Evolution of the MUTCD and Critical Issues Related to the ‘09 Edition

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MUTCD Evolution
The 10 editions of the MUTCD:

MUTCD Growth
How did we end up with a such large document on traffic control devices?

Traffic Control Devices History
Early markers were used in the Roman Empire
Also used on pioneer trails in America
Automobile age created new demands

Automobile Age
Early Intersection Control

Hand signals, police, and semaphores

Traffic Signal Towers

Early Traffic Signals

Many different signal designs

More Early Signals

Early Traffic Control Devices

1920 - 1st 3-color signal Detroit

1911 - 1st centerline Michigan

1914 - 1st electric signal Cleveland

The wide variety of devices created the need for uniformity

Early Traffic Signs
1923 Sign Shape Recommendations
Mississippi Valley Assoc of St Hwy Dept
Number of sides represents hazard level
- RR Grade Crossing
- Caution
- Stop Intersection
- Directions or Regulations
- Warning (speed reduction)

1924 Sign Color Recommendations
National Conference on Street and Highway Safety
For signs and signals
- Red - stop
- White - directions or distance
- Green - proceed
- Purple - intersection
- Yellow - caution

1925 Joint Board Report
Report of Joint Board on Interstate Highways
AASHO led
Developed U.S. Highway system
Included recommendations for standard signs

1927 AASHO Manual
Evolved from Joint Board
First national manual
Rural signs only
Title:
Manual and Specifications for the Manufacture, Display, and Erection of U.S. Standard Road Markers and Signs
Revised 1929 and 1931

1927 Signs
Block letter font

1930 NCHS Manual
Prepared by American Engineering Council
Signs, markings, and signals for urban areas
Title:
Manual on Street Traffic Signs, Signal and Markings
Not Revised
1930 Signs

1935 MUTCD

First MUTCD
1935 mimeograph
1937 typeset

Signs
White or yellow
Diamond, square, circle, octagon

Markings
White, yellow, or black

Signals
3-color signal as standard

1935 Signs

1937 Typeset Revised 1939

1942 MUTCD

Few major changes
Addressed wartime conditions
Conservation of materials
Blackout traffic control

Not Revised

Birth of the MUTCD

Problems of two manuals led to creation of the MUTCD

Joint Committee

1927 Rural Manual
1930 Urban Manual
1935 MUTCD

Blackout Devices
1948 MUTCD

Significant rewrite
Signs
  - Simplified messages
  - Eliminated square signs
  - Added advisory plate
  - Rounded alphabet
Pavement markings
  - Yellow - Double center & barrier line
  - White - all other applications
  - Edge lines not recommended
Simplified signal warrants

1948 Signs

Early Stop & Yield Signs

1954 Revision

Significant sign changes
  - Thru became stop
  - Secondary messages eliminated
  - New sign

Traffic Signal Legacies

Non-standard traffic signals continued in use through the 1950s and 1960s in some locations

1958 AASHO Interstate Manual

Created for the new Interstate Highway system
New features
  - White on green guide signs
  - Lower case letters
  - Green on white service signs
  - Utilized larger sign sizes
  - Blue service signs added in 1961 revision

New Interstate Signs

1961 MUTCD
- Federal compliance required
- New material:
  - Construction traffic control
  - Civil defense signing
  - Freeway guide signing

1971 MUTCD
- Significant rewrite
- DOT ownership
- New features:
  - Content: school areas
  - Color: orange
  - Shapes: pennant, pentagon
  - International sign influence
  - Many new symbols
  - Yellow markings for opposing traffic

1978 MUTCD
- Update of 1971 edition
- Loose leaf (binder) format
- Individual page revisions
- New content
  - RR-hwy grade crossings
  - Bicycle facilities
  - Yellow markings on left side
1978 Signs

1988 MUTCD
Update of 1978 edition
Included new revision (#5)
New content
Recreational/cultural signs
Logo signs
TODS
Planned to be revised only for safety reasons

MUTCD During the 1990s
Blue ribbon panel (1989)
Recommended reformat and rewrite of 1988 MUTCD
Need to clarify intent (shall, should, may)
Recognition of language challenges
“shall be permitted”  “may be justified”
“shall preferably be”  “it is desirable that”
“normally should”  “it is necessary that”
“may be required”  “is intended for use”
Reformat/rewrite process started in early 1990s
Resulted in 2000 MUTCD

Modern MUTCDs
2000 MUTCD
Dramatically different from 1988 MUTCD
Revised once (audible ped signals)
Many errors and inconsistencies
Errata did not address all the problems
2003 MUTCD
Primarily a fix of the 2000 MUTCD
Some new changes
Revised twice
Pharmacy signing, minimum sign retroreflectivity
2009 MUTCD
New edition with significant changes
Much new material

2000 MUTCD
Millennium edition
Reformatted/rewritten
Significantly different from 1988 MUTCD
First with 8½x11 pages
First to be on the internet
Editorial and technical shortcomings
1 Errata
1 Revision

Significant Changes
New structure
Standard, Guidance, Option, Support
New parts added to MUTCD
Low Volume Roads
Highway-Light Rail Transit Grade Crossings
Islands part deleted
Definitions added
Primary units: metric
2000: Selected Key Changes

- Legibility index = 40 ft/in
- Sign graphics not accurate
- Lane ending symbol (W4-2) dropped
- Crosswalk lines dropped from crossing signs
- New Yield Line
- In-road lights

2003: Selected Key Changes

- Some new/revised signs
- New sign color: Pink for incident mgmt
- Countdown ped signals
- Metric sign changes
- Accessibility in work zones
- Revisions:
  - 1: Pharmacy signing
  - 2: Min sign retro

2009: Philosophical Changes

- FWHA focus for 2009 MUTCD
  - Uniformity
  - Complete street concept: all road users
  - Aging population
  - Innovation
  - More specific detail, reduced ability to deviate
  - Fine tuning of TCD use
  - More devices addressed
  - Compliance dates restructured
  - Compliance as part of systematic upgrade
  - MUTCD applies to private property
  - Combine RR and LRT parts
  - New content
    - Toll road & managed lanes traffic control
    - Purple for toll roads
    - Changeable message signs

2003 MUTCD

- Primarily an update of the 2000 MUTCD
- Changes
  - Editorial improvements
  - Graphics corrected
  - Minor technical corrections
  - Some new material
  - Compressed text
  - 982 to 754 pages

2009 MUTCD

- Current edition (10th overall)
- Final rule: Dec 16, 2009
- NPA received more comments than any other
  - 1,840 individual letters
  - 15,000+ comments

- Many changes
  - 611 significant changes listed in Federal Register final rule

2009: Selected Key Changes

- Paragraphs numbered, guidance italicized, metric values removed
- Change in definition for a standard
  - Added: “Standard statements shall not be modified or compromised based on engineering judgment or engineering study”
- Legibility index = 30 ft/in
- Increases in sign sizes: 36 in Stop sign required for some situations
- Increased requirements for One Way signs
- Requirements for warning signs for changes in horizontal alignment
- Revised optional lane guide signing
- Individual arrows
- High-visibility safety apparel
- Required for all workers within the public right-of-way
- School warning signs: FYG only
- Cannot use Speed Limit sign alone to end school speed limit zone
- Yield or Stop signs required at passive grade crossings
2009: Signal Changes

- 12 inch indications for all new installations
- Limited use of 8 inch indications
- Signal head for each lane when speed $\geq 45$
- Backplates required
- Flashing yellow arrow for left turns
- Hybrid beacon (HAWK) for pedestrian crossing

2009 MUTCD Revisions

Rev 1: engineering judgment & definition of a standard
- Added: the MUTCD is not a substitute for engineering judgment
- Deleted: standard statements shall not be modified or compromised based on engineering judgment

Rev 2: compliance dates
- Only 12 of the previous 58 compliance dates have been retained
- Several of the remaining 12 have been modified

Hotlinks 2009 MUTCD

- FHWA posted hotlinks version of the 2009 MUTCD
- Cross-referenced chapters, sections, figures, and tables
- Pop-up definitions
- Links to external documents and web sites
- Links to official interpretations
- Indications of material affected by known errors
- 31 MB file - recommended for download

Additional Resources

- MUTCD web site
  - HTML & PDF versions of MUTCD (incl hotlink)
  - Lists of changes

- MUTCD History
  - Google “Gene Hawkins” CE Prof’s website
  - MUTCD History link
  - MUTCD history PPT presentation
  - ITE Journal articles
  - Scans of old MUTCDs

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