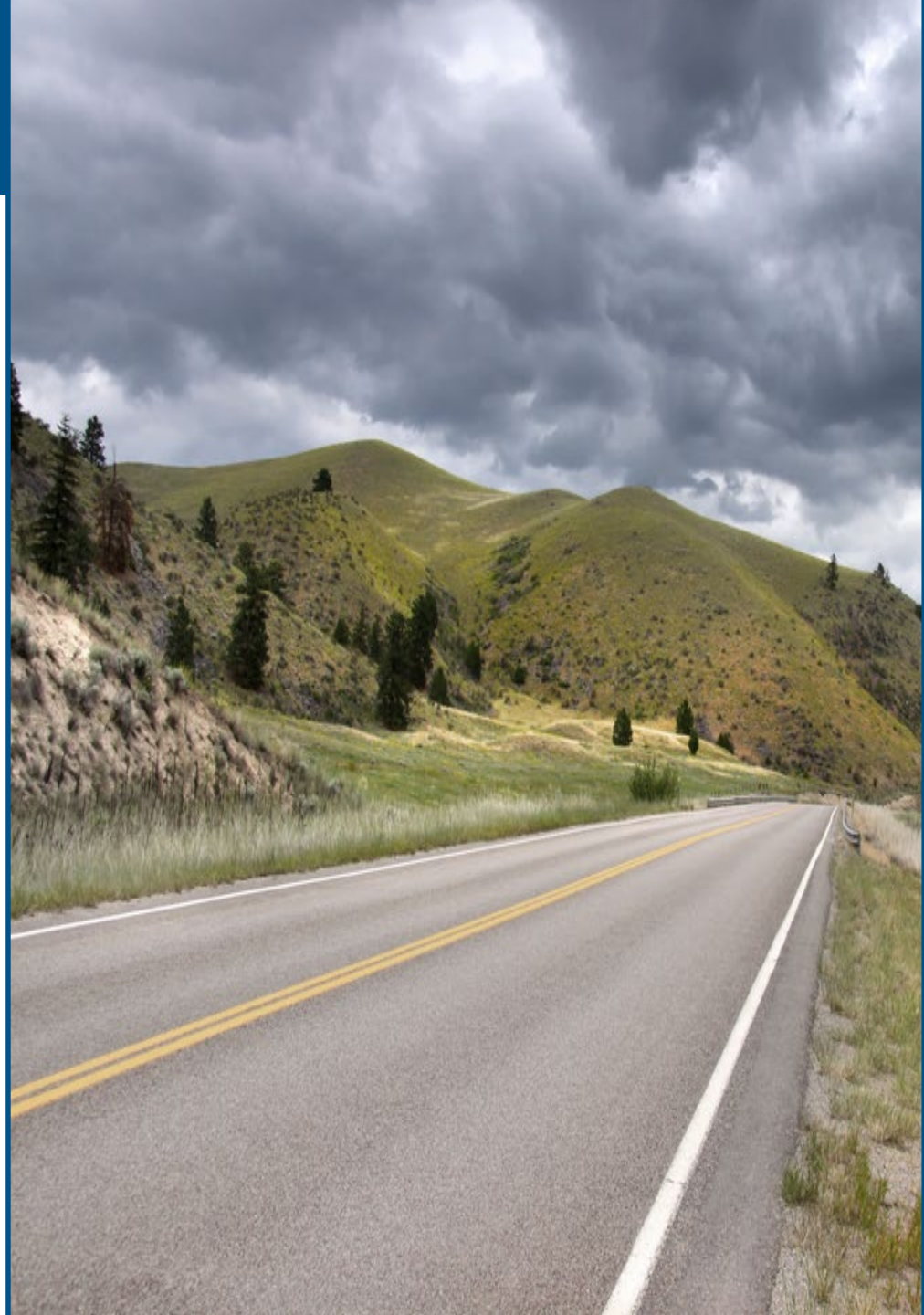
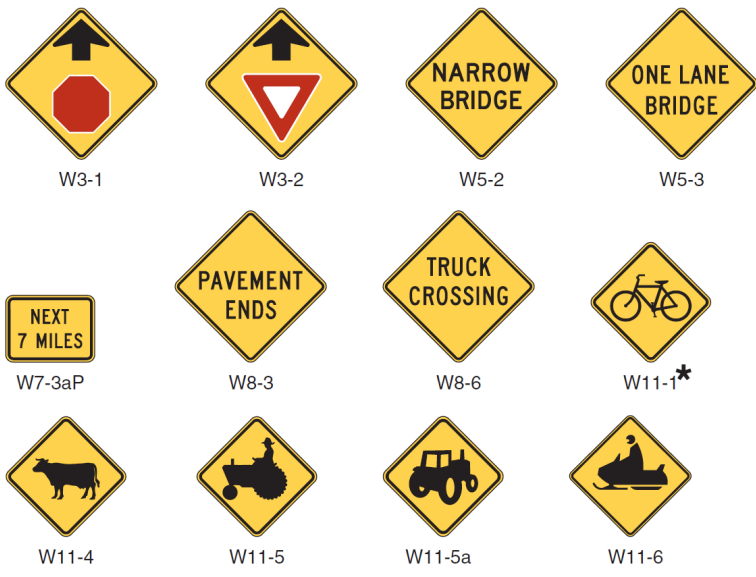
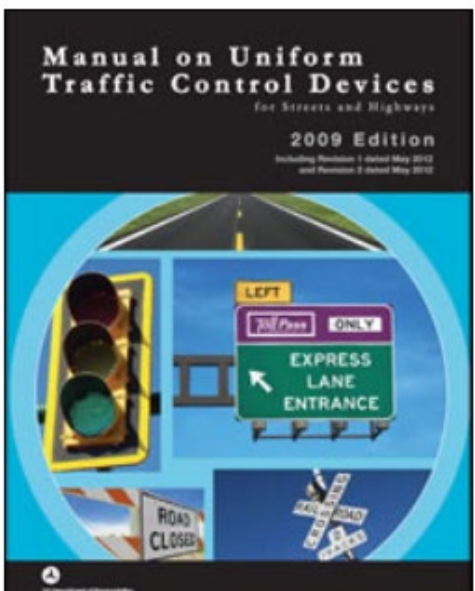


Montana LTAP SIGNING 101

Matt Ulberg, PE LTAP Director
With information support from
MDT Traffic Design Section and
Ivan Ulberg, PE



Today:

- Introduction into the world of signing (will be brief)
- Installation – supports, height, distance MDT style
- Maintenance – max number of bullet holes, minimum retro-reflectivity, etc.
- Rules (MCA / MUTCD) – more like State Law



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Traffic Signing Principles (there are five)

EVERY SIGN should...

- Fulfill a need
- Command attention
- Convey a clear, simple meaning
- Command respect from road users, and
- Give adequate time for response



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Traffic Signing Types (there are three)

- Regulatory – “Rules of the road”, laws and regulations
- Warning – advance notice of hazards or unanticipated conditions, particularly for those unfamiliar with area
- Guide – Driver navigation. Get you where you’re going.



Colors

- Regulatory – black, white, red.
 - Stop signs, yield signs, speed limits, do not enter signs
- Warning – yellow background, black border and symbols
 - Curve signs, hill with grade, pavement ends, chevrons
- Guide – white letters, green / blue / brown background
 - Street signs, hospital sign, airport sign, destination signs



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Placement

- Regulatory signs – typically placed at the point of enforcement.
- Warning signs – typically in advance of condition, but at times at the point of hazard (hazard panels, chevrons).
- Guide signs – where it makes sense, with flexibility. Should not conflict with regulatory or warning signs.



MDT's Traffic Manual – available on-line

18.3(2)

HIGHWAY SIGNING

November 2007

Posted or 85th-Percentile Speed (mph)	Advance Placement Distance (ft) ①							
	Condition A: Speed reduction and lane changing in heavy traffic. ②	Condition B: Deceleration to the listed advisory speed (mph) for the condition. ③						
		0③	10	20	30	40	50	60
20	225	⑤	⑤	—	—	—	—	—
25	325	⑤	⑤	⑤	—	—	—	—
30	450	⑤	⑤	⑤	—	—	—	—
35	550	⑤	⑤	⑤	⑤	—	—	—
40	650	125	⑤	⑤	⑤	—	—	—
45	750	175	125	⑤	⑤	⑤	—	—
50	850	250	200	150	100	⑤	—	—
55	950	325	275	225	175	100	⑤	—
60	1100	400	350	300	250	175	⑤	—
65	1200	475	425	400	350	275	175	⑤
70	1250	550	525	500	425	350	200	150



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Simplified rule of thumb chart

Table 1. Clear Distance to See Sign

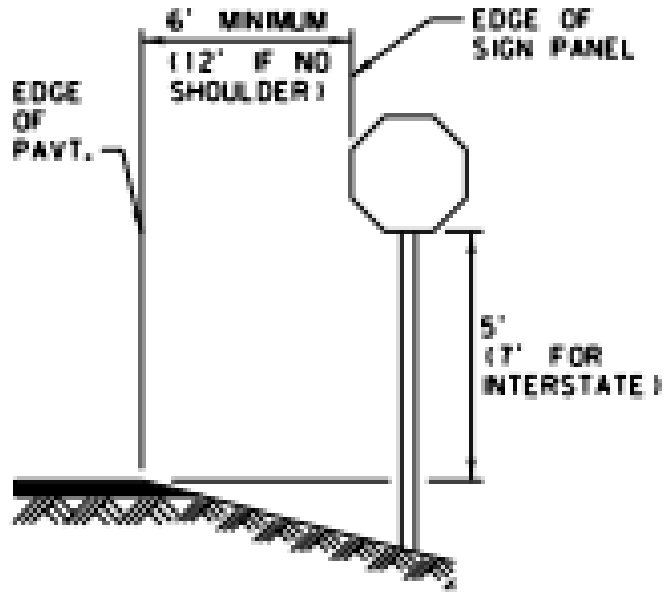
Speed Limit (mph)	Critical Signs (feet)	Noncritical Signs (feet)
30	250	150
40	350	200
50	450	250
60	600	300



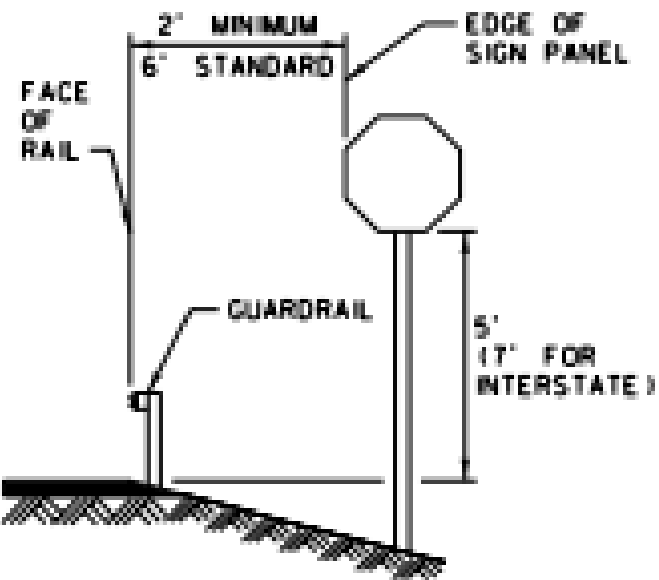
MDT Detailed Drawing 619-00

REGULATORY
R1-1 / R1-2

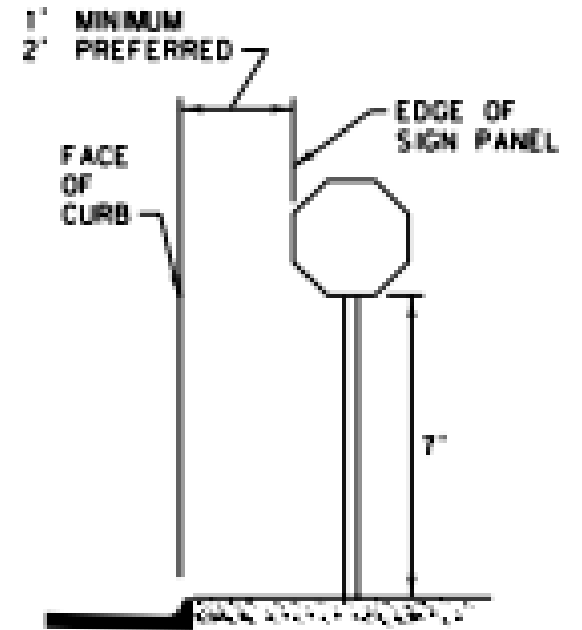
RURAL ①



RURAL WITH GUARDRAIL ②

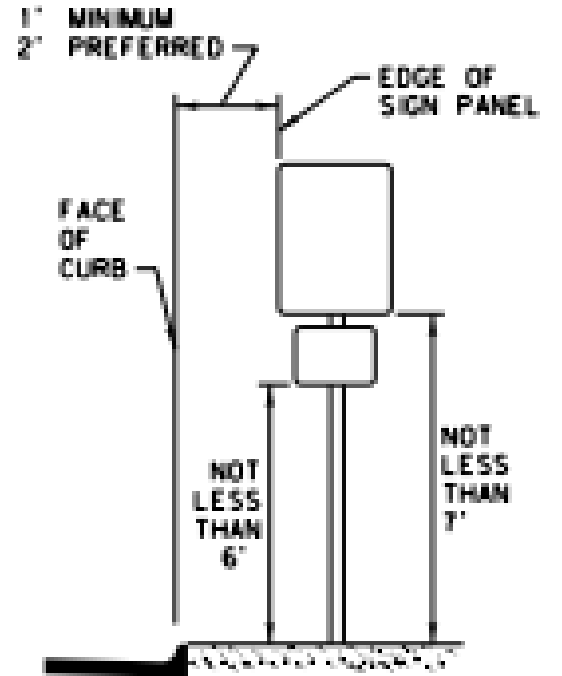
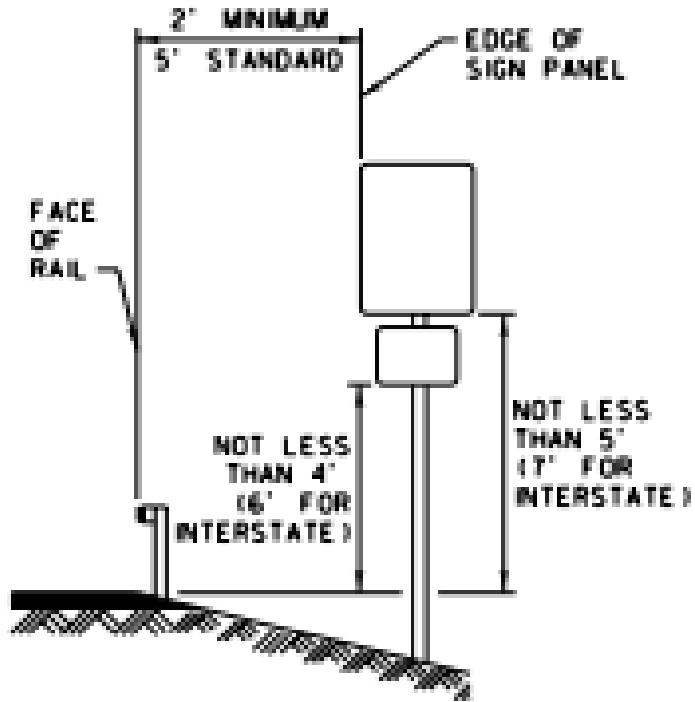
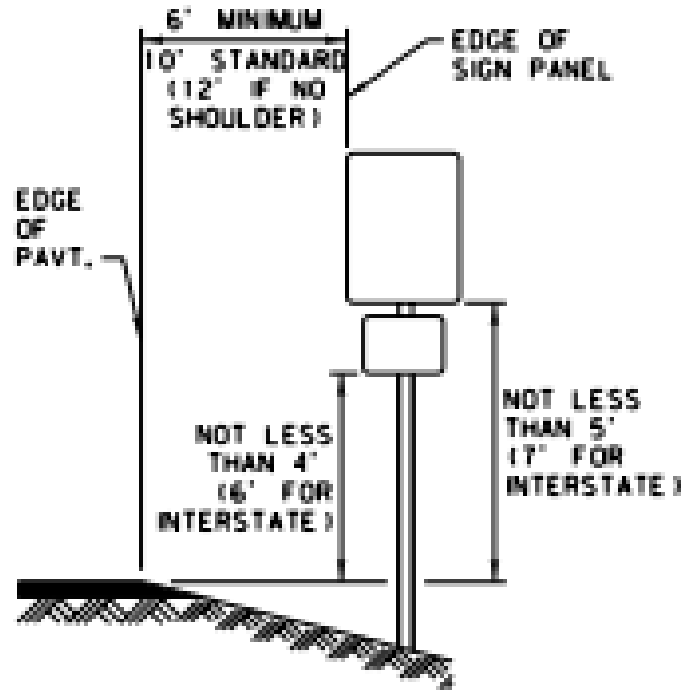


URBAN ③



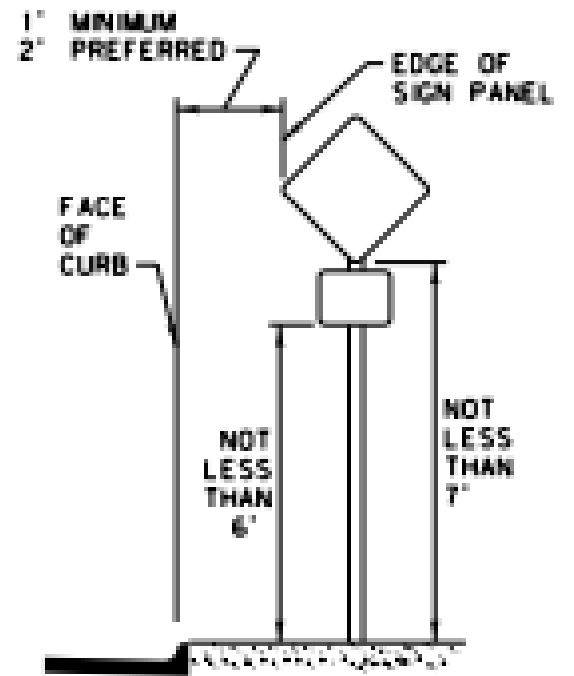
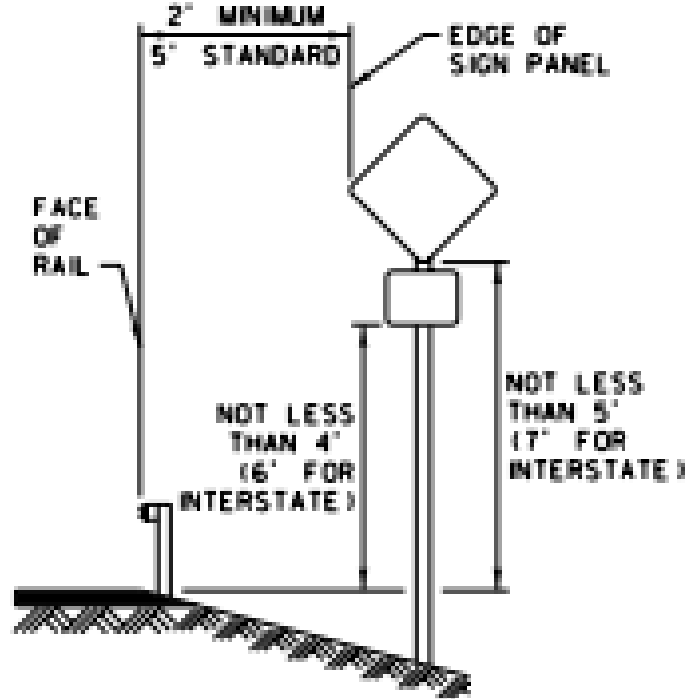
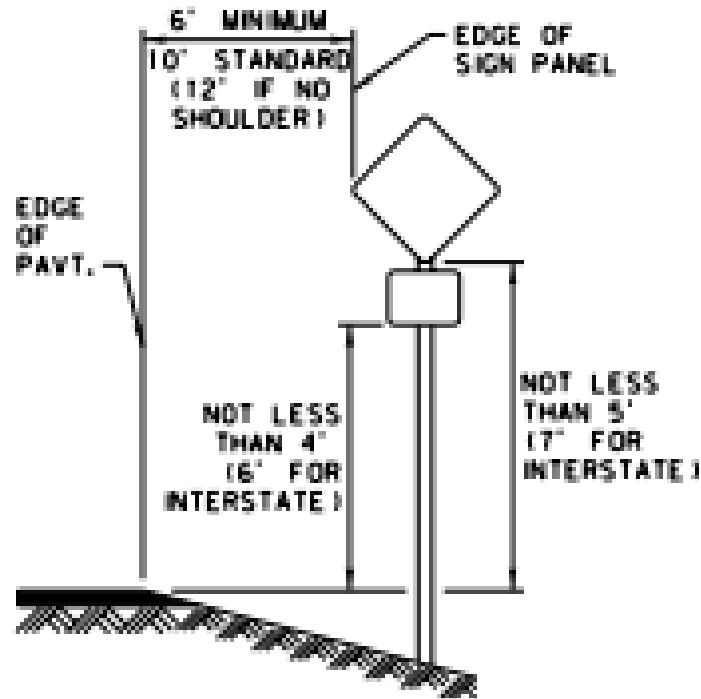
MDT Detailed Drawing 619-00

REGULATORY
EXCEPT R1-1 / R1-2



MDT Detailed Drawing 619-00

WARNING



Supports

1. Any sign that can be hit, will be hit. Supports **MUST** be crashworthy.
2. Most signs can be placed on a single support, or post.
3. Unless a breakaway base is used, all supports should be direct bury into soil. No concrete.



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Supports – crashworthy sizes

- Wood Post – USE 4” round, OR 5” round drilled perpendicular to traffic flow – so they will snap off when hit.
- U-channel steel post – 3 lbs per foot or less = direct bury (no concrete), will snap or bend when hit.
- Square Steel Tube – 2 ¼” or less = direct bury (no concrete), will snap or bend when hit.



Supports – crashworthy sizes

- Special note: If you use stubs for the base of your U-channel steel post (3 lbs per foot or less), make sure they are less than 4” tall to prevent snagging hazard.



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Supports – breakaway base required

- Unless sign can be shielded or placed outside of clear zone, larger supports must have breakaway features.
 - U-channel or square steel tube larger than 3 lbs per ft.
 - I-beam steel post

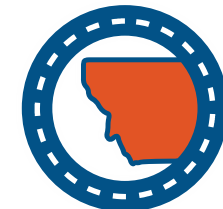




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Retro-reflectivity

- Signs must be able to be seen at night, as well as during the day.
- Modern sign faces consist of film material (sheeting), which is compromised of glass beads (type I-III) or microprisms (type IV+), which are designed to reflect incident light from the sign face back to the source.
- This material fades over time; night-time performance controls sign life (daytime visual recognition lasts much longer than night-time).



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Can we decide to replace signs based on daytime inspections?



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Sign Management System

- Inventory
- Inspection
- Preventive Maintenance
- Repair and Replacement
- Reporting and Record Keeping



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Inventory

- Database of signs installed on your roads
- Can't know what you need to maintain if you don't know what you have.
- Will help you:
 - Know the age of the sign, and when it has reached the end of its useful life.
 - Identify corridors that need improvements, track recent maintenance, identify single sign needs.
 - Minimize tort liability.
 - Budgeting to manage resources; efficient use of resources.



Inspection

- Periodically inspect all signs, both during daylight and at night. Have a checklist. Pack a lunch...
- Make sure they are still there (and not on some kid's dorm wall or neighbor's garage).
- Determine if they are all shot-to-heck and dyin'.
- Add this information into inventory database as appropriate.



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Signs with extensive gunshot holes should be replaced.

This sign has been hit by several gunshots. Even with the holes the sign can be read during the day and functions as intended, but leaving a sign up in this condition does not convey a serious message and may encourage more gun shots to this and other signs. The sign should be replaced or repaired as soon as practical. Minor damage can often be repaired in the field.



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Preventative Maintenance

- Sign cleaning
- Vegetation control
- Sign support adjustments



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Vegetation control



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Repair and Replacement

- Vandalism (missing, partially missing, destroyed, painted).
- Hit by vehicle – knocked down, bent, tipped.
- Relocated and/or adjusted by local constituents.
- Damage by weather, flood, fire, pestilence.
- Reached the end of its useful life.
 - This is hard to recognize. Especially for night-time retro-reflectivity.

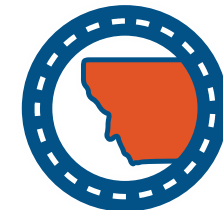


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Reporting and Record Keeping

The paperwork behind the work

- Keeping good records will help:
 - Make good decisions, allocate resources, eliminate redundancy.
 - Identify problem areas that require more frequent attention.
 - Defend against lawsuits, challenges wrt sign conditions.
 - Provide documentation of maintenance program.



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Vague legal slide to scare everyone

Tort Liability—tort law applies to lawsuits in which the plaintiff seeks to recover money to compensate for personal injuries or property damage that they claim was caused by the defendant. In order to recover money damages from a roadway agency in a negligence case, the plaintiff must prove the following four things:

1. that the roadway agency owed them a duty;
2. that the roadway agency breached that duty;
3. that the roadway agency's conduct was the proximate cause of the harm; and
4. and that the plaintiff was actually injured or damaged.

In general, the law imposes on anyone carrying out an activity that may cause harm to others the duty to exercise ordinary care to avoid that harm. The law requires that we act reasonably under the circumstances. Failure to do so is negligence.



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Why?

- The MUTCD, a Federal Highways document, is like the “one ring” in Tolkien’s stories.
- It is 816 pages (plus intro and appendices) of pure, unadulterated technical discussion and shall / should / may. Also available on-line.
- All traffic control devices on any facility open to the public shall comply with the Manual by LAW.



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The Why, in print...

2009 Edition

Page 27

PART 2 SIGNS

CHAPTER 2A. GENERAL

Section 2A.01 Function and Purpose of Signs

Support:

- 01 This Manual contains Standards, Guidance, and Options for the signing of all types of highways, and private roads open to public travel. The functions of signs are to provide regulations, warnings, and guidance information for road users. Words, symbols, and arrows are used to convey the messages. Signs are not typically used to confirm rules of the road.
- 02 Detailed sign requirements are located in the following Chapters of Part 2:
 - Chapter 2B — Regulatory Signs, Barricades, and Gates
 - Chapter 2C — Warning Signs and Object Markers
 - Chapter 2D — Guide Signs for Conventional Roads
 - Chapter 2E — Guide Signs for Freeways and Expressways
 - Chapter 2F — Toll Road Signs
 - Chapter 2G — Preferential and Managed Lane Signs



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We have our own MUTCD chapter!

2009 Edition

Page 531

PART 5

TRAFFIC CONTROL DEVICES FOR LOW-VOLUME ROADS

CHAPTER 5A. GENERAL

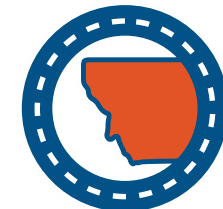
Section 5A.01 Function

Standard:

- 01 A low-volume road shall be defined for this Part of the Manual as follows:
- A. A low-volume road shall be a facility lying outside of built-up areas of cities, towns, and communities, and it shall have a traffic volume of less than 400 AADT.
 - B. A low-volume road shall not be a freeway, an expressway, an interchange ramp, a freeway service road, a road on a designated State highway system, or a residential street in a neighborhood. In terms of highway classification, it shall be a variation of a conventional road or a special purpose road as defined in Section 1A.13.
 - C. A low-volume road shall be classified as either paved or unpaved.

Support:

- 02 Low-volume roads typically include agricultural, recreational, resource management and development such as mining and logging and grazing, and local roads in rural areas.



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MDT directed to adopt MUTCD as official Manual

Montana Code Annotated 2017

TITLE 61. MOTOR VEHICLES

CHAPTER 8. TRAFFIC REGULATION

Part 2. Traffic Control Devices

Department Of Transportation To Adopt Manual

61-8-202. Department of transportation to adopt manual. The department of transportation shall adopt a manual for a uniform system of traffic control devices consistent with this chapter for use upon highways within the state. The manual adopted by the department of transportation must correlate with and so far as possible conform to the Manual on Uniform Traffic Control Devices, as amended, published by the United States federal highway administration.



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Locals directed to conform to the state manual and specifications, i.e. MUTCD

Montana Code Annotated 2017

TITLE 61. MOTOR VEHICLES

CHAPTER 8. TRAFFIC REGULATION

Part 2. Traffic Control Devices

Local Traffic Control Devices

61-8-206. Local traffic control devices. (1) Local authorities in their respective jurisdictions shall place and maintain traffic control devices upon highways under their jurisdiction that they consider necessary to indicate and to carry out the provisions of this chapter or local traffic ordinances or to regulate, warn, or guide traffic. All traffic control devices must conform to the state manual and specifications.

- (2) (a) An automated enforcement system designed to detect traffic violations that is attached to a traffic control device may not be used to enforce traffic laws.
- (b) Subsection (2)(a) does not apply to automated enforcement systems attached to traffic control devices at railroad grade crossings.



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FHWA – 2010 Publication (great resource for information)

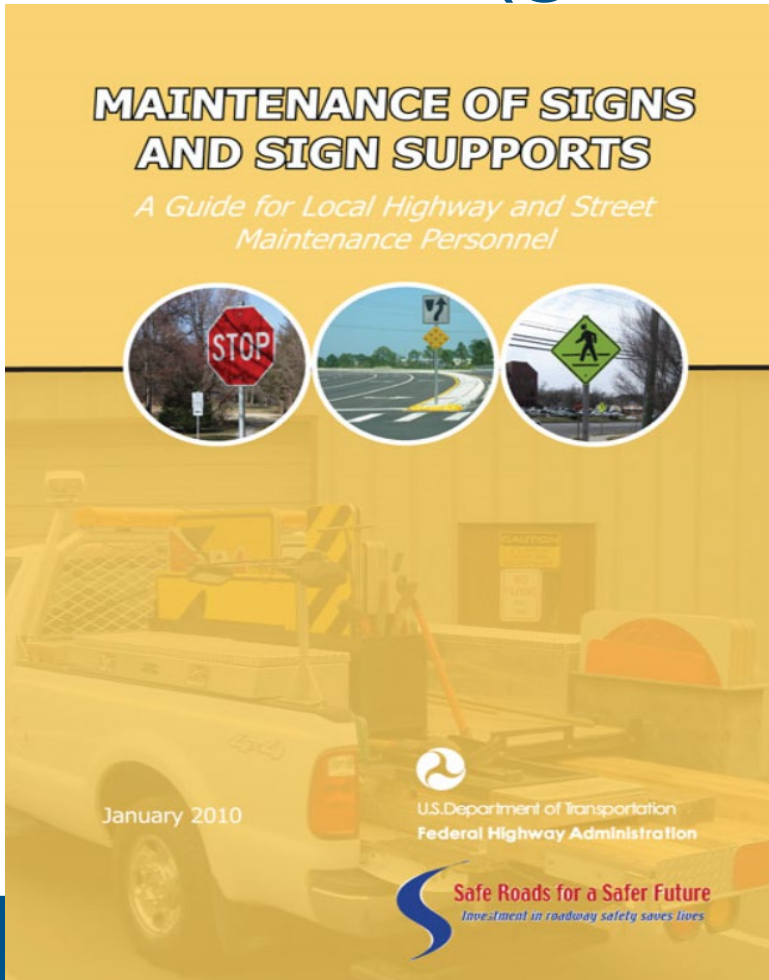


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Summary:

ANSWER TO ~50% OF ALL YOUR QUESTIONS

- When in doubt, don't place the sign
- Place only signs you are willing to defend and maintain
- Over-signing is worse than under-signing
- Signing for a change in standard right-of-way assignment (STOP/YIELD)
- Sign for any unanticipated or unique changes in conditions (for out-of-character or unforeseen curves, intersections)

ASK:

- Does it command attention
- Does it convey a clear, simple meaning
- Will it command respect from road users, and...
- Have you given adequate time for the driver's response (placement)



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