

Making Your Signs Shine Sign Management Options for Your Agency



Why Do We Install Signs?

Required by MUTCD?

NO

Engineering Decision?

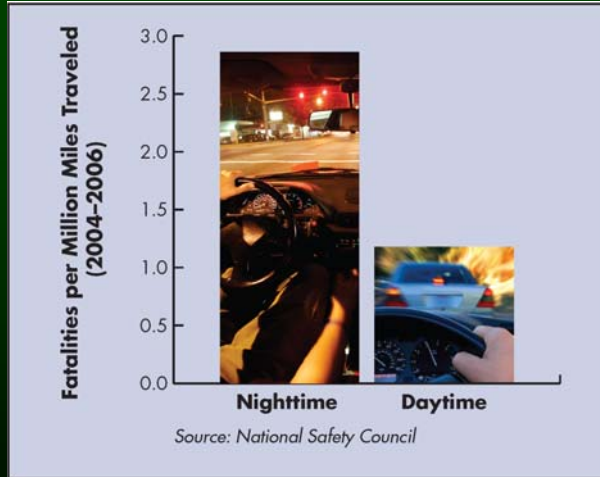
YES!

Why?

*To help drivers
(including older)*



Night Travel and Crashes



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Nighttime Driving

Daytime

Many cues available
Driver task relatively easy



Nighttime

Few cues remain
Task more difficult



Retroreflectivity provides nighttime guidance

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Background

1993 DOT Appropriations Act - "The Secretary of Transportation shall revise the MUTCD to include a standard for a minimum level of retroreflectivity that must be maintained for traffic signs and pavement markings which apply to all roads open to public travel."



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Final Rule



- Published on Dec 21, 2007
- *Vol 72, No. 245*
- Revision #2 of the 2003 Edition of the MUTCD
- Effective Jan 22, 2008

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Compliance Dates

Jan 22, 2012	Identify and begin using method(s)
Jan 22, 2015	Replace identified regulatory, warning, and ground-mounted guide signs
Jan 22, 2018	Replace identified street name and overhead guide signs

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New MUTCD Language

Section 2A.09 Maintaining Minimum Retroreflectivity

“Standard:

Public agencies or officials having jurisdiction **shall** use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3”

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MUTCD Table 2A-3

Sign Color	Criteria	Sheeting Type (ASTM D4956)			
		Beaded			Prismatic
		I	II	III	III, IV, VI, VII, VIII, IX, X
White on Red	CR ≥3	35 / 7			
Black on Orange or Yellow	Bold or Text ≥48"	x	50		
	Fine or Text <48"	x	75		
Black on White	—	50			
White on Green	Overhead	x / 7	x / 15	x / 25	250 / 25
	Shoulder	x / 7	120 / 15		

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Sheeting Types (ASTM 4956-04) That Can Be Used:

- Prismatic sheeting may be used for all signs.
- High Intensity Beaded (Type III) and Super Engineer Grade (Type II) may be used for all signs except for the white legend on overhead guide signs.
- Engineer Grade (Type I) may be used for all signs except for:
 - a. the white legend on guide signs,
 - b. the white legend on street name signs, and
 - c. all warning signs.

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New MUTCD Language

Section 2A.09 Maintaining Minimum Retroreflectivity

“Guidance:

...one or more of the following assessment or management methods should be used...”

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Sign Maintenance Methods

- Visual Nighttime Inspection
- Measured Sign Retroreflectivity
- Expected Sign Life
- Blanket replacement
- Control signs
- Any combination of above
- Other methods based on engineering studies

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Visual Inspection

- Nighttime visual inspection by a trained inspector
- Conduct on regular basis
- Must use one of the options:
 - *Calibration signs, or*
 - *Comparison panels, or*
 - *Consistent parameters*



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Visual Inspection

- Common elements of all visual inspection procedures
 - *Aim inspection vehicle headlamps*
 - *Two-person crew works best*
 - *Use low-beam headlamps*
 - *Have evaluation form and criteria*
 - *Conduct evaluations at roadway speed (100 to 600 ft)*

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Calibration Signs Option

- “Calibrate” eyes with calibration signs
- Calibration signs are near minimum retro
- Evaluate signs compared to calibration signs



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Comparison Panels Option

- Small panels at/near minimum retroreflectivity levels
- Clipped to sign - viewed 25 ft with flashlight near inspector's ear
- Replace sign if panel is brighter



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Consistent Parameters Option

- Inspection process replicates criteria used to develop minimum levels
 - *Inspector - older driver (>60 years)*
 - *SUV type vehicle (2000 or newer)*
 - *Cutoff headlamps (properly aimed)*



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Advantages / Disadvantages Visual Inspection

- Advantages:
 - *Signs are viewed in their natural surroundings*
 - *Low level of sign replacement and sign waste*
- Disadvantages:
 - *Subjective: but research has shown that trained observers can detect signs with marginal retroreflectivity.*
 - *Exposure of conducting nighttime inspections*
 - *Paying overtime*

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Measured Sign Retroreflectivity

- Measure signs with portable retroreflectometer
- Need to follow proper procedure
- Average of 4 measurements
- Compare average to minimum values
- Not all signs need to be measured
 - *Measure marginal signs*



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Advantages / Disadvantages Measured Sign Retro

- Advantages:
 - *Most direct means of monitoring retroreflectivity levels*
 - *Removes subjectivity*
- Disadvantages:
 - *Cost of instruments (approx \$12,000)*
 - *Time consuming / resource intensive*
 - *May neglect other attributes of the sign's overall appearance.*

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Expected Sign Life

- Determine life of sheeting types in your area
- End of life based on retro values
- Set up replacement program that ensures individual signs (type, color) are replaced prior to the end of their expected service life
- Periodic nighttime or instrument inspections to verify



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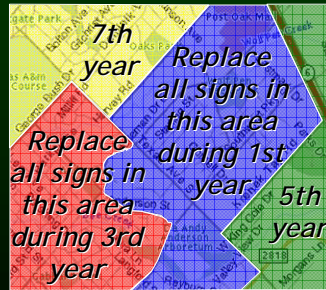
Advantages / Disadvantages Expected Sign Life

- Advantages:
 - *Can use a date sticker, bar code, or computerized sign management system*
 - *Agencies can develop or copy local service life levels*
- Disadvantages:
 - *Requires tracking installation date of all signs.*
 - *May be time consuming to inspect date stickers if the stickers are not easily viewable or computer inventory is not used*

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Blanket Replacement

- Replace all signs at the same time
- Divide agency into areas/corridors
- Relate number of areas to replacement cycle (based on service life)
- Replace all signs in an area/ corridor each replacement cycle
 - 10 year life, → 10 areas
 - Annual replacement in each area



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Advantages / Disadvantages Blanket Replacement

- Advantages:
 - Low likelihood of a given sign being skipped over or not being replaced. This ensures that all replaced signs are visible and meet minimum retroreflectivity levels.
- Disadvantages:
 - Waste if signs that are relatively new are removed during a normal replacement cycle.

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Control Signs

- Select signs to represent all signs in the field
 - *Control signs in maintenance yard or selected field signs*
- Monitor control signs
 - *Periodically measure retroreflectivity of control signs*
 - *Replace all equivalent signs when control signs near minimum levels*
- Control signs need to adequately represent all signs in the field



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Advantages / Disadvantages Control Signs

- Advantages:
 - *Not very labor intensive*
 - *Low cost option*
- Disadvantages:
 - *Need an adequate sampling of signs*

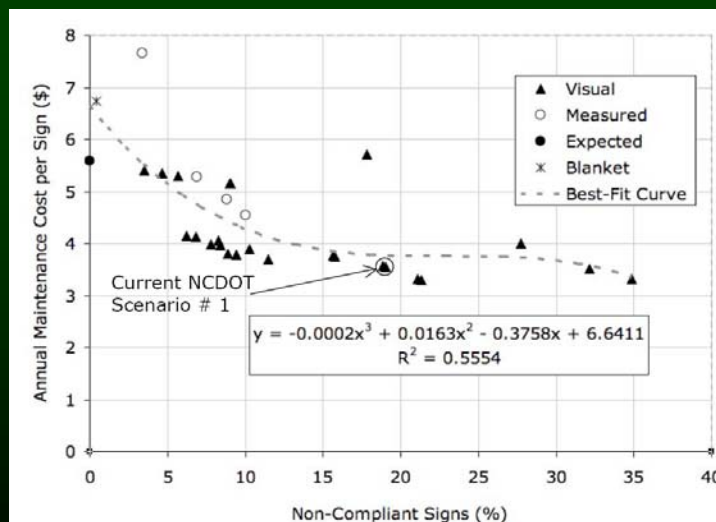
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Combining Alternatives

- Combination of methods
 - Use one or more of the methods together
 - Support and reinforce each other
- Possibilities
 - Visual inspection to identify signs to be measured
 - Measured retro of control signs

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Comparing Methods



Source: North Carolina State

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Comparing Methods

Scenario #	Annual Cost per Sign (\$)	Non-compliant Signs (%)	Additional Cost over Scenario 1 (percent)	Inspection Frequency (years)	Rejection Threshold (W & Y, R & G)
1	3.56	19.0	0%	2.64	20, 4
5	3.89	10.3	9.3%	2.64	30, 5
9	3.96	8.4	11.2%	2.64	40, 6
12	3.78	9.4	6.2%	3	40, 6
13	3.98	7.8	11.8%	2.64	50, 7
16	3.81	8.9	7.0%	3	50, 7

NOTE: W: White, Y: Yellow, R: Red, G: Green

All visual inspection methods

- Expected Sign Life - \$5.59 per sign per year
- Blanket Sign Life - \$6.74 per sign per year

Source: North Carolina State

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Exempt Signs

- Parking/Standing/Stopping
- Walking/Hitchhiking
- Adopt-A-Highway
- Blue or Brown Backgrounds
- Exclusive Use of Bikes or Pedestrians

Note: Must still meet other requirements in MUTCD (inspections, retroreflective, etc.)



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Assistance

- NACE Grant Program with 3M
 - *Reduce cost to replace engineer grade signs with prismatic*
 - *Open to NACE members only (county or local agency)*
 - *Deadline - June 30, 2009*
- 3M Grant Program
 - *Upgrade from what you are using now*
 - *Open to all governmental agencies*
 - *Deadline - November 30, 2009*
- Can only apply for one in 2009



National Association of County Engineers



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Michigan LTAP RoadSoft Sign Module

- Users Focus Group
- Work Plan for 2009
- Laptop Data Collector
- Training for Local Agencies
- Training Package for Elected Officials
- Resources

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Summary

- New regulation in place
- Must use an assessment or management method in MUTCD
- Must begin to make decisions now in order to meet compliance dates
- Consider life-cycle costs, not just initial costs, when replacing signs