individuals than any other traffic engineering reference document.
77. Specific groups of individuals that may use the MUTCD are listed below.
    a. Engineers. Engineers are professional engineers who have been licensed by a licensing jurisdiction to practice engineering in a specific field. Professional

engineers are involved with all aspects of traffic control device activities. Some states and other organizations (such as the federal government) allow an individual to use the term "engineer" without being licensed. Within the context of this VSP, the term engineer is intended to mean an individual who is licensed as a professional engineer or has equivalent qualifications and that has the level of traffic engineering expertise appropriate to make traffic control device decisions. Engineering groups involved with the MUTCD typically include:

i. Public agency traffic engineers.
ii. Other public agency engineers that have some involvement for agency transportation responsibilities. These are typically civil engineers and can include a public works director, city engineer, or county engineer, among others.
iii. Other types of engineers that work for agencies and provide specific engineering expertise as it relates to traffic control devices. These are commonly electrical engineers, human factors engineers, operations engineers, construction engineers, and maintenance engineers.
iv. Private sector engineers that are contracted to provide the appropriate engineering expertise for an agency or private road owner.
v. Research engineers that use specific engineering expertise to evaluate specific traffic control device issues.

b. Technical. Technical individuals are those with specialized technical knowledge that do not have an engineering license, but who may or may not work under the supervision of an engineer. Technical individuals are typically involved in recommending decisions regarding the application/selection of traffic control devices, traffic control device location, and incorporating traffic control devices into design plans. They typically include two groups:

i. Engineers-in-training. These are individuals who have an engineering degree but who have not yet met the requirements to obtain an engineering license.
ii. Technicians. These are individuals who do not have an engineering degree, but who have developed detailed technical knowledge.

c. Field personnel. Field personnel are individuals that are involved with those traffic control devices activities that occur in the field. These activities typically include installing devices in accordance with MUTCD principles and agency/owner policies and may also include some aspects of traffic control device operation and maintenance. Field personnel groups involved with the MUTCD typically include:

i. Agency field personnel.
ii. Contractor field personnel.
iii. Utility company personnel.
iv. Emergency and first responder personnel.

d. Administrative. Administrative individuals are those who are not typically involved in day-to-day activities of traffic control devices, but who may establish boundaries within a jurisdiction on those activities. User groups in this category may include: elected officials, legal/policy personnel, budgeting personnel, department heads, and public administrators.

e. Legal. Legal individuals are lawyers, paralegals, expert witnesses and others that are involved in traffic control device activities that occur through the courts. These activities most often occur as the result of tort liability lawsuits.
f. Industry/Manufacturing/Vendors. These individuals are involved in the invention and development of new traffic control devices and the fabrication, distribution, and/or installation of traffic control devices.
g. Enforcement. These individuals enforce the regulations established by traffic control devices and/or develop materials used to educate road users about traffic control devices.
h. Education. These individuals conduct activities that educate road users regarding meanings of traffic control devices.
i. Public: These individuals respond to traffic control devices as part of their travels, but have no responsibility for conducting traffic control device activities. The public may also influence public opinion regarding use of traffic control devices. Members of the public may also be subject to complying with provisions in the MUTCD. Examples include:
    i. Media personnel due to the requirement to wear high visibility apparel when on or near the roadway).
    ii. School crossing guards.

78. The manner in which MUTCD content is used is highly influenced by the knowledge, skills, and abilities of the individual users of the MUTCD.
    a. Smaller agencies usually do not have traffic engineering individuals or staff with expertise in traffic control devices.
    b. Engineers that work for public agencies tend to move between technical areas (design, planning, traffic, construction, etc.) as they progress through their career. Fewer individuals employed by public agencies are spending the majority of their career in traffic engineering.
79. The MUTCD cannot be a simple and streamlined document and also be all things to all people. One of the key rules of effective written communication is to prepare the content for the targeted audience.
80. A user's decision regarding a specific activity for a specific traffic control device can be influenced by the following factors:
    a. The level of mandate defined in the MUTCD and the reasonableness of deviating from the principle based on the circumstances.
    b. The practices and policies of the jurisdiction.
    c. The specific conditions that exist in the field where the device is to be located.
    d. The desire to avoid creating a risk that might lead to tort liability.
    e. The influences of higher level management and/or elected officials.

Challenges

81. The intended user of the MUTCD has never been defined in the MUTCD. Some MUTCD content requires engineering study or judgment, while other content can be implemented by individuals that do not have an engineering background. There is also MUTCD content that establishes regulations or definitions that are closely related to laws and ordinances.

Needs

82. There is a need to define the target audience for MUTCD content and to prepare the content for that audience.
    a. There may be a need to restructure MUTCD content by user groups so that the content can be targeted to those groups.
83. Qualified practitioners need flexibility to develop traffic control device solutions that are the most appropriate for a given situation in a manner that best balances the needs of road users (including the need for uniformity/consistency) and the capabilities of the public/private organization responsible for the location.

Questions

84. Should the MUTCD be structured so that content is organized according to the user that is expected to use specific content?
85. Should MUTCD content be written with a traffic engineer as the intended audience?
    a. What is the appropriate level of experience/expertise for someone to be considered qualified to use the MUTCD?
    b. Can MUTCD content be structured so that some content is targeted to traffic engineers and other content is targeted to other user groups?
86. Should the MUTCD be written so that agency employees that are not engineers can make decisions regarding specific traffic control device activities? If so, for which activities should such individuals be allowed to make decisions?

MUTCD ADMINISTRATION

Because of its existence as a legally defined national standard reference document, the MUTCD also has a legally defined administrative status. This status defines its ownership and processes that are used to modify its content. The items in this section address MUTCD ownership issues and issues related to changing the content of the MUTCD.

Opinions

87. The MUTCD is owned and administered by the FHWA.
    a. It has been owned and administered by the FHWA since shortly after publication of the 1971 edition.
    b. Because it is a federal regulation (due to the fact that it is defined in the CFR as a national standard), it can be changed or revised only through the federal rulemaking process.
        i. There are federal regulations that specify the procedures for changing the MUTCD.
        ii. The CFR requires the states to adopt an MUTCD that is in substantial conformance with the national MUTCD. States have their own procedures for adopting the national MUTCD or a state MUTCD that is in substantial conformance.

88. Although the MUTCD is owned by the FHWA, the FHWA distributes the MUTCD only in PDF and html formats.
    a. Printed versions of the MUTCD are available from various sources, including AASHTO, ATSSA, and ITE.
        i. The printed versions are not typically updated or reprinted when FHWA publishes an MUTCD revision.
89. The NCUTCD provides input to FHWA regarding MUTCD content (see Appendix D – NCUTCD).
    a. NCUTCD and its predecessor organizations have been involved in developing content since before publication of the first edition in 1935.
90. Revising the MUTCD is a cumbersome process. The process of changing the MUTCD is an involved one that requires multiple steps and can take place over an extended period of time depending upon the extent of the proposed change (see Appendix C – Revising the MUTCD).
    a. The rulemaking effort for the 2009 MUTCD took almost two years from the publication of the NPA to the publication of the final rule.
91. In recent times, changes to the MUTCD have attracted a significant number of docket comments.
    a. There were over 15,000 individual comment items that derived from over 1,800 letters posted to the docket for the NPA that resulted in the 2009 MUTCD.
92. Over its entire life, the average time between new editions of the MUTCD is 8.2 years.
93. In recent times, changes to the MUTCD have generally been limited to new editions with the exception of a few revisions that focused on specific issues. Since the publication of the 2000 edition, there have been 5 revisions:
    a. 2000 MUTCD: 1 revision on accessible pedestrian signals.
    b. 2003 MUTCD: 2 revisions; 24-hour pharmacy signing and minimum sign retroreflectivity.
    c. 2009 MUTCD: 2 revisions; use of engineering judgment and compliance dates.
94. Since the publication of the 1988 edition, the number of revisions to the MUTCD has been limited in order to keep the printed version of the MUTCD viable and to minimize the frequency at which extensive training of agency personnel on MUTCD changes is needed..
    a. Experiences with the 1971 and 1978 editions showed that extensive revisions between editions caused the printed edition to become out-of-date soon after publication.
95. Recent experience with the 2000, 2003, and 2009 MUTCD rulemaking indicate that there are a large number of changes associated with rulemaking for a new MUTCD.
    a. The number of items identified in the NPA and FR rulemaking notices for these editions are:
        i. 2000 MUTCD: multiple items in 8 NPA rulemaking notices, 288 items in FR.
        ii. 2003 MUTCD: 316 items in NPA, 384 items in FR.
        iii. 2009 MUTCD: 513 items in NPA, 611 items in FR.
    b. Evaluating the impacts of such a large number of proposed changes and the interaction between the various proposed changes, particularly without a review

of the revised MUTCD language prior to publication of the final rule, is a difficult undertaking.
    i. The NCUTCD is most effective in reviewing a large number of proposed changes when the NPA is published at least one month before an NCUTCD meeting and the docket comment period encompasses two NCUTCD meetings.
    ii. The NCUTCD provides the FHWA with invaluable practitioner insights into the impacts of proposed MUTCD language. The volunteer effort contributed by NCUTCD members has significant value to the FHWA but can be realized only when adequate time is provided for thorough review.
    iii. The NCUTCD process for evaluating rulemaking has not changed to accommodate modern communication methods.
  c. As the MUTCD migrates to greater use of electronic formats, it will be easier to revise the MUTCD on a more frequent basis, meaning that individual revisions can address fewer significant items.
    i. Limiting the number of revisions in a single rulemaking may reduce the total time needed to develop and process the rulemaking.
    ii. The frequency of revisions may need to be limited.

96. With the exception of the two rulemaking efforts for sign and marking minimum retroreflectivity, rulemaking effort for changes to the MUTCD have not included an assessment of the economic impacts of the proposed changes.
  a. This was not as significant an issue for past editions of the MUTCD due to the flexibility that prior editions provided.
  b. As that flexibility has been reduced, the costs of MUTCD changes are of increasing concern to agencies.

Challenges

97. Changing the MUTCD is cumbersome and occurs at a slow pace.
98. Rulemaking for a new edition of the MUTCD creates the potential for numerous challenges with respect to unintended consequences of insufficiently coordinated content.
  a. The magnitude of the number of changes and the establishment of a new format associated with the 2000 MUTCD required the publication of the 2003 MUTCD within a short period of time in order to correct numerous errors and shortcomings.
  b. Objections to final rule content in the 2009 MUTCD that were not subject to public review required additional rulemaking to address the objections.
99. The interest in MUTCD rulemaking actions is demonstrated by the large number of docket comments. Such a large number of comments make it more challenging to coordinate conflicting opinions and to minimize unintended consequences of changes made to the NPA.
100. Proposed changes associated with a new edition of the MUTCD have grown to a size that makes it difficult to absorb the potential impact of the changes within the available time.

101. The requirement that MUTCD changes can be made only through rulemaking makes it more difficult to change the MUTCD, which is both an advantage and disadvantage. Some of the challenges associated with the rulemaking process are:
    a. It is a time-consuming process. A small rulemaking can take a year or more to complete. A more complex rulemaking (such as a new edition) can take multiple years to prepare the material and do the rulemaking.
    b. There is a limited period of time for the public and practitioners to process the proposed changes and respond with comments. There may or may not be an adequate amount of time depending upon the number of proposed changes and the significance of the proposed changes.
    c. The number of significant changes associated with a new edition can be numerous. The ability to adequately review and comment on a large number of changes can be limited if the comment period is too short.
    d. Proposed rulemaking actions that do not fully encompass two NCUTCD meetings limit the ability of the NCUTCD to provide thoughtful and meaningful comment on proposed changes.
    e. The slow pace of the MUTCD rulemaking process (including development of proposed language) promotes changes that are thought-out and not reactive.
102. When a FR is published, it can be difficult to discern the text changes that have been made from the NPA.
    a. In an NPA, the FHWA typically provides a markup document that shows the proposed changes compared to the current MUTCD.
    b. In a FR, the FHWA typically provides a markup document that shows the final rule changes for the new MUTCD compared to the previous MUTCD.
    c. There is no markup in a FR that shows the changes from the NPA to the FR.

Needs

103. There is a need for improved processes for incorporating new technologies, laws, and practices into the MUTCD in an appropriate and timely manner.
104. Changes to the MUTCD need to have a rational basis. The basis for making changes should be related to the degree of requirement associated with a change.
    a. Changes to standard (shall) statements should be made only when required by state/federal law or regulation or when justified by scientifically conducted research that is both peer-reviewed and published. If changes to standards are proposed on some other basis, there should be a more detailed review and evaluation process.
105. There is a need to reduce the amount of content in an MUTCD rulemaking action. Potential options for reducing the size of rulemaking actions include:
    a. Reducing the portion of the MUTCD subject to rulemaking.
    b. Reducing the size of the MUTCD.
    c. Doing more frequent revisions but limiting the size of each revision.
106. There is a need to better integrate MUTCD revisions that take place between complete editions into practice.
    a. This can occur through greater reliance on electronic versions.

107. There is a need to time the publication of an NPA so that it meets one of the following:
    a. The NPA is published no less than one month before an NCUTCD meeting.
    b. If the NPA is published less than one month before an NCUTCD meeting, the docket comment period should remain open until after the second NCUTCD meeting following the publication of the NPA.
108. There is a need for the FHWA to distribute an NPA to FR markup when a final rule is published.
109. There is a need for the NCUTCD to review its consensus building processes for possible improvements in developing recommendations for MUTCD content.

Questions

110. What is the proper threshold to establish for determining the basis for adding a new standard to the MUTCD or revising an existing standard?
111. What degree of review should be conducted on studies that are used to support changes to the MUTCD?
112. Should the MUTCD be a document that is owned and administered by FHWA?
    a. If not, what is the most appropriate group to own and administer the MUTCD?
        i. NCUTCD, AASHTO, ITE, or other?
113. Is there a way that FHWA could retain ownership of the MUTCD, but make changes without the cumbersome requirements of rulemaking?
    a. Could changes for some MUTCD content be required to go through rulemaking while changes to other MUTCD content be allowed without rulemaking?
    b. If changes can be made without rulemaking, is it possible to require a consensus-developing approach to approve those changes before inclusion in the MUTCD?
        i. Approval by the NCUTCD is one such option for developing a consensus.
114. What marketing and/or outreach efforts need to be associated with the development of an MUTCD long-range vision and strategic plan?

INFLUENCE OF TECHNOLOGY ON DEVICES AND THE MUTCD

For most of their existence, the technologies associated with traffic control devices have remained relatively stable and there have been few technological advancements that necessitated swift changes in the MUTCD. Since the mid-1990s, technology in general has advanced rapidly. In recent years, there have been several advancements that could impact the future of traffic control devices or the delivery of MUTCD content. The items in this section describe technology-related issues associated with traffic control devices and the MUTCD.

Opinions

115. Use of electronic versions of the MUTCD is increasing.
    a. The MUTCD is currently available in PDF, html, and tablet/smart phone applications.
    b. Over the next few years, publication delivery technologies are expected to improve so that the primary means of delivering the MUTCD to the user will be

some form of electronic format. These advances in communications technologies will make it easier to connect/coordinate content in one place in the MUTCD with content in other places of the MUTCD (or related documents if the MUTCD is divided into multiple documents).

c. With the growth of an electronic MUTCD, the use of printed versions of the MUTCD will decrease, but there will likely always be a need for a paper version for archival or legal purposes.

116. Technologies that are used in traffic control devices are advancing rapidly (see Appendix E – Future of Traffic Control Devices)
    a. These advancements provide greater capabilities for devices and can improve the effectiveness or ability to operate/maintain the devices.

Challenges

117. Innovative traffic control device solutions may be developed in advance of MUTCD content that address all possible uses of these innovative devices. The lack of MUTCD content for innovative/new traffic control devices may create inconsistent uses and hamper the development of appropriate content.
    a. Traffic control device technologies may be advancing so rapidly that it is difficult to develop MUTCD content before advanced devices are introduced and experience widespread use.
    b. Advancements in technology could lead to a tendency to encourage over-control of road user movements and activities.

Needs

118. There is a need to focus greater attention on upcoming traffic control device technologies and how those technologies should be addressed in the MUTCD.
119. There is a need to provide early flexibility in traffic control device principles for advancements and new technologies while directing the use of such advancements and technologies toward national uniformity/consistency.
120. New technologies need to have human factors evaluations before being implemented in the MUTCD.

Questions

121. What is the best way to deal with the development of innovative traffic control devices that are not addressed by the MUTCD?

CHAPTER 3:
RECOMMENDED VISION

Having identified the critical opinions, challenges, needs, and questions associated with the MUTCD, this chapter presents a long-range vision for the future of the MUTCD. This vision recommends what the MUTCD should be in about 20 years (mid-2030s). Each of the vision statements evolves from an issue, challenge, need, or question expressed in the previous chapter. The vision is divided into the following topics:

- Fundamental Assumptions
- Fundamental Recommendations
- Guiding Rules for MUTCD Content
- MUTCD Structure and Content
- MUTCD Revisions

Items that make up the vision have numbers that are greater than 500 so that they can be distinguished from the items in the previous chapter. The strategic plan, described in the next chapter, offers recommendations on how to transition from the current MUTCD to the MUTCD described in the long-range vision. The justification for each numbered item in the vision (except for those in the Fundamental Assumptions section) is labeled as the "basis for recommendation" and is provided as the last subitem under each numbered item. The basis for recommendation is shown by a square bullet (■).

FUNDAMENTAL ASSUMPTIONS

Fundamental assumptions represent foundational elements of a national traffic control device system. These items do not need to be justified or supported by evidence, argument, or data.

501. Traffic control devices are an essential element of the transportation infrastructure.
    a. They promote roadway safety, operational efficiency (mobility), and the orderly movement of traffic by communicating regulations, warnings, and guidance information to road users.
    b. They will continue to be needed in the foreseeable future.
502. Agencies and owners of private property responsible for roadways open to public travel have a duty to provide traffic control devices that are appropriate for the conditions at a specific location. Agencies and property owners conduct a range of traffic control device activities in meeting their duty (see item 530 for a list of traffic control device activities)
503. Traffic control devices need to meet the expectations of road users. Meeting road user expectations means that:
    a. A given device always has the same meaning. The meaning of a device does not change based on the context in which it is used.
    b. The desired response or responses to a device is the same no matter where the device is used, although it may be necessary for the road user to make a decision whether to initiate that response.

c. A device has the same basic appearance (communication features) no matter where it is used. Appearance characteristics are color, shape, legend, and the layout of the individual elements that make up the device. Communication features can also include acoustic and tactile properties.
    i. Size is not an appearance characteristic, it is an installation characteristic.
d. The application of a device in a given situation is consistent with driver expectations. There needs to be some flexibility to adapt use of a device to the specific conditions that exist at a given location.
e. A specific traffic control device operates in a uniform or consistent manner.
    i. In some cases, operational characteristics need to be identical at all locations and in other cases, they need to be similar. Examples of each include:
        - The order of signal indications is always green followed by yellow followed by red (while some may define this as an operational characteristic, it could also be defined as an appearance characteristic).
        - The length of yellow and all-red time may vary by location, but the determination of the lengths of these intervals is based on consistent methods from one location to another.
f. The installation of a device is appropriate for the conditions in which it is used. Installation characteristics include size, height, lateral distance from the travel lane or other reference point, longitudinal distance from the subject of the device, and its conspicuity.

504. National principles are necessary to provide a system of traffic control devices that meet the expectations of road users.
    a. Traffic control device principles can range from required to optional practices.
    b. The level of mandate associated with specific traffic control device principles depends upon how variance from expectations affects road user performance.
505. It is not possible to establish national standards (requirements) that apply to all traffic control device activities in all situations.
    a. Some traffic control device activities can be standardized.
    b. Some traffic control device activities can be prescribed, but require decision-making flexibility to accommodate local site conditions.
506. The traffic control device activities involve two types of acts:
    a. Ministerial acts represent activities that follow specific instructions and do not involve decision making (see item 529).
    b. Discretionary acts represent activities where a decision is made between choices regarding the conduct of a traffic control device activity (see item 529).
507. Traffic control device principles should:
    a. Consider the needs of all road users, but should not be expected to accommodate 100 percent of the needs of 100 percent of road users 100 percent of the time.
        i. The ADA and the associated regulations establish requirements that must be met for certain traffic control devices.
    b. Account for human factors concepts such as expectancy, visual performance, comprehension, detection, and reaction time.
        i. Auditory, and tactile perception are additional human factors concepts that relate to pedestrians that may need to be accounted for.

c. Address the typical traffic control devices situations that occur in the field and provide flexibility to address variations from typical conditions where it is appropriate for such variations.
d. Recognize that there are not always sufficient public agency resources to implement the most effective solution.

FUNDAMENTAL RECOMMENDATIONS

These fundamental recommendations address critical issues related to the MUTCD as a document and its status as a national standard that is defined in federal code.

508. The MUTCD should continue to be the authoritative national reference document for traffic control device principles.
    a. This vision recommends changes to the MUTCD to improve its ability to function as the authoritative national reference document for traffic control device principles.
    - Basis for recommendation: The need for a uniform and consistent system of traffic control devices can be met only if there is one primary reference document that establishes the most critical traffic control device principles.

509. The MUTCD should continue to be defined in the CFR as the national standard for traffic control devices.
    a. States should continue to be required to adopt the national MUTCD or an MUTCD that is in substantial conformance.
    - Basis for recommendation: The authority for the MUTCD as the authoritative national reference document is based on its definition as the national standard in the CFR.

510. The FHWA should continue to own and administer the MUTCD.
    a. This vision recommends changes in how MUTCD content is revised and how content is developed.
    - Basis for recommendation: No other organization can provide all of the following capabilities that are necessary for the MUTCD to be the authoritative national reference document for traffic control devices.
        (i) National reach.
        (ii) Dedicated staff and resources focused solely on the MUTCD.
        (iii) Ability to distribute the MUTCD as a free document.
        (iv) Revision process that provides for input from all stakeholders using appropriate consensus-developing procedures.

511. MUTCD content should provide the appropriate level of flexibility to make traffic control device decisions that are in the best interest of road users and the agencies/private property owners responsible for traffic control devices
    - Basis for recommendation: Although currently defined in the CFR as a national standard, not all content in the MUTCD represents a standard (requirement) that cannot be modified or revised.

512. The CFR for the MUTCD (23 CFR 655) should be revised to be more consistent with the CFR language for the Green Book (23 CFR 625.4). These revisions should:

a. Add language from 23 CFR 625 related to accommodating local needs (concept of Context Sensitive Solutions).
   - Basis of recommendation: Adding the concept of CSS to the MUTCD would address the need to have flexibility to accommodate site specific conditions that are not adequately addressed by MUTCD language.

513. The FHWA should revise the definition of substantial conformance as stated in the 23 CFR 655 to the definition that will ultimately be approved by the NCUTCD.
   a. The NCUTCD Edit Committee is currently working to prepare a new definition of substantial conformance.
   - Basis for recommendation: The definition of substantial conformance was added to the CFR in a 2006 revision and became a significant issue during discussions about the impacts of MUTCD changes implemented with the 2009 edition.

514. Traffic control device discretionary acts should be performed by professional engineers with appropriate traffic engineering expertise.
   a. In states and other agencies/organizations (such as the federal government) that do not require a license or registration to practice engineering, an individual performing discretionary traffic control device acts shall have a level of traffic engineering expertise equivalent to that of a professional engineer.
   - Basis for recommendation: Some MUTCD content is written to provide guidance in making decisions related to certain traffic control device activities. These decisions are engineering decisions that should be made by a professional engineer with the appropriate training, experience, and expertise.

515. Traffic control device ministerial acts should be performed by individuals with proper authority and appropriate training, experience, and expertise.
   - Basis for recommendation: Some MUTCD content is written as instructions that do not require an engineering decision. These instructions can be followed by individuals that have the appropriate training, experience, and expertise to follow the instructions.

GUIDING RULES FOR MUTCD CONTENT

The guiding rules for MUTCD content establish a basic set of expectations that all MUTCD content should meet. Current and future MUTCD content should be evaluated for consistency with these guiding rules.

516. MUTCD content should be consistent with the purpose of the MUTCD.
   a. The recommended purpose of the MUTCD is presented in item 526.
   - Basis for recommendation: Content that is not consistent with the purpose of the MUTCD is irrelevant and should not be included.

517. MUTCD content should establish the appropriate level of mandate for a given traffic control device principle.
   a. The recommended levels of mandate are presented in item 533.
   b. The recommended levels of mandate are intended to give practitioners the appropriate levels of flexibility to address competing needs and resources.
      i. Such flexibility should provide practitioners with the ability to appropriately balance roadway safety, operational efficiency (mobility), and costs, with due

consideration of the needs of the typical road user population at the location where a device is installed and the ability of agencies to implement MUTCD content.

ii. Flexibility should enable effective management of assets and resources.

- Basis for recommendation: MUTCD principles range from absolute requirements (no deviation allowed) to optional practices that have no level of mandate. Compliance with principles is best achieved when the mandate level is appropriate to the need for compliance.

518. MUTCD content should be prepared so that it is useable by the intended MUTCD user and the level of mandate for the content.
    a. The user groups that represent practitioners responsible for conducting traffic control device activities are:
        i. Engineering: Professional engineers with the appropriate training, experience, and expertise. Professional engineers can be involved in all traffic control device activities and can make discretionary decisions as well as perform ministerial acts.
            - Some states and other organizations (such as the federal government) allow an individual to use the term "engineer" without being licensed. Within the context of this VSP, the term engineer is intended to mean an individual who is licensed as a professional engineer or has equivalent qualifications and that has the level of expertise appropriate to make traffic control device decisions.
        ii. Technical: Professional staff with the appropriate training, experience, and expertise. Technical staff may make discretionary decisions if working under the supervision of a professional engineer or complying with recommended practices and may perform ministerial acts as well.
        iii. Field: Individuals responsible for conducting the physical acts of placing, operating, maintaining, and/or removing traffic control devices. Field personnel perform ministerial acts and do not make discretionary decisions.
    - Basis for recommendation: MUTCD principles will not be effective if they are written at a level above that of the intended user.

519. MUTCD content and changes to MUTCD content should be based on one or more of the following:
    a. Widespread national experience that conclusively demonstrates the traffic control device is effective.
    b. Peer-reviewed and published research that demonstrates the traffic control device is effective.
        i. In this context, peer-reviewed implies review and approval by individual reviewers that are not a part of the organization that conducted or sponsored the research.
        ii. In this context, published implies distribution of the research results through a venue other than the organization that conducted or sponsored the research.
    c. A change in federal law or regulation related to traffic control devices.
    - Basis for recommendation: Content should not be included in the MUTCD unless it is adequately justified and/or supported.

520. MUTCD content should not describe traffic engineering practices or other topics that are not traffic control device activities. Examples of traffic engineering practices that should not be in the MUTCD include:
    a. Procedures for determining and setting speed limits.
    b. Procedures for determining advisory speeds.
    c. Procedures for determining traffic signal green time.
    d. Procedures for selecting messages for changeable message signs not defined in the MUTCD.
    - Basis for recommendation: MUTCD content should be limited only to principles that specifically describe the conduct of a traffic control device activity.

521. MUTCD content should caution against over-control of the road user.
    - Basis for recommendation: Excessive use of traffic control devices breeds disrespect, increases road user workload, and increases driver distraction.

522. The MUTCD should not serve as an educational document.
    - Basis for recommendation: The purpose of the MUTCD is to establish principles, but it does not need to explain the reason for those principles.

523. While tort liability is often a traffic control device concern, it should not be a motivating factor in making decisions related to any traffic control device activity.
    - Basis for recommendation: Traffic control device decisions should be based on sound engineering principles and demonstrated effectiveness of the device.

524. The MUTCD should provide a means of accommodating advancements in traffic control device technologies and other traffic control device-related improvements in a timely manner but in a way that does not rush implementation of new technologies before they have been fully evaluated.
    - Basis for recommendation: Advancements in traffic control device and vehicle technologies will introduce new capabilities into the traffic control device field in the coming years. The MUTCD has historically addressed existing traffic control device technologies. New traffic control device technologies are typically not incorporated into the MUTCD until they have been established in practice.

525. MUTCD content should recognize that alternative traffic control device treatments or combinations of treatments may be as or more effective than the treatment specified in the MUTCD. MUTCD content should allow alternative treatments if there is adequate justification or evidence of equal or better performance as long as the alternative treatments do not compromise the uniform standards in the MUTCD.
    - Basis for recommendation: Innovative uses of traffic control devices are appropriate as long as they are consistent with the guiding rules in the MUTCD.

RECOMMENDED MUTCD LANGUAGE

Use of the MUTCD can be improved through the addition of specific language to Part 1. This language clarifies critical aspects about MUTCD intent, use, and application. Such clarifications are not currently included in the MUTCD. The items in this heading should be added to Part 1 (Introduction) of the MUTCD.

526. **Section 1A.XX Purpose of the MUTCD:** The purpose of the MUTCD is to establish national criteria for the use of traffic control devices that meet the needs and

expectations of the target road users on all road systems. This purpose is achieved through the following objectives:

a. Promote national uniformity in the meaning and appearance of traffic control devices.
b. Promote national consistency in the use, installation, and operation of traffic control devices.
c. Provide principles for traffic engineers to use in making decisions regarding the use, installation, operation, maintenance, and removal of traffic control devices.

- Basis for recommendation: The purpose of the MUTCD has never been defined but its purpose is critical in defining what content should be in the MUTCD and how that content should be used.

527. **Section 1A.XX MUTCD Guiding Rules:** MUTCD content should comply with the following guiding rules:

a. See items 516 to 525 for the guiding rules that are recommended for the MUTCD. The basis for recommendation that is provided with each of these items would not be included in the MUTCD.

- Basis for recommendation: The Guiding Rules will help to define the development and inclusion of content in the MUTCD. The Guiding Rules must be included as part of the MUTCD text so that all users will understand the foundational elements of MUTCD content.

528. **Section 1A.XX Target Road Users:** There are two groups of target road users:

a. One target road user group for traffic control devices is an operator of a vehicle. This target user is the reasonable and prudent individual who is alert, attentive, and unimpaired, that has a basic proficiency in operating a vehicle on a specific facility, that has demonstrated a basic understanding of traffic control devices and traffic laws, and is operating in a legal and lawful manner that is appropriate for the facility and conditions, while demonstrating due care for the current conditions on the roadway.
b. Another target road user group for traffic control devices is pedestrians. This target user is an alert and attentive individual who is functioning in a legal and lawful manner that is appropriate for the facility and conditions, while demonstrating due care for the current conditions on the roadway. Pedestrians with disabilities may be blind or vision-impaired, have mobility limitations, or other impairments.

- Basis for recommendation: Proper use of traffic control devices can be optimized by specifying the expectations of the road users that will be responding to the traffic control devices.

529. **Section 1A.XX Traffic Control Device Acts – Ministerial and Discretionary:** There are two types of actions associated with traffic control device activities: ministerial and discretionary.

a. Ministerial acts are those acts involving obedience to clearly defined orders to the extent that the individual is left no choice of his/her own. Within the content of the MUTCD, ministerial acts are those that are associated with conducting an activity specified by a shall, must, or should statement and which comply with any mandate associated with the shall, must, or should statement without deviation.

b. Discretionary acts are those involving the power to make choices among valid alternatives and to exercise independent judgment in choosing a course of action. Within the content of the MUTCD, discretionary acts are those that are associated with a decision to deviate from a must or should statement and with decisions associated with ought or may statements.
c. See item 533 for definitions associated with the levels of mandate.

- Basis for recommendation: Distinctions between the types of acts will provide the ability to establish the qualifications needed to perform selected traffic control device principles.

530. **Section 1A.XX Traffic Control Device Activities:** The activities associated with traffic control devices are:
a. Meaning: The process of defining the meaning of a specific device and the expected road user response to the device.
b. Appearance: The process of establishing the general physical characteristics of a specific device as it appears to the road user. These characteristics include color, shape, legend, and the relative position and layout of individual elements.
c. Use: The process of making a decision to use a specific device at a specific location and the manner and criteria by which such a decision is made given the specific circumstances at that location.
d. Installation: The process of determining the proper position for a device and providing appropriate visibility for the device. Considerations related to installation include height, lateral distance (offset), longitudinal distance from a reference point, and distance from other devices. Installation also includes addressing the visibility/detection of a device. In addition to height, lateral distance, and longitudinal distance, visibility/detection incorporates size, conspicuity, and contrast with the environmental background. The physical activity of installing a device is not an activity for MUTCD content purposes.
e. Operation: The process of establishing how the physical characteristics of a device changes over a relatively short period of time to impact the movement of traffic. Most traffic control devices are static and do not have an operational aspect. However, some devices do operate (such as signals and changeable message signs). Operation does not include gradual deterioration over an extended period of time of physical characteristics due to aging, weathering, or other factors.
f. Maintenance: The process of monitoring the features of a device and its performance and taking appropriate actions so that that it will function in the intended manner throughout the life of the device and be replaced at the end of its useful life.
g. Removal: The process of determining when to remove a specific device from service.

- Basis for recommendation: Distinctions between the types of activities will provide the ability to establish the qualifications needed to perform selected traffic control device principles.

531. **Section 1A.XX MUTCD User:** Traffic control device principles in the MUTCD shall be developed for and used by individuals who are duly authorized and qualified to conduct traffic control device activities. Ministerial activities shall be performed by

individuals that are properly trained to conduct the specific activity. Discretionary activities shall be performed by a professional engineer with the appropriate level of traffic engineering expertise.

a. In states and other agencies/organizations (such as the federal government) that do not require a license or registration to practice engineering, an individual making discretionary traffic control device decisions shall have a level of traffic engineering expertise equivalent to that of a professional engineer.

- Basis for recommendation: Establishes minimum qualifications for those responsible for performing traffic control devices activities. Reduces the potential for individuals that are not qualified to perform traffic control device activities.

532. **Section 1A.XX Traffic Control Device Decision Making:** In making traffic control device decisions , professional engineers should consider the impacts of the decision on the safety and operational efficiency (mobility) of road users at that location, the impact of the decision on the effective utilization of agency resources, cost-effectiveness, and the impact of the decision on enforcement and education aspects of traffic control devices.

- Basis for recommendation: Specifically states that traffic control device decisions require a balance between competing factors.

533. **Section 1A.XX Definitions:** The following heading definitions should be added to the MUTCD (see item 536 for a detailed description of each term):

a. Uniform Standard. A statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. The verb "shall" is used. A uniform standard cannot be revised or modified for any reason.

b. Consistent Standard. A statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. The verb "must" is used. Deviations from a consistent standard are allowed when justified by an engineering study. Consistent standard statements are sometimes modified by Options.

c. Guidance. A statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. The verb "should" is used. Guidance statements are sometimes modified by Options.

d. Option. A statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Consistent Standard or Guidance statement. The verb "may" is used.

e. Preference. A statement of preferred practice in typical situations that carries no requirement, recommendation, or other expectation of compliance. The verb "ought" is used.

f. Support. An informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. The verbs "shall," "must," "should," and "may" are not used in Support statements.

- Basis for recommendation: Definitions are needed for the new levels of mandate that are recommended.

MUTCD CONTENT

This vision recommends changes to MUTCD content and to the manner by which MUTCD content is evaluated.

534. All MUTCD content should be consistent with the Guiding Rules (see items 516 to 525).
    - Basis for recommendation: The Guiding Rules establish basic requirements for MUTCD content. Content that is not consistent with the Guiding Rules should not be included in the MUTCD.
535. The lack of a maintained UVC requires that the recommended legal meaning of traffic control devices should be provided in the MUTCD or a separate document subject to rulemaking.
    a. MUTCD should be the basis for the guidance of motor vehicle laws.
    - Basis for recommendation: Effective use of traffic control devices requires an understanding of their meaning and relation to traffic law.
536. MUTCD content should be structured to provide a range of mandates as described below:
    a. Uniform requirements (Standard)
        i. These represent requirements that are needed to establish uniformity across the nation as they relate to critical aspects of traffic control devices.
        ii. Uniform standards are absolute and cannot be violated at any time under any circumstances. There can be no variation and no range of performance or other criteria.
        iii. Uniform standards use the operative verb "shall."
        iv. Uniform standards are required for the meaning and appearance aspects of traffic control devices. Uniform standards can also be established for other aspects of traffic control devices.
        v. There is no opportunity for the exercise of discretion in the execution of an activity defined by a uniform standard. As such, activities associated with the execution of a uniform standard are ministerial activities.
        vi. Deviations from a uniform standard are not permitted.
        vii. Uniform standards cannot be modified by an option.
    b. Consistent requirements (Standard)
        i. These represent requirements that are needed to establish consistency across the nation as they relate to crucial aspects of traffic control devices.
        ii. Consistent standards define an expected practice that may have a minimum, maximum, or range of criteria.
        iii. Consistent standards use the operative verb "must."
        iv. Consistent standards would most often apply to selected aspects of use and installation, but can be applied to other aspects of traffic control devices.
        v. If the action aligns with the requirement of the consistent standard, there is no discretion in the use of a consistent standard. As such, activities associated with the execution of a consistent standard are ministerial activities.
        vi. Deviations from a consistent standard are discretionary activities and require an engineering study.

c. Recommended practices (Guidance)
    i. These represent recommendations that are needed to promote consistency across the nation as they relate to various aspects of traffic control devices that are deemed important but not crucial.
    ii. Guidance defines a recommended practice.
    iii. Deviations from guidance may be appropriate due to a wide variety of factors.
    iv. Guidance uses the operative verb "should."
    v. Guidance would typically apply to all traffic control device aspects except meaning and appearance.
    vi. If the action aligns with the recommendation of the guidance, there is no discretion in the use of guidance. As such, activities associated with the execution of guidance are ministerial activities.
    vii. Deviations from guidance are discretionary activities and require the conduct of an engineering study or the exercise of engineering judgment.
d. Optional practices (Option)
    i. These represent alternatives that may improve the performance of traffic control devices.
    ii. Options define an optional practice.
    iii. Options use the operative verb "may."
    iv. Options may require an engineering study or the exercise of engineering judgment depending upon the specific language of the option.
    v. Implementation of an option may be appropriate due to a wide variety of factors.
    vi. Options typically apply to all traffic control device aspects except meaning and appearance.
    vii. There is no expectation of compliance with (no requirement to use) an option statement. If an option statement is used, there may be standards or guidance associated with the implementation of the option.
    viii. The decision to implement an option is a discretionary act that requires an engineering study or the exercise of engineering judgment. Once a decision has been made to implement an option, the conduct of an option action is a ministerial act that does not require a decision.
e. Preferred practices (Preference)
    i. These represent preferences that are desirable to improve the performance of traffic control devices.
    ii. Preference defines a desired practice.
    iii. Deviations from preference may be appropriate due to a wide variety of factors.
    iv. Preference uses the operative word "ought."
    v. Preference could typically apply to all traffic control device aspects except meaning and appearance.
    vi. There is no expectation of compliance with a preferred practice.
    vii. If the action aligns with the preference, there is no discretion in the use of preference. As such, activities associated with the execution of preference are ministerial activities.

viii. Deviations from preference are discretionary activities and require the exercise of engineering judgment..

f. Background information (Support)
   i. These represent statements that provide additional information about a traffic control device but which have no associated expectation of action.
   ii. Support does not use any of the other operative words (shall, must, should, ought, or may).

- Basis for recommendation: The creation of additional levels of mandate will provide greater flexibility to practitioners in those areas where flexibility is appropriate.

537. When new traffic control device principles are added to the MUTCD, they should typically be introduced as non-mandatory practices and maintained as such for at least one edition of the MUTCD.
   a. Such an approach provides a means of implementing new practices in a manner that allows agencies to transition previous installations to the preferred practice before they become a required practice.
   b. Such an approach will also provide a national opportunity to evaluate the effectiveness of the principles before they become uniform requirements (uniform standards).

- Basis for recommendation: Traffic control device principles that are implemented without national use can create implementation challenges or demands that were not apparent before establishing the principles.

MUTCD STRUCTURE

As described in the previous chapter, the structure of the 2009 MUTCD is of a stovepipe nature. This structure has been in place for virtually the entire existence of the MUTCD. Users are familiar with this structure and comments to the FHWA RFC in the Spring 2013 indicated a desire to keep the MUTCD as a single document. The vision recommendations related to the MUTCD structure offer a primary recommendation and an alternate recommendation to reorganize the structure of the MUTCD. The decision on the most appropriate structure for the MUTCD is a policy decision – while there may be good reasons that support several different ways of structuring the content – the decision is one that is made at a policy level and not on a technical basis.

538. The MUTCD should continue to exist as a single document with the current structure.
   a. The ability to use MUTCD content can be simplified by labeling traffic control device provisions with “smart tags” that identify the traffic control device, activity(s) being addressed by each provision and the user group(s) that would most likely perform the activity. Additional information, such as the level of mandate, related reference materials, applications, and other information, could also be included as part of the smart tags.
      i. Such smart tags provide the ability to easily reorganize MUTCD content to meet various needs.
      ii. Smart tags may be created for specific applications such as urban intersections, rural intersections, mid-block pedestrian crossings, and others.

These smart tags can be used to illustrate various approaches for traffic control device treatments related to these applications.

b. Basis for recommendation: The splitting of standards into two levels of standards and the creation of the preferred practice level reduce the need for a document that is divided by user group, level of mandate, or traffic control device activity. Furthermore, content can be labeled with "smart tags" so that the electronic version of the MUTCD can be reorganized into individual "break-out" documents to better suit the needs of a specific user group.

539. Significant effort should be devoted to a study of how portions of the MUTCD can be subject to rulemaking while other portions of the MUTCD can be revised/updated without going through the rulemaking process. Such an effort should:
    a. Develop a method for determining what content should go through rulemaking and what should not.
    b. Involve a dialogue with high-level policymakers at the FHWA to identify potential options and explore legal options for accomplishing the desired outcome.

If the MUTCD is to be restructured, the following recommendations present the recommended form of structure.

540. The MUTCD for the mid-2030s should be structured as a multi-volume single document as indicated below. Each volume is described in a separate item in the subsequent items.
    a. Volume 1: Definitions, Meaning, and Appearance
    b. Volume 2: Use, Operation, and Removal
    c. Volume 3: Installation and Maintenance (Typical Applications)
    - Basis for recommendation: See basis descriptions for individual volumes (see items 541, 542, and 543).

541. Volume 1: Definitions, Meaning, and Appearance. This volume would contain the following content:
    a. Definitions that are used in the 2009 MUTCD.
        i. These would be the same as the definitions that are currently in Section 1A.13 of the 2009 MUTCD.
    b. Meaning of all traffic control devices.
        i. Meaning of traffic control devices includes:
            - Name.
            - Purpose.
            - Expected road user response.
    c. Appearance characteristics of all traffic control devices.
        i. Appearance of traffic control devices includes:
            - Color.
            - Shape.
            - Legend.
            - Detection.
            - Texture.
            - Sound.

- Relative position and proportion of individual elements.

ii. Appearance does not include size as a characteristic (size is an installation characteristic).

d. All content in this volume would be presented as uniform standards that could not be revised or modified for any reason.

e. This volume could be cited in the CFR as the national standard for traffic control devices if there is a desire to limit rulemaking to only a portion of MUTCD content.

i. If Volume I were the only volume subject to rulemaking, then mandatory requirements (shall and must) could not be used in the other volumes.

ii. This would necessitate a change in the approach of defining content in the other volumes or would require that other volumes that contain shall and must statements also be subject to rulemaking.

f. Volume I could be revised only through the federal rulemaking process.

▪ Basis for recommendations:

(i) Appearance is a standard. Individuals that are responsible for fabricating traffic control devices are typically not involved in other traffic control device activities.

(ii) Citing this as the national standard establishes uniformity in meaning and appearance and does not allow meaning and appearance to be altered.

(iii) Traffic control device meaning is a legal/policy issue. While the meaning of some traffic control devices may be defined in state laws, the MUTCD establishes the official meaning/definition for traffic control devices used in the U.S. It is absolutely essential that device meaning be constant and unvarying. There can be no variation in traffic control device meaning. Once established, traffic control device meaning does not need to be referenced by users on a regular basis.

(iv) Critical aspects of traffic control device appearance are also a legal/policy issue. As with meaning, it is absolutely essential that the critical aspects of traffic control device appearance be constant and unvarying. The critical aspects of traffic control device appearance that cannot change include color and shape. These aspects of appearance are uniform standards that cannot be varied except through rulemaking.

(v) The expected users of Volume I are all practitioners plus other groups that are not normally involved in traffic control device decision making.

(vi) Practitioners are expected to use Volume I only as a reference in the conduct of the other traffic control device activities. They are not expected to use it on a daily basis.

(vii) Manufacturers, fabricators, and others that make traffic control devices would need only Volume I to perform their work. This would improve the probability that such groups will have all the information they need to meet their responsibilities.

542. Volume II: Use, Operation, and Removal. The volume would contain the following content:

a. Traffic control devices principles related to use, operation, and removal activities.

b. The content in this volume would be presented as uniform standards, consistent standards, guidance, options, preferences, and support.
c. The content in this volume could be used by technicians and field personnel when conducting a ministerial act (traffic control device principles provide specific instruction such that there is no decision to be made).

- Basis for recommendation:
  (i) Volume II is intended to be the decision-making portion of the MUTCD.
  (ii) Volume II contains principles that are used in the process of determining the use and application of traffic control devices and in preparing roadway plans.

543. Volume III: Installation and Maintenance. This volume would contain the following content:
   a. Traffic control device principles related to installation and maintenance activities. These would include:
      i. Height
      ii. Lateral placement
      iii. Longitudinal placement
      iv. Size
      v. Visibility characteristics (size, legibility, contrast, conspicuity). Examples of visibility characteristics in the current MUTCD include: enhanced conspicuity (as described in Section 2A.15), enhanced contrast (as described in Section 3A.05), and backplates (as described in Section 4D.12).
   b. Typical applications illustrating position and coordination of various traffic control devices that may be used at a single location.
      i. These would be drawings that illustrate the typical use and placement of traffic control devices for a given situation. Departure from the use or placement illustrated in the typical application would require an engineering decision.
   c. Written so that field personnel can use without making engineering decisions.
   - Basis for recommendation:
     (i) Pertinent MUTCD content should be available in a manner that makes it easy to use by field personnel.
     (ii) Volume III could be published as a transportable and durable printed document that can withstand field conditions.
     (iii) Volume III would consolidate field-related content so that field users are not diverted or confused by discretionary content intended for engineers.

MUTCD REVISIONS

The vision items in this heading recommend changes to the manner by which MUTCD content is added or revised.

544. A new edition of the MUTCD should be published every 8-10 years.
   - Basis for recommendation: There is a need for stability following the publication of a new edition before beginning the extensive process of preparing a new

edition. This helps to identify new content in the current edition that needs to be modified based on experience with the new principles.

545. MUTCD revisions between new editions should be limited to only those that address one or more of the following:
    a. To address known errors or inaccuracies in the current edition.
    b. To address a change in national law or regulation.
    c. To address a significant safety, operational, or administrative issue.
    d. To provide principles for new devices not currently addressed in the MUTCD that are, or will soon be, in widespread use throughout the nation.
    - Basis for recommendation: Revisions between editions may not be recognized by all users, particularly those that rely upon printed versions of the MUTCD. Also, new editions issued too frequently put a burden on agencies to frequently retrain their staff on all the new provisions of the MUTCD.

546. Large MUTCD NPA rulemaking actions should provide more thorough review of the proposed content and impacts of the proposed content. This can be achieved through one or more of the following actions:
    a. Limit the size of a single rulemaking action to no more than 100 items identified in the *Federal Register* notice.
        i. Question: We are specifically asking for input on what is an appropriate value for the maximum number of significant items in a rulemaking.
    b. Extend the docket comment period for NPA rulemaking that has more than 100 items to encompass at least 2 NCUTCD meetings.
        i. Question: We are specifically looking for input on what is an appropriate value for the length of a docket period with a large number of *Federal Register* items.
    c. Revise the CFR so that only a portion of the MUTCD requires rulemaking to make changes or additions.
    d. Limiting the number of changes will make it easier for the public to digest the impacts of proposed changes and evaluate the value of the proposed changes.
    - Basis for recommendation: It is difficult to review and coordinate large numbers of significant items in a proposed rule.

547. The FHWA should limit the number of open MUTCD rulemaking actions to no more than two at any point in time.
    - Basis for recommendation: The limit will help to promote greater consistency between rulemaking actions and will avoid having a single large rulemaking broken up into numerous smaller rulemakings.

548. An MUTCD NPA rulemaking action should take full advantage of the benefits of a thorough NCUTCD review and comment on the proposed language through one of the following actions:
    a. The FHWA should publish an NPA notice in the *Federal Register* no less than one month in advance of an NCUTCD meeting.
    b. If the NPA notice is published less than one month before an NCUTCD meeting, the docket comment period should extend through at least the second NCUTCD meeting following the publication of the notice.

- Basis for recommendation: The NCUTCD is a group that represents a significant cross-section of groups and practitioners with an interest in traffic control device principles and that are responsible for using the MUTCD on a daily basis.

549. The FHWA should publish a Supplemental NPA (SNPA) if any of the following situations occur:
    a. An NPA has more than 100 items in the Federal Register notice and the number of docket comments is substantial.
        i. A substantial number of comments is defined as more than 100 unique, non-form letters submitted to the docket.
    b. The NPA has more than 100 items in the Federal Register notice and the comment period is less than 6 months.
    c. The FR, in the absence of an SNPA, would contain new language that was not included in the NPA.
    - Basis for recommendation: When changes are made to NPA language, those changes benefit from review by the practitioners responsible for complying with the provisions to avoid conflicts and errors before being published as a final rule.

550. Proposed changes to MUTCD required or recommended principles shall include a safety and/or operational assessment of the individual changes as part of the NPA.
    - Basis for recommendation: Previous rulemaking efforts have not provided detailed assessments of the benefits associated with a proposed change in an MUTCD requirement.

551. Proposed changes to MUTCD required or recommended principles changes shall include an estimated economic impact of the individual changes as part of the NPA. The estimate should address not only the costs associated with replacement of the device itself, but also any updating of related infrastructure (such as sign supports or signal poles/arms). The assessment should be of life cycle costs and not limited to just the 7-year time frame associated with the unfunded mandate regulations.
    a. The estimate should recognize that some existing traffic control device provisions require significant infrastructure modifications that may not be economically feasible for the limited benefits that might be realized.
    - Basis for recommendation: With the exception of the minimum retroreflectivity requirements, previous rulemaking efforts have stated only that economic impacts are not significant and have not provided a detailed assessment or analysis of the economic impacts of changes to requirements or recommendations. A detailed analysis is needed to determine whether a proposed change contributes to the classification of a rulemaking action as an unfunded mandate.

552. Changes to MUTCD content should be proposed only if the changes are adequately justified by one or more of the following (see related item 519 for additional detail):
    a. Widespread national experience.
    b. Peer-reviewed and published research that indicate a safety, operational, or economic improvement.
    c. A change in federal law or regulation.
    - Basis for recommendation: MUTCD content, particularly requirements or recommendations, should not be added or revised simply on the perception that it is beneficial to incorporate into the MUTCD.

553. When new content that does not meet the justification in item 552 is proposed for the MUTCD, it should be presented as preferred practice (see related item 537 for additional detail).
    - Basis for recommendation: Requirements or recommendations should not be added to the MUTCD without sufficient justification.
554. When an MUTCD FR is published, the FHWA should distribute a markup that shows the changes from the NPA to the FR.
    a. This markup would be in addition to the markup that shows changes from the previous MUTCD.
    - Basis for recommendation: To provide the ability to assess the number of changes that are made as part of the final rule (in response to docket comments) that were not in the NPA. This would allow MUTCD users to quickly assess where changes have been made from the material that was provided for review and comment.

CHAPTER 4:
RECOMMENDED STRATEGIC PLAN

For purposes of this document, the strategic plan describes the manner in which the recommended items of the vision are implemented, assuming the items in this draft are approved. In essence, it represents a road map for achieving the MUTCD that is desired by the mid-2030s. It is worth noting that the actual content of the strategic plan portion depends upon what items are actually approved in the final vision. The strategic plan is structured into four phases.

PHASE I – COMPLETION OF STRATEGIC PLANNING PROCESS

The items associated with this phase are projected to occur between the present time and 2015. The intent of this phase is to complete the MUTCD strategic planning effort and to identify additional activities that are needed to address the long-range needs of the MUTCD.

801. There should be a comprehensive evaluation of the differences in state traffic laws (rules of the road) that are related to traffic control devices or otherwise impact the use of traffic control devices.
802. There should be a comprehensive evaluation of the differences in state tort liability laws that are related to traffic control devices or otherwise impact the use of traffic control devices.
803. There should be a comprehensive evaluation of the differences in state engineering practice/registration laws that are related to traffic control devices or otherwise impact the use of traffic control devices.
804. The VSP should be adopted by the NCUTCD and submitted to the FHWA as NCUTCD policy.
    a. Approval is expected to occur in January 2014 with submission to the FHWA in spring 2014.
805. Other MUTCD stakeholder groups should evaluate the draft VSP in late 2013 and take formal action to approve it.
    a. Some organizations may wish to wait until the NCUTCD establishes its official position before adopting their own positions.
806. The FHWA should publish an RFC on the NCUTCD approved plan, recognizing that some groups may have adopted changes to the NCUTCD plan.
    a. The RFC will provide opportunity for broader comment on the VSP.
807. The FHWA should not initiate rulemaking on the MUTCD until the completion of the strategic planning process unless rulemaking is needed for a specific or small number of urgent issues that cannot wait until the 2018 MUTCD.

PHASE II – PREPARATION OF AND RULEMAKING FOR THE 2018 MUTCD

Once the MUTCD strategic planning process is completed, there will be sufficient direction to begin preparation of the next MUTCD. For purposes of this document, the next MUTCD is assumed to be published in 2018.

808. The focus of the 2018 MUTCD should be improvement of the content in the 2009 MUTCD.
    a. There should not be major changes in the 2018 MUTCD in order to provide a level of stability in the MUTCD over at least two editions.
809. Changes introduced in the 2018 edition should be limited to:
    a. Correcting errors or inaccuracies in the 2009 MUTCD.
    b. Adding content to address new technologies or treatments that have been introduced or developed since publication of the last MUTCD.
    c. Adding content necessitated by new legislation.
    d. Adding content related to an urgent or critical need.
810. The NCUTCD should begin work on developing smart tags or other content-coordination processes for incorporation into the 2025 MUTCD.

PHASE III – PREPARATION OF 2025 MUTCD

Once the 2018 MUTCD is published, the NCUTCD and FHWA can begin work on the 2025 MUTCD.

811. The focus of the 2025 MUTCD should be a restructuring of the levels of mandate within the 2009 and 2018 MUTCDs.
812. The NCUTCD should evaluate current MUTCD language to determine:
    a. Shall statements that are more appropriately stated as must statements.
    b. Should statements that are more appropriately stated as ought statements.
    c. Other content for which the level of mandate should be changed.
813. NCUTCD activity related to level of mandate should consider material previously submitted to FHWA that has not yet been incorporated into the MUTCD.
814. Due to the expected number of changes associated with the 2025 MUTCD, the FHWA should conduct rulemaking in a manner consistent with the recommendations in Chapter 2, specifically the limitations on the amount of material in a single rulemaking and limits on the number of concurrent rulemakings.
    a. This may necessitate some early NPA rulemakings.

PHASE IV – PREPARATION OF 2033 MUTCD

Plans for the 2033 MUTCD are difficult to propose due to uncertainty over content and advances in communication technologies. This plan assumes that technologies will have advanced sufficiently to provide the ability for specific users to select MUTCD content that is pertinent to only a specific group or specific application (such as urban intersections).

815. The FHWA develops the necessary information technology tools so that MUTCD content can be easily categorized by all of the following:
    a. Expected user group(s).
    b. Expected traffic control device activity.
    c. Typical traffic control device type of application(s) (location or use). A few examples of applications include:
        i. Urban intersection.

ii. Rural intersection.
iii. Residential street.
iv. Mid-block pedestrian crossing.
v. Pedestrian facilities.

d. Level of mandate.

816. The NCUTCD completes the process of categorizing every sentence in the MUTCD by the desired categories.

817. The FHWA, with support from the NCUTCD, completes the process of developing an electronic draft version of the MUTCD that can be restructured according to various needs and that provides the ability to quickly and easily combine content that relates to a specific need or application.

818. The FHWA initiates rulemaking for the restructurable MUTCD.

819. New content is included in the NPA rulemaking effort in a manner that is consistent with the recommendations in the vision.

CHAPTER 5:
REFERENCES

DOCUMENTS

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Federal Register, National Standards for Traffic Control Devices; Revision of Manual on Uniform Traffic Control Devices. FHWA Docket No. 86-12, Vol 51, No. 110, June 9, 1986.

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Government Printing Office, Code of Federal Regulations, Title 23, Part 655. "Traffic Control Devices on Federal-Aid and Other Streets and Highways." http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=b7cc2200066b6240b626b1c8b19d2291&rgn=div6&view=text&node=23:1.0.1.7.30.2&idno=23 (Accessed May 2013).

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National Committee on Uniform Traffic Control Devices. http://ncutcd.com (Accessed May 2013).

APPENDIX A:
CODE OF FEDERAL REGULATIONS 23 CFR 655

Notes:

- The CFR language in this appendix represents the current version as of May 23, 2013.
- This appendix does not include Appendix to Subpart F of Part 655—Alternate Method of Determining the Color of Retroreflective Sign Materials and Pavement Marking Materials

Title 23: HIGHWAYS
PART 655—TRAFFIC OPERATIONS
SUBPART F—TRAFFIC CONTROL DEVICES ON FEDERAL-AID AND OTHER STREETS AND HIGHWAYS

§ 655.601 Purpose.

To prescribe the policies and procedures of the Federal Highway Administration (FHWA) to obtain basic uniformity of traffic control devices on all streets and highways in accordance with the following references that are approved by the FHWA for application on Federal-aid projects:

(a) MUTCD.

(b) AASHTO Guide to Metric Conversion.

(c) AASHTO Traffic Engineering Metric Conversion Factors.

(d) The standards required in this section are incorporated by reference into this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the FHWA must publish notice of change in the Federal Register and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Transportation Operations, 1200 New Jersey Avenue SE., Washington, DC 20590, (202) 366-8043 and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA call (202) 741-6030, or go to http://www.archives.gov/federal-register/cfr/index.html.

(1) AASHTO, American Association of State Highway and Transportation Officials, Suite 249, 444 North Capitol Street NW., Washington, DC 20001

(i) AASHTO Guide to Metric Conversion, 1993;

(ii) AASHTO, Traffic Engineering Metric Conversion Factors, 1993—Addendum to the Guide to Metric Conversion, October 1993.

(2) FHWA, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, telephone (202) 366-1993, also available at http://mutcd.fhwa.dot.gov.

(i) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition, including Revisions No. 1 and No. 2, FHWA, dated May 2012.

(ii) [Reserved]

[77 FR 28466, May 14, 2012]

§ 655.602 Definitions.

The terms used herein are defined in accordance with definitions and usages contained in the MUTCD and 23 U.S.C. 101(a).

§ 655.603 Standards.

(a) National MUTCD. The MUTCD approved by the Federal Highway Administrator is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). For the purpose of MUTCD applicability, open to public travel includes toll roads and roads within shopping centers, airports, sports arenas, and other similar business and/or recreation facilities that are privately owned but where the public is allowed to travel without access restrictions. Except for gated toll roads, roads within private gated properties where access is restricted at all times are not included in this definition. Parking areas, driving aisles within parking areas, and private highway-rail grade crossings are also not included in this definition.

(b) State or other Federal MUTCD. (1) Where State or other Federal agency MUTCDs or supplements are required, they shall be in substantial conformance with the National MUTCD. Substantial conformance means that the State MUTCD or supplement shall conform as a minimum to the standard statements included in the National MUTCD. The FHWA Division Administrators and Associate Administrator for the Federal Lands Highway Program may grant exceptions in cases where a State MUTCD or supplement cannot conform to standard statements in the National MUTCD because of the requirements of a specific State law that was in effect prior to the effective date of this final rule, provided that the Division Administrator or Associate Administrator determines based on information available and documentation received from the State that the non-conformance does not create a safety concern. The guidance statements contained in the National MUTCD shall also be in the State Manual or supplement unless the reason for not including it is satisfactorily explained based on engineering judgment, specific conflicting State law, or a documented engineering study. The FHWA Division Administrators shall approve the State MUTCDs and supplements that are in substantial conformance with the National MUTCD. The FHWA Associate Administrator of the Federal Lands Highway Program shall approve other Federal land management agencies MUTCDs and supplements that are in substantial conformance with the National MUTCD. The FHWA Division Administrators and the FHWA Associate Administrators for the Federal Lands Highway Program have the flexibility to determine on a case-by-case basis the degree of variation allowed.

(2) States and other Federal agencies are encouraged to adopt the National MUTCD in its entirety as their official Manual on Uniform Traffic Control Devices.

(3) States and other Federal agencies shall adopt changes issued by the FHWA to the National MUTCD within two years from the effective date of the final rule. For those States that automatically adopt the MUTCD immediately upon the effective date of the latest edition or revision of the MUTCD, the FHWA Division Administrators have the flexibility to allow these States to install certain devices from existing inventory or previously approved construction plans that comply with the previous MUTCD during the two-year adoption period.

(c) Color specifications. Color determinations and specifications of sign and pavement marking materials shall conform to requirements of the FHWA Color Tolerance Charts.[1] 1 An

[1] Available for inspection from the Office of Traffic Operations, Federal Highway Administration, 1200 New Jersey Avenue, SE., Washington, DC.

alternate method of determining the color of retroreflective sign material is provided in the appendix.

(d) Compliance —(1) Existing highways . Each State, in cooperation with its political subdivisions, and Federal agency shall have a program as required by 23 U.S.C. 402(a), which shall include provisions for the systematic upgrading of substandard traffic control devices and for the installation of needed devices to achieve conformity with the MUTCD. The FHWA may establish target dates of achieving compliance with changes to specific devices in the MUTCD.

(2) New or reconstructed highways. Federal-aid projects for the construction, reconstruction, resurfacing, restoration, or rehabilitation of streets and highways shall not be opened to the public for unrestricted use until all appropriate traffic control devices, either temporary or permanent, are installed and functioning properly. Both temporary and permanent devices shall conform to the MUTCD.

(3) Construction area activities. All traffic control devices installed in construction areas using Federal-aid funds shall conform to the MUTCD. Traffic control plans for handling traffic and pedestrians in construction zones and for protection of workers shall conform to the requirements of 23 CFR part 630, subpart J, Traffic Safety in Highway and Street Work Zones.

[48 FR 46776, Oct. 14, 1983, as amended at 51 FR 16834, May 7, 1986; 68 FR 14139, Mar. 24, 2003; 71 FR 75115, Dec. 14, 2006; 74 FR 28442, June 16, 2009; 74 FR 66861, Dec. 16, 2009]

§ 655.604 Achieving basic uniformity.

(a) Programs. Programs for the orderly and systematic upgrading of existing traffic control devices or the installation of needed traffic control devices on or off the Federal-aid system should be based on inventories made in accordance with the Highway Safety Program Guideline 21, "Roadway Safety." These inventories provide the information necessary for programming traffic control device upgrading projects.

(b) Inventory. An inventory of all traffic control devices is recommended in the Highway Safety Program Guideline 21, "Roadway Safety." Highway planning and research funds and highway related safety grant program funds may be used in statewide or systemwide studies or inventories. Also, metropolitan planning (PL) funds may be used in urbanized areas provided the activity is included in an approved unified work program.

[48 FR 46776, Oct. 14, 1983, as amended at 71 FR 75115, Dec. 14, 2006]

§ 655.605 Project procedures.

(a) Federal-aid highways. Federal-aid projects involving the installation of traffic control devices shall follow procedures as established in 23 CFR part 630, subpart A, Federal-Aid Programs Approval and Project Authorization. Simplified and timesaving procedures are to be used to the extent permitted by existing policy.

(b) Off-system highways. Certain federally funded programs are available for installation of traffic control devices on streets and highways that are not on the Federal-aid system. The procedures used in these programs may vary from project to project but, essentially, the guidelines set forth herein should be used.

§ 655.606 Higher cost materials.

The use of signing, pavement marking, and signal materials (or equipment) having distinctive performance characteristics, but costing more than other materials (or equipment)

commonly used may be approved by the FHWA Division Administrator when the specific use proposed is considered to be in the public interest.

§ 655.607 Funding.

(a) Federal-aid highways. (1) Funds apportioned or allocated under 23 U.S.C. 104(b) are eligible to participate in projects to install traffic control devices in accordance with the MUTCD on newly constructed, reconstructed, resurfaced, restored, or rehabilitated highways, or on existing highways when this work is classified as construction in accordance with 23 U.S.C. 101(a). Federal-aid highway funds for eligible pavement markings and traffic control signalization may amount to 100 percent of the construction cost. Federal-aid highway funds apportioned or allocated under other sections of 23 U.S.C. are eligible for participation in improvements conforming to the MUTCD in accordance with the provisions of applicable program regulations and directives.

(2) Traffic control devices are eligible, in keeping with paragraph (a)(1) of this section, provided that the work is classified as construction in accordance with 23 U.S.C. 101(a) and the State or local agency has a policy acceptable to the FHWA Division Administrator for selecting traffic control devices material or equipment based on items such as cost, traffic volumes, safety, and expected service life. The State's policy should provide for cost-effective selection of materials which will provide for substantial service life taking into account expected and necessary routine maintenance. For these purposes, effectiveness would normally be measured in terms of durability, service life and/or performance of the material. Specific projects including material or equipment selection shall be developed in accordance with this policy. Proposed work may be approved on a project-by-project basis when the work is (i) clearly warranted, (ii) on a Federal-aid system, (iii) clearly identified by site, (iv) substantial in nature, and (v) of sufficient magnitude at any given location to warrant Federal-aid participation as a construction item.

(3) The method of accomplishing the work will be in accordance with 23 CFR part 635, subpart A, Contract Procedures.

(b) Off-system highways. Certain Federal-aid highway funds are eligible to participate in traffic control device improvement projects on off-system highways. In addition, Federal-aid highway funds apportioned or allocated in 23 U.S.C. are eligible for the installation of traffic control devices on any public road not on the Federal-aid system when the installation is directly related to a traffic improvement project on a Federal-aid system route.

Appendix to Subpart F of Part 655—Alternate Method of Determining the Color of Retroreflective Sign Materials and Pavement Marking Materials

Not included in this appendix but available on-line at:
http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=b7cc2200066b6240b626b1c8b19d2291&rgn=div6&view=text&node=23:1.0.1.7.30.2&idno=23.

APPENDIX B:
HISTORY AND GROWTH OF THE MUTCD

The MUTCD was first published in 1935 and there have been succeeding editions in 1942, 1948, 1961, 1971, 1978, 1988, 2000, 2003, and 2009. Table 2 summarizes the evolution of the MUTCD and key information about the size of each edition. The need for uniform standards was recognized long ago. The American Association of State Highway Officials (AASHO), now known as the American Association of State Highway and Transportation Officials (AASHTO), published a signing manual for rural highways in 1927, and the National Conference on Street and Highway Safety (NCSHS) published a traffic control device manual for urban streets in 1930. In the early 1930s, the necessity for unification of the standards applicable to the different classes of road and street systems was obvious. To meet this need, a joint committee of AASHO and NCSHS developed and published the original edition of this Manual on Uniform Traffic Control Devices (MUTCD) in 1935. A special War Emergency Edition of the MUTCD was published in 1942 to address the unique needs of World War II. These first two editions represent the initial era of the MUTCD. The first post-war edition was published in 1948 and represented a significant change from the earlier editions. The 1961 edition also represented a significant change from the 1948 edition. The 1948 and 1961 editions represent the transition era as the MUTCD expanded to include more items. A new edition was published in 1971 and represented the first edition administered by the FHWA as they took ownership of the MUTCD shortly after publication of the 1971 edition. Later editions in the mature era are the 1978 and 1988 MUTCDs. After publication of the 1988 MUTCD, work began on a significantly revised edition, which was published in 2000. This represents the beginning of the modern MUTCD era and the establishment of electronic versions of the MUTCD that were freely available on the FWHA website. The 2000 MUTCD contained numerous shortcomings which were addressed by the publication of a new edition relatively soon in 2003. The most recent edition was published in 2009.

Table 2. Summary of MUTCD Evolution

Edition	MUTCD Era	Pages	Parts	Size (inches)	Thickness (inches)
1935	Initial	166	4	6×9	⅜
1942		208	4	6×9	⅜
1948	Transition	223	4	6×9	⅜
1961		333	6	6×9	⅝
1971*	Mature	377	8	6×9	¾
1978		425	9	6×9	1⅜
1988		473	9	6×9	1⅜
2000	Modern	982	10	8½×11	1⅝
2003		754	10	8½×11	1¼
2009		864	9	8½×11	1⅝

Note: *FHWA assumed MUTCD ownership

As the MUTCD has progressed through the years, it has also grown in size and depth of content. Figure 1 illustrates the growth of the MUTCD over its lifetime as a function of the area of total pages. Until the publication of the 2000 edition, the MUTCD was printed on pages that were 6×9 inches. Beginning with the 2000 edition, the size of a page increased to 8½×11 inches. The figure accounts for this change in size by reporting MUTCD size as area instead of the number of pages. The figure also indicates a decrease in the number of pages between the 2000 and 2003 editions. This was achieved through a reduction in white space (reduced fonts and line spacing).

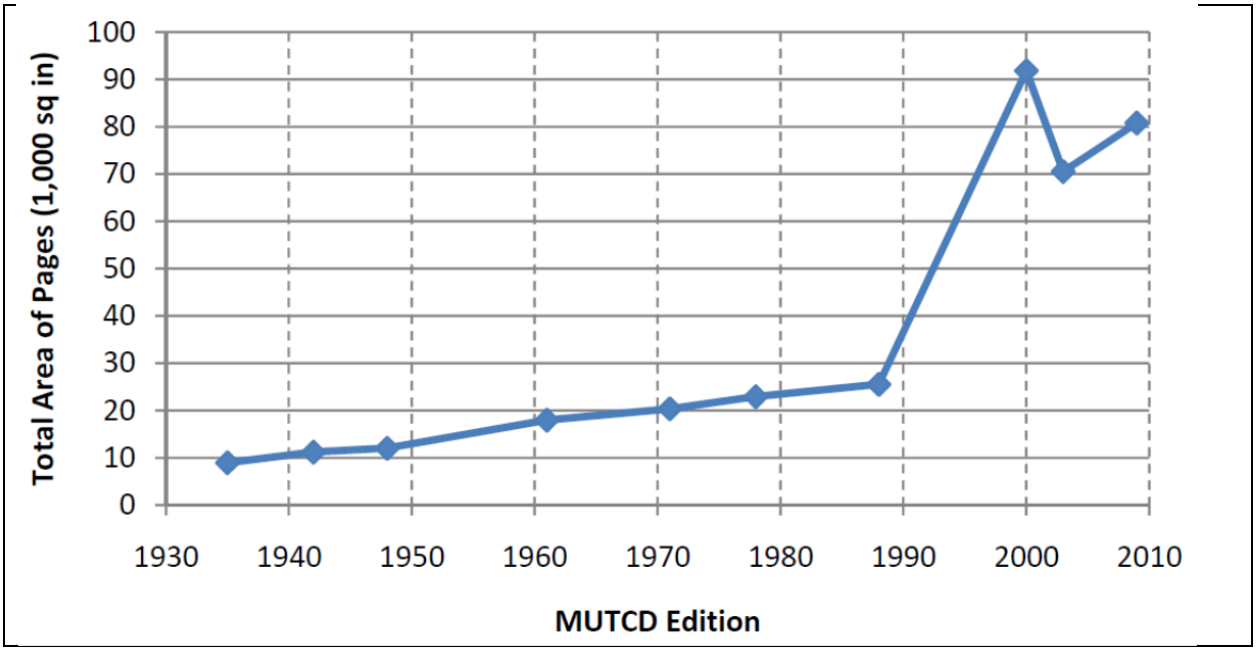

Figure 1. Growth of the MUTCD

Prior to the publication of the 2000 edition, the MUTCD provided a significant amount of general guidance information (before guidance was defined as a "should" statement). The MUTCD editions prior to 2000 provided the practitioner with a great deal of flexibility (some may say too much) in adapting traffic control device decisions to the local circumstances. Many practitioners thought they had flexibility because the shall, should, and may statements were intertwined in every paragraph. This was confusing and led to misinterpretations of the intent of the MUTCD. The 2000 MUTCD was an attempt to correct these misinterpretations. The 2009 edition has transitioned from the earlier documents that provided significant amounts of flexibility to one that is very prescriptive in nature. The more prescriptive nature of the 2009 MUTCD is indicated by the increase in the use of the words shall, should, and may compared to the 2003 MUTCD as shown in Table 3.

Table 3. Comparison of Shall, Should, and May between 2009 and 2003 Editions

Edition	Number of Times the Word Occurs*		
	Shall	Should	May
2003	2,073	2,152	1,377
2009	2,987	2,503	1,661
# Increase	914	351	284
% Increase	44%	16%	21%

*In the text of the MUTCD, does not include figures or tables.

The structure of the MUTCD has also grown over time. The MUTCD began in 1935 with four parts and has grown to as many as ten parts, as was the case with the 2003 MUTCD. However, the sign part of the MUTCD contains many chapters for different types of signs. Many of these sign chapters rival other parts of the MUTCD in the breadth of content. Table 4 identifies when each part (and chapters for signs) were added to a new edition of the MUTCD. It is worth noting that the devices associated with specific applications were often included in earlier editions before that application became a stand-alone part of the MUTCD. An example is that the signing and signals for highway-railroad grade crossings were included in earlier editions of the MUTCD before they were separated out into Part 8 with the publication of the 1978 edition.

Detailed information about the evolution of the MUTCD and copies of previous editions of the MUTCD can be found on the MUTCD History website.[1]

[1] See Gene Hawkins "History of the MUTCD" at https://ceprofs.civil.tamu.edu/ghawkins/MUTCD-History.htm.

Table 4. Growth of Parts and Sign Chapters

Part and Chapter	Edition									
	1935	**1942[C]**	**1948**	**1961**	**1971**	**1978**	**1988**	**2000**	**2003**	**2009**
Introduction/General	0	0	0	0	1	1	1	1	1	1
Definitions	0	0	0	App A	8	×	×	1	1	1
Signs	1	1	1	1	2	2	2	2	2	2
Sign Introduction	×	×	1A	1A	2A	2A	2A	2A	2A	2A
Regulatory Signs	×	×	1B	1B	2B	2B	2B	2B	2B	2B
Warning Signs	×	×	1C	1C	2C	2C	2C	2C	2C	2C
Guide Signs	×	×	1D	1D	×	×	×	×	×	×
Guide Signs – Conventional	×	×	×	×	2D	2D	2D	2D	2D	2D
Guide Signs - Expressways	×	×	×	×	2E	2E	2E	2E	2E	2E
Guide Signs - Freeways	×	×	×	×	2F	2F	2F	2E	2E	2E
Motorist/Specific Services Signs	×	×	×	×	×	×	2G	2F	2F	2J
Recreational and Cultural Interest Area Signs	×	×	×	×	×	×	2H	2H	2H	2M
Tourist Oriented Directional Signs	×	×	×	×	×	×	2I	2G	2G	2K
Civil Defense/Emergency Management Signs	×	×	×	6	2G	2G	2J	2I	2I	2N
Toll Road Signs	×	×	×	×	×	×	×	×	×	2F
Preferential and Managed Lane Signs	×	×	×	×	×	×	×	×	×	2G
General Information Signs	×	×	×	×	×	×	×	×	×	2H
General Service Signs	×	×	×	×	×	×	×	×	×	2I
Changeable Message Signs	×	×	×	×	×	×	×	×	×	2L
Markings	2	2	2	2	3	3	3	3	3	3
Signals	3	3	3	3	4	4	4	4	4	4
Islands[A]	4	4	4	4	5	5	5	×	×	×
Low-Volume Roads	×	×	×	×	×	×	×	5	5	5
Temporary Traffic Control[B]	×	×	×	5	6	6	6	6	6	6
School Areas	×	×	×	×	7	7	7	7	7	7
Rail Grade Crossings	×	×	×	×	×	8	8	8	8	8
Light Rail Crossings	×	×	×	×	×	×	×	10	10	×
Bicycles	×	×	×	×	×	9	9	9	9	9

Notes: This table does not identify parts/chapters that were added between publication of new editions.
An × indicates that the part/chapter was not included in that edition of the MUTCD.
A: The islands part of the MUTCD was converted to markings for islands in the 2000 edition and incorporated into Part 3.
B: The title of this part has changed several times through the various editions.
C: Parts 1-4 were provided for both normal conditions and for blackout conditions.

APPENDIX C:
REVISING THE MUTCD

Because it is defined as a federal regulation, the MUTCD can be changed only through the federal rulemaking process. In brief, this means that the responsible federal agency (for the MUTCD, this is the FHWA as part of the Department of Transportation) must publish proposed changes to the MUTCD so that the public can comment on those changes. It is worth noting that the terms "rulemaking" and "amendments" are sometimes used interchangeably with respect to revising the MUTCD. However, because the MUTCD is a published document, revisions of the document are more properly defined as amendments rather than rulemaking. The typical steps of the revision process are described below. The order of some of the early steps may vary.

1. **Request for Comments.** This is an optional step and is not always a part of the MUTCD rulemaking process. In this step, the FHWA announces that they are considering rulemaking related to some aspect of the MUTCD and requests comments from the public regarding critical issues identified by the FHWA.
2. **Change Development.** The need for a change is identified. This need may be identified by FHWA, the NCUTCD, an agency, a group, or an individual. The ideas for MUTCD changes typically originate with the FHWA MUTCD team or the NCUTCD.
3. **Experimentation.** If the change does not comply with the current MUTCD, an experiment is conducted to evaluate the effectiveness of the proposed change.
4. **Advance Notice of Proposed Amendments (ANPA).** This is an optional step and is not always a part of the MUTCD rulemaking process. In this step, the FHWA announces the general nature of revisions to the MUTCD that it is considering and asks for public input on those revisions. The descriptions of the proposed revisions may be general and conceptual or they may be specific. The draft language is evaluated and refined by the FHWA in preparation for publication of a Notice of Proposed Amendments (NPA) to the MUTCD
5. **Public Comment for ANPA.** If an ANPA is published, this is a mandatory step. In this step, the public provides input on the ANPA by submitting comments to the Federal Register docket. The length of time that comments will be accepted (how long the docket is open) varies depending upon the amount of material and significance of the revisions being considered.
6. **MUTCD Proposed Language.** Complete draft language for the MUTCD is developed (typically by the FHWA or NCUTCD).
7. **Notice of Proposed Amendments (NPA).** The FHWA publishes an NPA in the *Federal Register*. This is a mandatory step if revisions to the MUTCD are to be proposed. The notice describes the changes being proposed to the MUTCD, explains the justification for the changes, and the deadline for making comments about the proposed changes. Depending upon the scope of the proposed revisions, the descriptions may be limited to the most significant of the revisions. If there was an ANPA, the NPA summarizes the public comments to the ANPA.
8. **Public Comment for NPA.** The public makes comments on the proposed changes by submitting them to the *Federal Register* docket. All comments are viewable to the

public on the www.regulations.gov website. The length of time during which comments can be made varies depending upon the extent of the proposed changes. For a new edition of the MUTCD, the comment period is typically about six months.

9. **Public Comment Review.** The FHWA reviews the public (docket) comments and identifies needed changes to the NPA language as they deem appropriate.
10. **Supplemental Notice of Proposed Amendments (SNPA).** This is an optional step and is not always a part of the MUTCD rulemaking process. The FHWA may publish a Supplemental NPA if the changes they make to the NPA are significantly different in nature from those proposed in the original NPA. The public then comments on the SNPA in the same manner they commented on the NPA.
11. **Public Comment on SNPA.** The public makes comments on the supplemental notice of proposed changes by submitting them to the *Federal Register* docket. All comments are viewable to the public on the http://www.regulations.gov website. The length of time during which comments can be made varies depending upon the extent of the proposed changes.
12. **Final Rule (FR).** In this step, the FHWA publishes a *Federal Register* notice that makes the official changes to the MUTCD as a new MUTCD or a revision of the current MUTCD. The notice provides a response to issues raised by public comments and an updated analysis and justification for the rule, including an analysis of any new data submitted by the public.
13. **Effective Date.** The changes become effective 30 days after the date of the FR.

Once a rulemaking notice is published, the FHWA will not comment on or share plans regarding opinions or anticipated changes to the NPA.

APPENDIX D:
NATIONAL COMMITTEE ON UNIFORM TRAFFIC CONTROL DEVICES

Throughout the life of the MUTCD, there has been a committee associated with the MUTCD. [1] This committee has been known by four different names and has had many changes in membership.[2] In its early years, the committee was responsible for the development and publication of the MUTCD. However, since 1979, the National Committee on Uniform Traffic Control Devices (NCUTCD) has served as an independent organization providing professional input on the content of the Manual, which has been published by the federal government.

The NCUTCD is an organization whose purpose is to assist in the development of standards, guides and warrants for traffic control devices and practices used to regulate, warn and guide traffic on streets and highways. The NCUTCD recommends to the Federal Highway Administration (FHWA) and to other appropriate agencies proposed revisions and interpretations to the Manual on Uniform Traffic Control Devices (MUTCD) and other accepted national standards. NCUTCD develops public and professional awareness of the principles of safe traffic control devices and practices and provides a forum for qualified individuals with diverse backgrounds and viewpoints to exchange professional information.

The earliest form of the NCUTCD was created in 1932 in response to the conflicts caused by having separate manuals for rural and urban areas. It was named the Joint Committee on Uniform Traffic Control Devices (JC). Its purpose was to bring all standards for traffic control devices under one cover and to recognize the rapid developments in the art of traffic control. In its original form, the JC consisted of members representing the American Association of State Highway Officials (AASHO) and the National Conference on Street and Highway Safety (NCSHS). The JC was expanded after the start of World War II to add representatives of the Institute of Traffic Engineers (ITE) to those of AASHO and the NCSHS.

After publication of the 1948 MUTCD, the NCSHS was dissolved and replaced on the JC by the National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) and the committee was renamed the National Joint Committee on Uniform Traffic Control Devices (NJC). In 1960, the American Municipal Association and the National Association of County Officials were added to the committee. The final draft of the 1971 MUTCD was approved by the five parent organizations of the NJC in May 1970.

The publication of the 1971 MUTCD was significant for a number of reasons and marked a point of departure for the NJC. Following the publication of the 1971 MUTCD, the FHWA took over full responsibility for the development of the MUTCD from the NJC. Accordingly, in 1972, the name of the committee was changed to the National Advisory Committee on Uniform Traffic Control Devices (NAC) and its role was changed to that of an official advisory committee to the Secretary of Transportation. Requests for rulings or changes were submitted by FHWA to the NAC and the committee returned its recommendations to FHWA for a final decision. The NAC

[1] http://ncutcd.com/doc/History.pdf (accessed May 27, 2013).
[2] A detailed history of the NCUTCD is found on the NCUTCD website at http://ncutcd.com/doc/History.pdf.

continued to grow, and by the time the 1978 MUTCD was published in September 1978, NAC membership had grown to 10 organizations.

In June 1979, the Secretary of Transportation terminated its sponsorship of the NAC in accordance with President Carter's policy to limit the number of federal advisory committees. About the same time, FHWA also announced it would adopt all future changes to the MUTCD through the Federal Register rulemaking process. The NAC responded to this action by forming the NCUTCD as a new organization that was independent of the federal government. In its new role, the responsibilities of the NCUTCD were to initiate, review, and/or comment on proposed changes to the MUTCD. As such, the NCUTCD had the opportunity to review proposals and make recommendations to the FHWA in the same manner as any other member of the public.

Today, the NCUTCD continues to function in the same way that it has since 1980. The governing body of the NCUTCD is the Council. The Council has 38 members appointed by the 20 sponsoring organizations, which are listed in Table 5. All recommendations and comments of the NCUTCD must be approved by the Council. There is also an Executive Board and 8 permanent Technical Committees: Regulatory/Warning Signs, Guide and Motorist Information Signs, Markings, Signals, Temporary Traffic Control, Railroad and Light Rail Transit Highway Grade Crossings, Bicycle, and Research. The Technical Committees are responsible for developing the recommendations, which are then distributed to the NCUTCD sponsoring organizations for comment before they are presented to the Council for approval. The NCUTCD meets twice a year in January (the week before the Transportation Research Board Annual Meeting) and June in coordination with the AASHTO Subcommittee on Traffic Engineering. An NCUTCD meeting typically lasts 3 days and is attended by approximately 250 individuals.

Table 5. NCUTCD Sponsoring Organizations

American Assoc. of State Highway & Transportation Officials (AASHTO)	Association of Pedestrian and Bicycle Professionals (APBP)
American Automobile Association (AAA)	American Highway Users Alliance (AHUA)
American Public Transportation Association (APTA)	Human Factors Resources (HFR)
American Public Works Association (APWA)	Institute of Transportation Engineers (ITE)
American Railway Engineering & Maintenance of Way Association (AREMA)	International Assoc. of Chiefs of Police (IACP)
American Road & Transportation Builders Association (ARTBA)	International Bridge, Tunnel & Turnpike Association (IBTTA)
American Society of Civil Engineers (ASCE)	International Municipal Signal Association (IMSA)
American Traffic Safety Services Association (ATSSA)	League of American Bicyclists (LAB)
Association of American Railroads (AAR)	National Association of County Engineers (NACE)
	Governors Highway Safety Association (GHSA)
	National Safety Council (NSC)

Proposed MUTCD content that is developed or refined within the NCUTCD process typically experiences the following steps in developing a consensus opinion on the proposal:

1. An NCUTCD task force develops initial language.
2. An NCUTCD technical committee refines and approves the language.

3. The language is sent to NCUTCD sponsoring organizations for comment. The comments are reviewed by the task force, which makes suggested changes to the original language.
4. The revised language is presented to the technical committee. The technical committee may further refine the language before voting to approve the language.
5. The revised language is presented to the NCUTCD Council for a formal vote. At least two-thirds of the Council must vote in favor of a proposal to establish a policy of the NCUTCD.
6. If approved by the Council, the language is sent to the FHWA as an official recommended change to MUTCD language with a request that the language be considered for inclusion in the next MUTCD rulemaking action.

APPENDIX E:
FUTURE OF TRAFFIC CONTROL DEVICES

Our current system of traffic control devices (TCDs) originated in the early part of the 20th century as the amount of automobile traffic increased and it became necessary to control vehicle traffic for both safety and operational reasons. In the early days, there was a great deal of variability in traffic control devices. Signs were hand painted and took whatever appearance the creator thought appropriate. Pavement markings used whatever color provided contrasts and might be used only in limited locations. There were a wide range of traffic signal designs with various arrangements of lenses, colors, and shapes. The recognition of the need to create a uniform system of traffic control devices led to the publication of the first MUTCD in 1935. The national system of traffic control devices achieved uniformity as our surface transportation network matured between the 1930s and 1970s, largely due to the recognition of the MUTCD as the national standard for traffic control devices. The use of the network also grew during this time, increasing the travel between jurisdictions. In the 1970s and 1980s, there began an increase in the prevalence of tort liability claims involving traffic control devices and this led to a restructuring of the MUTCD, which was published in 2000. At the present time, the United States has a well-developed traffic control device infrastructure, which is highly standardized through the MUTCD and which has been relatively stable for over a quarter century. During this last quarter century, there have been numerous advances in traffic control, some of which have found their way into the MUTCD. Among these advances are:

- Brighter sign sheeting.
- Improved sign fabrication practices.
- Light emitting diodes (LEDs) in traffic signals and signs.
- Improvements in traffic signal controller technologies, which increase the signal phasing flexibility.
- Improvements in accessible pedestrian signals.
- Improvements in pedestrian acoustical and tactile devices.

Also during the last 25 years or so, there have been other types of advancements that impact the MUTCD and traffic control devices. These include:

- The MUTCD has become a free, on-line document.
- Revisions to the MUTCD have shifted to the federal rulemaking process.
- The technology revolution in computers, communications, and materials has created expanded opportunities for the use and management of traffic control devices.
- Individual mobility has significantly increased, with much higher travel within and between communities.
- Vehicle technologies and safety features have improved dramatically.
- Tort liability claims related to traffic control devices have increased.

And during the last 5 years or so, the following trends have also impacted the MUTCD and the use of traffic control devices:

- A greater emphasis on accessibility and equality for pedestrians and bicyclists.
- The introduction of new devices with new materials or advanced technologies.
- An increase in the regulation of traffic control devices through more specific language in the MUTCD.
- The sometimes politicalization of the traffic control devices decision-making process, either through legislation or direction by elected officials.
- A reduction in public agency staffing levels and the resulting decrease in traffic engineering expertise.
- The need to bring into uniformity diverse road operators or those entities which have an effect on travel safety in the U.S. such as: railroads, toll authorities, airports and private property open to public travel.
- The increasing demand for various forms of advertising (both in-vehicle, out-of-vehicle) that effectively compete for drivers' attention.
- An enhanced need to "share" roadway, sidewalk and pathway rights-of-way among pedestrians (walkers, joggers, bike, wheelchair) and motorized vehicles (single-person vehicle, mopeds, autos, buses, trucks).
- (Not sure if this is statistically true or not) Increase in red-light running, speeding above the posted speed limit and general disregard for traditional traffic control devices.

Given the recent advances and the expectation of even greater advances in the near future (Moore's law predicts that the number of transistors that can be placed inexpensively on an integrated circuit doubles approximately every two years), there can be little doubt that the transportation system and traffic control environment will be radically different in 20-30 years from what it is today. It is likely that today's professionals will tell their grandchildren the statements below and their grandchildren will stare in disbelief.

- We could drive on roads without paying tolls.
- We had to steer the vehicle with an actual steering wheel (it also had pedals for brakes and gas).
- Signs, markings, and signals told us what to do.
- We used paper maps to help us find our way (already a dated concept).

In the future, we may see some of the following trends occur:

- Increases in most modes of travel:
  - Bus,
  - Rail (light, commuter, heavy, high speed),
  - Pedestrians,
  - Bicycles,
  - Personal (skates, skate/long boards, single person vehicles), and
  - Share-a-car applications.
- Improvements in the traditional passenger vehicle:
  - Predictive cruise control,
  - GPS tracking (needed for vehicle-mile based taxes),
  - Vision enhancements (night vision, traffic control device tracking, vehicle and obstacle identification),

- Driver and vehicle monitoring:
  - Driver drowsiness, distraction, and impairment,
  - Vehicle's position with respect to lane lines,
  - Vehicle's speed with respect to speed limit,
- Reduced reliance on fossil fuels, and
- Fully automated vehicles on selected major facilities.

- Changes in the characteristics of road users:
  - Increase in older drivers (the aging population of the U.S. will bring into increased focus the needs of the elderly and mobility-impaired individuals and their interface with larger and higher-performing road vehicles),
  - Decrease in younger drivers,
  - Increased diversity in driver language,
  - Demand for access to personal transportation despite limitations, and
  - Increase in demand for driver attention.
    - Increase distraction opportunities.
- Improvements to existing traffic control devices (current form likely to exist for another 15± years):
  - TCDs that communicate with vehicles and pedestrians,
    - Roadside traffic control devices that send active messages to vehicles,
    - In-vehicle traffic control devices that supplement the messages of roadside traffic control devices, and
    - Automated road systems that may eliminate the need for traffic control devices on those roads.
  - Enhancements to nighttime visibility (luminescent materials and LEDs in signs and markings, for example),
  - TCD operation associated with vehicle position (vehicles sending position and speed information to smart traffic control devices and/or signals controllers).
  - Active notification of violations,
  - Use of traffic control devices to dynamically manage pavement space,
  - Active warning of intermittent hazards, and
  - Reduction in use of traditional guide signs due to in-vehicle navigation systems.
- Issues related to the use of traffic control devices:
  - Shorter time frames for introducing new products and new devices,
  - Recognition of need for traffic control device expertise in making decisions,
  - Greater communication between agencies responsible for traffic control devices.
  - The MUTCD will need to be adaptable to changing technologies.
- Changes in the roadway environment:
  - Increase in toll roads; either flat or variable pricing (the increase in toll road relates to the issue of agencies and the public being willing to pay for advanced traffic control devices).
  - Increase in variable on-street variable parking pricing or downtown congestion pricing schemes (requiring need for new signing or communication w/drivers re: fees).

There are barriers to these and other advances in traffic control devices and related technologies. Among the barriers are:

- Funding:
  - Will agencies and the public be willing to pay for the improved capabilities of smart traffic control devices?
  - Maintenance demands of the advanced systems could be greater and require higher funding levels.
- Safety and liability:
  - Advanced systems will require a higher level of precision and accuracy than that currently used.
  - Who will be at fault when technology fails?
  - What is the failsafe mode when there is a power failure or other type of failure?
- Accessibility:
  - How do pedestrians and bicyclists fit into an advanced traffic control device system? Will they need tracking capability that is consistent with vehicles?
- Institutional momentum:
  - "We've always done it that way" attitude hinders innovation.
- Privacy:
  - Drivers may want to protect personal travel information.
- Fleet turnover:
  - Some of the advanced traffic control device systems could eliminate the ability of older vehicles to travel on some roads.
- Turf protection:
  - Agencies and industry have an investment in the current system and may want to retain that investment rather than move to newer systems.
- Changing the MUTCD through the rulemaking process is a time-consuming activity and limits the ability of the MUTCD to respond to changing technologies and innovation.
  - Because of the slow pace of MUTCD change, the private sector may be on a second or third generation of technology by the time the first generation is adopted in the MUTCD.

There will be a need in the future to provide some degree of standardization and/or consistency in the manner that in-vehicle traffic control device messages are communicated to drivers. This may be a new part of the MUTCD that addresses how traffic control device are displayed to the driver, automatic vehicle control system response to assure uniform automated response to a traffic control device, fail-safe features, maintenance and how on-board or roadside failures are reconciled by the system. By assuring uniformity of automated vehicle systems to traffic control device (whatever they might look like, if visible at all), there will be standardized response by all vehicles to each traffic control device. This should facilitate queue compression, braking rates and distances, etc.

Given the information described above, the MUTCD of the future should be a document that is adaptable to changing technologies in traffic control devices, vehicles, and user characteristics. The strategic planning effort should focus on overarching visions and goals and should not address issues related to specific traffic control devices.

APPENDIX F:
TARGET GROUP OF DRIVERS

The issue of which drivers traffic control devices are intended to serve is important as it addresses the extent to which agencies should try to accommodate the needs of a wide variety of drivers. It would be simple to say that traffic control devices should accommodate all drivers on roadways. However, this is not a practical expectation. There are some drivers that agencies may not be able to accommodate. Examples include:

- Drivers who are not operating a vehicle in a legal manner. This includes:
  - Drivers who are intoxicated or otherwise legally impaired,
  - Drivers who do not have a driver's license,
  - Drivers who are not operating their vehicle in accordance with the law or that are not complying with traffic control devices, and/or
- Drivers who are not properly trained to operate a vehicle. This includes:
  - Drivers who may have a license in another country but who are not familiar with driving practices in the U.S.,

The 2009 MUTCD recognizes these limitations and includes the following statement:

> *"The proper use of traffic control devices should provide the reasonable and prudent road user with the information necessary to efficiently and lawfully use the streets, highways, pedestrian facilities, and bikeways."*[1]

The capabilities of a driver cannot be understated. Driving is a learned process. The driver must possess a minimum level of knowledge and skill in order to safely operate a vehicle. The driver licensing process provides a means of confirming the competence level of a driver. The Uniform Vehicle Code (UVC) states that an applicant be tested for the following capabilities in order to obtain a driver's license:

- Visual acuity,
- Ability to read and understand official traffic control devices used in the state,
- Knowledge of safe driving practices,
- Knowledge of the traffic laws, and
- Ability to exercise ordinary and reasonable control in the operation of a vehicle.

In possessing these capabilities, a driver should have a basic knowledge of the types of potential situations which may be present in the roadway environment and the type of responses that are appropriate for a given situation. However, the driver is not required to anticipate extraordinary dangers, impediments, or obstructions to which his or her attention has not been directed, or of which he or she has not been warned.

[1] 2009 MUTCD, Section 1A.02, paragraph 06.

Although transportation agencies are responsible for a roadway, they cannot be "an insurer of the road or a guarantor of absolute safety."[1] Courts have recognized that "it is impossible to design and construct a highway that is always free from [hazards]."[2] The responsibility of an agency is to maintain roadways "in a way that is reasonably safe for travel."[1] The driver is required to use reasonable care for his or her own safety. It is only an alert, attentive, and unimpaired driver that can use the roadway in a safe and efficient manner.

[1] S.I. Pivnik and J.B. Humphreys. *Traffic Improvements - Legal Aspects and Liability*. Institute of Transportation Engineers, Washington, D.C., 1980.

[2] Hampton v. State Highway Commission. 200 Kansas 565. 498 P.2d 236 (1972).