Making Rural Roads Safe, Understanding Retroreflectivity for Signs and Pavement Markings

Rural Road Safety Webinar Series Thursday, September 30

NACo is pleased to present this webinar in cooperation with the Federal Highway Administration and the National Association of County Engineers.









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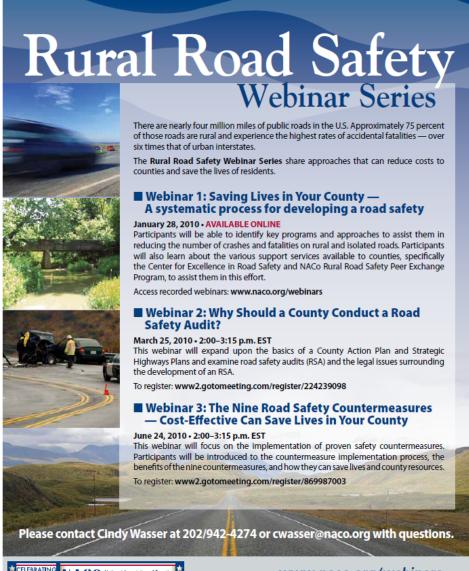
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Peer Exchange Program kicked off at:

Developing County Solutions to Improve Rural Road Safety NACE 2009 Annual Meeting - Management & Technical Conference April 23 Peoria, IL

Workshop Objectives: Develop a system for sharing rural road safety best practices among counties



The FHWA, Office of Safety Nine Proven Safety Countermeasures <u>Program</u>

- 2:00 Welcome/Review Objectives/Introduce Speakers
 Moderator James Davenport, Program Manager, NACo
- 2:05 Signs & Pavement Marking Retroreflectivity Notice of Rule Making Greg Schertz, P.E. FHWA-Federal Lands Highway
- 2:25 Case study Local Example of Implementing Standards for Retroreflectivity to Improve Visibility of Signs and Road Markings.

 Jim Ellison, P.E

 James W. Ellison Inc.
- 2:45 Q&A
- 3:15 Conclusion Moderator



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Andrew Goldschmidt at <u>agoldschmidt@naco.org</u> or Ilene Manster at <u>imanster@naco.org</u>



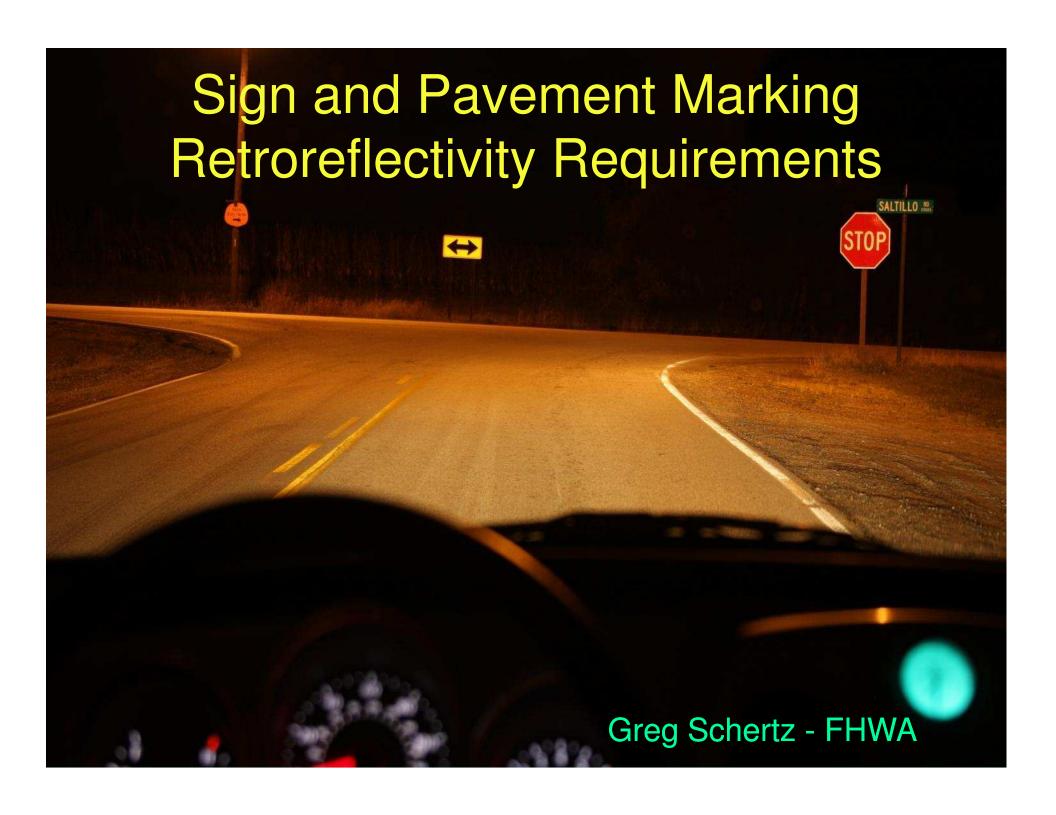
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For more information on NACo's Rural Road Safety Resource Center please visit

http://www.naco.org/programs/csd/Pages/RuralRoadResourceCenter.aspx







Signs Provide Critical Information to Drivers, But Retroreflectivity Degrades Over Time

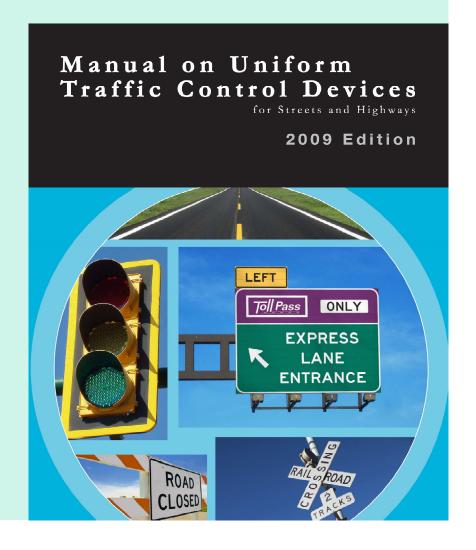
When
Do We
Replace
Signs?





Manual On Uniform Traffic Control Devices (MUTCD)

National standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.



Modified MUTCD

- 2003 MUTCD
 Revision #2
- EffectiveJan 22, 2008
- Remained in 2009 MUTCD



New MUTCD Standard

"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"



New MUTCD Language

Section 2A.08 Maintaining Minimum Retroreflectivity

"Support:

Compliance... is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3.









- Establish and implement method(s)
 - January, 2012
- Replace identified regulatory, warning, groundmounted guide signs (except street-name)
 - January, 2015
- Replace identified street name & overhead guide signs
 - January, 2018

Allowed Methods

<u>Assessment Methods</u>

(to determine which signs don't meet minimums)

- Visual Nighttime Inspection
 - a. Calibration signs
 - b. Comparison panels
 - c. Consistent parameters
- 2. Measured Sign Retro

Management Methods

(after your signs meet minimums)

- 3. Expected Sign Life
- 4. Blanket Replacement
- 5. Control Signs

Sign Methods Summary Table

Summary of Sign Retroreflectivity Maintenance Methods

					EQUIP	MENT EDS			CTOR	DEM	ME ANDS
imp	len	nente	d must be d and in use ary 2012	Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Trained	Age	At Night	Must Stop At Signs
	I Procedures	Calibration Signs	*		Any		(1)	٧	Any	٧	
T METHODS	Select Any 1 of These 3 Visual Procedures	Comparison Panels	NA PF		Any		9	>	Any	٧	Only Marginal Signs
ASSESSMENT METHODS	Select Any 1	Consistent Parameters			PU or SUV		(1)	>	60+	>	
	Moseurad	Retro	9≝	٧		ン	(1)	(2)	Any		Every Sign
HODS	Expected Sign Life		/			7	(1)				
MANAGEMENT METHODS	Blankot	Replacement	6 1 5 2 4 3			>	(1)				
MAN	Control	Signs	CONTROL	To Check Control Signs		>	(1)	(2)			Only Control Signs

⁽¹⁾ Not required in MUTCD, but might be beneficial

⁽²⁾ Need training on operation of retroreflectometer

[✓] Means "required"

Summary of Sign Retroreflectivity Maintenance Methods

						MENT EDS			CTOR MTS	TIME DEMANDS	
imp	A method must be mplemented and in use by January 2012			Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Trained	Age	At Night	Must Stop At Signs
	Procedures	Calibration Signs	CI WE VIELD		Any		(1)	>	Any	>	
T METHODS	of These 3 Visual	Comparison Panels	NA PR		Any		(1)	>	Any	ン	Only Marginal Signs
ASSESSMENT METHODS	Select Any 1	Consistent Parameters			PU or SUV	2.18	(1)	ン	60+	>	



(2) Need training on operation of retroreflectometer

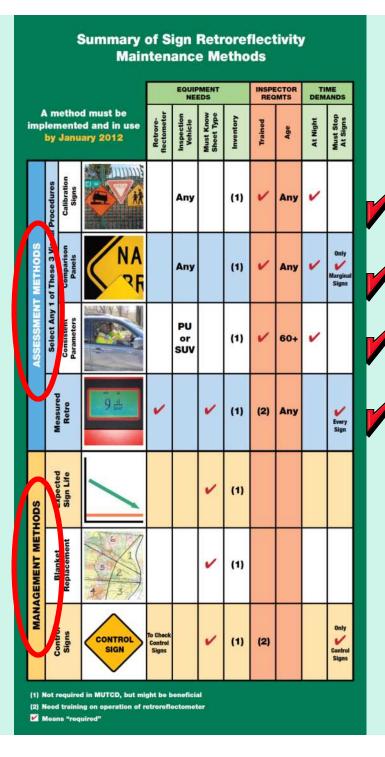
✓ Means "required"

							MENT EDS			CTOR MTS		ME ANDS	
		len	nente	d must be ed and in use ary 2012	Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Trained	Age	At Night	Must Stop At Signs	
	I	Procedures	Calibration Signs	CI WE VIELD		Any		(1)	V	Any	V		
	r METHODS	of These 3 Visual	Comparison Panels	NA RF		Any		(1)	>	Any	٧	Only Marginal Signs	
	ASSESSMENT	Select Any 1	Consistent Parameters			PU or SUV		(1					
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(1) Not	requi	red	in M	UTCD, but mi	ght b	e ber	eficia						PIDCE
(2) Nee	d traii	nin	g on	operation of r	etror	eflect	omet	er 📗					PULL
✓ Mea	Means "required"												
	SOOS	2	Sign										

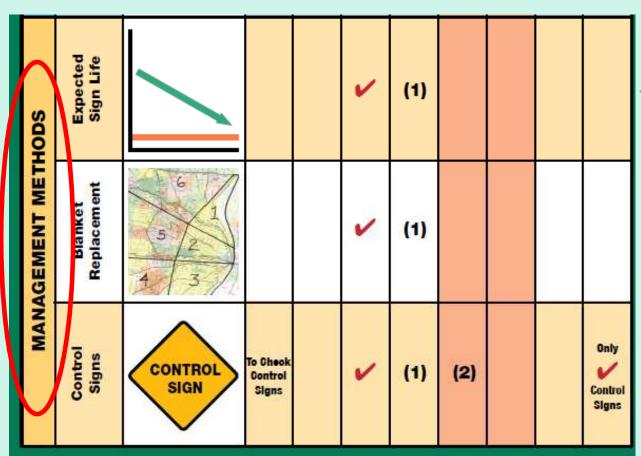
							MENT EDS			CTOR MTS		ME ANDS	
	A method must be implemented and in use by January 2012					Retrore- flectometer Inspection Vehicle Must Know Sheet Type Inventory			Trained	Age	At Night	Must Stop At Signs	
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	T METHODS	of These 3 Visual	Comparison Panels	NA PF		Any		(1)	>	Any	٧	Only Marginal Signs	
	ASSESSMENT METHODS	Select Any 1	Consistent Parameters			PU or SUV		(1)	>	60+	٧		
	(1) Not required in MUTCD, but might be beneficial												
(2	(2) Need training on operation of retroreflectometer Means "required"										Every		
		Иe	ans	"required"								Sign	

							MENT EDS			CTOR MTS		ME ANDS			
li	imp	len	nente	d must be ed and in use ary 2012	Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Trained	Age	At Night	Must Stop At Signs			
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		cted	Life									*			

Sign Methods Summary Table



		MENT EDS			CTOR MTS		ME Ands
Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Trained	Age	At Night	Must Stop At Signs



- (1) Not required in MUTCD, but might be beneficial
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					MENT EDS		INSPE REQ	CTOR MTS	TII DEM	ME Ands	
			Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Trained	Age	At Night	Must Stop At Signs	
HODS	Expected Sign Life				V	(1)					
MANAGEMENT METHODS	Blanket Replacement	5 2 4 3			V	(1)					
MAN	Control	CONTROL	To Check Control Signs		V	(1)	(2)			Only Control Signs	

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HODS	Expected Sign Life				~	(1)					
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Exempt Signs

Parking/Standing/Stopping

Walking/Hitchhiking

Adopt-A-Highway

Blue or Brown Backgrounds

 Exclusive Use of Bikes or Peds

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



More Information www.fhwa.dot.gov/retro

4-page "Maintaining Traffic Sign Retroreflectivity" FHWA-SA-07-020

report.center@fhwa.dot.gov

NEW MUTCD SIGN YOUR Maintaining Traffic Sign Retroreflectivity tic sign: provide important information to drivers at all times, both day and right. To be effective, their visibilit must be maintained. The 2003 Maximi in Uniform Traffic Centrol Devices (MUICD) addresses sign visibility in several places, including Sections 14.03, 14.04, 1A.05, 2A.06, 2A.08, and 2A.22. These sections address factors The second revision of the requires that agencies m 5c signs to a minimum 2003 MUTCD introduces reflectivity out ined in new language establishing the MUTCD. The Fede ninimum retroraflactivity Administration (FHWA SIGN this proposed change v maintained for traffic signs. afety while providing s billity for agencies to ch Agencies have until January 2012, to enance method that be their specific condition establish and imple Induding Table 2A-3 MUTCD does not impl FOR SMALL AGENCIES, FEDERAL LAND MANAGEMENT AGENCIES, AND TRIBAL GOVERNMENTS

Sign Retroreflectivity Guidebook (toolkit CD included) FHWA - CFL / TD-09-005

Sign Retro Summary

- Approaching deadlines
 - Jan. 2012 : Methods in place
 - Jan. 2015: Replace reg, warn, grd-mt guide
- Delaying decisions will increase funding challenges



Notice of Proposed Amendment (NPA)

- Federal Register April 22, 2010
- 2009 MUTCD Proposed Revision 1
- "Maintaining Minimum Retroreflectivity of Longitudinal Pavement Markings"
- Request for public comment within 120 days (August 20, 2010)

Proposed Pavement Marking Retro Rule

- Very similar to sign retro requirements
 - Focuses on "methods"
 - Must tie to minimum values
- Applies to required or recommended longitudinal lines in MUTCD
 - Center lines
 - Edge lines
 - Lane lines

Proposed Pavement Marking Retro Rule

- Does not apply:
 - When you have:
 - Continuous roadway lighting, or
 - RRPMs in good condition, or
 - Posted speed less than or equal to 30mph
 - Optional* lines in MUTCD
 - Transverse markings, symbols, etc.

Pavement Marking Retro Rule Schedule

- Comment period over
- Assembling and studying comments
- Intent to publish Final Rule in 2011
- However, we don't know what decisions will need to be made or what they will be



New MUTCD Table with Specifications for New Sheeting

	Sheeting Type (ASTM D4956-04)									
Sign Color	В	eaded She	eting	Prismatic Sheeting						
	I	II III		III, IV, VI, VII, VIII, IX, X						
White on	W* G ≥ 7 (9)	W* G ≥ 15 (30)	W* G ≥ 25 (45)	W ≥ 250 (250 – 700); G ≥ 25 (38 – 75)						
Green	W* G ≥ 7 (9)	W ≥ 120 (140 – 700); G ≥ 15 (30 – 75)								
Black on	Y*; O*	Y ≥ 50 (100 – 525); O ≥ 50 (60 – 265)								
Yellow or Black on Orange	Y*; O*	Y ≥ 75 (100 – 525); O ≥ 75 (60 – 265)								
White on Red			W ≥ 35 (70 R ≥ 7 (14 -							
Black on White	W ≥ 50 (70 – 700)									

Required or Recommended Centerline Markings

- Urban arterials/collectors
 - 20 ft or more in traveled way width, and
 - ADT ≥ 4,000
- Two-way streets/highways
 - three or more lanes for moving motor vehicle traffic
- Rural arterials and collectors
 - ≥ 18 ft in traveled way width, and
 - ADT ≥ 3,000
- Other traveled ways where an engineering study indicated a need for a centerline



Required or Recommended Edge Lines

- Freeways and expressways
- Rural arterials and collectors
 - ≥ 20 ft traveled way width, and
 - ADT ≥ 3,000
- Other paved streets and highways where an engineering study indicated a need for edge line markings

Proposed Minimum Retro Levels

(mcd/m²/lux)

Posted Speed (mph)	≤ 30	35 - 50	≥ 55
2-lane roadways with only centerline	n/a	100	250
All other roadways	n/a	50	100

Exceptions:

- When at least 3 RRPMs are visible from any position along a line at night
- When continuous roadway lighting assures that markings are visible

Considerations for Complying with the Requirements for Traffic Sign Retroreflectivity





James W. Ellison, P.E.
County Traffic
Engineer
Pierce County, WA

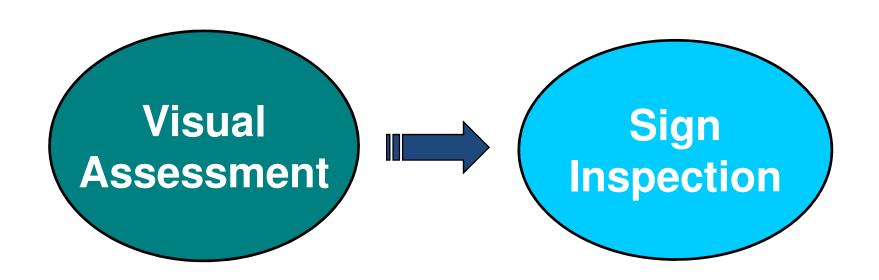


The Complexity of Sign Retroreflectivity

- Driver
- Vehicle
- Road
- Environment
- Sign
- Sign location
- Ra measurement



Maintaining Traffic Signs



Sign Retroreflectivity

Sign Maintenance

Sign Inspection is Sign Maintenance





The Value (and Need) for Sign Inspection

- Benefits of Inspecting Signs
 - Is the sign still there?
 - Is it lying on the ground?
 - Has it been defaced?
 - Can you see it?
 - How well can you answer inquiries from the attorneys or the insurance company or the newspaper?
 - Proactively fixing sign concerns (versus reacting on someone else's notification) costs less

The Value (and Need) for Sign Inspection

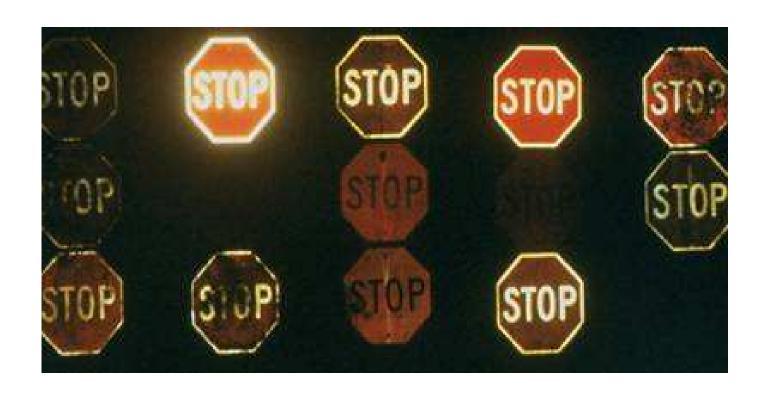
Is the sign adequately delivering the intended message to the road user?

Does it command respect?

Sign Inspection is Sign Maintenance



Can we decide to replace signs based on daytime inspections?



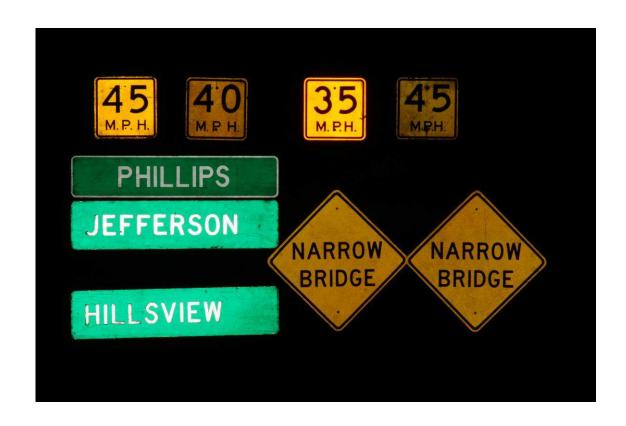
Older Signs Pulled From Field and Set Up in Sign Shop Yard



Visual Assessment of Signs at Night

- Issues to consider
 - Overtime? Shift differential? One person or two?
 - On-board tools and equipment?
 - Do you fix sign problems you encounter? Or call another crew? Or defer the work?
 - Agency policy recommended

What do the numbers look like?



Pictures do not represent retroreflectivity well

Use of a Sign Retroreflectometer

- Borrow for a day or two and take some sample measurements to get a feel for what the numbers look like (and how some of your signs compare)
- LTAPs: Consider purchasing one that can be made available to your constituency
- Or Purchase
 - In-field control sample readings
 - Test new sheeting
 - Quality control & inspection for contractor-installed signs



Retroreflectivity measurements



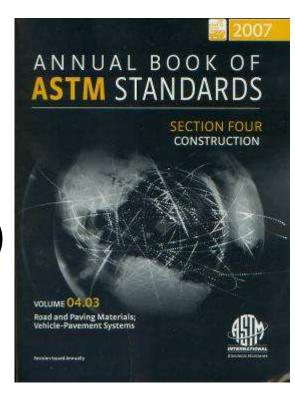


Decide on Sheeting Types

Engineering grade (EG)
 (ASTM Type I)

Phase Out Type I for:

- Yellow (Warning) Signs
- Orange (Temp Traffic Control)
- Green (Guide & Street Name Signs)



Decide on Sheeting Types Yellow, Orange, Green (Red series, White also)

Consider:

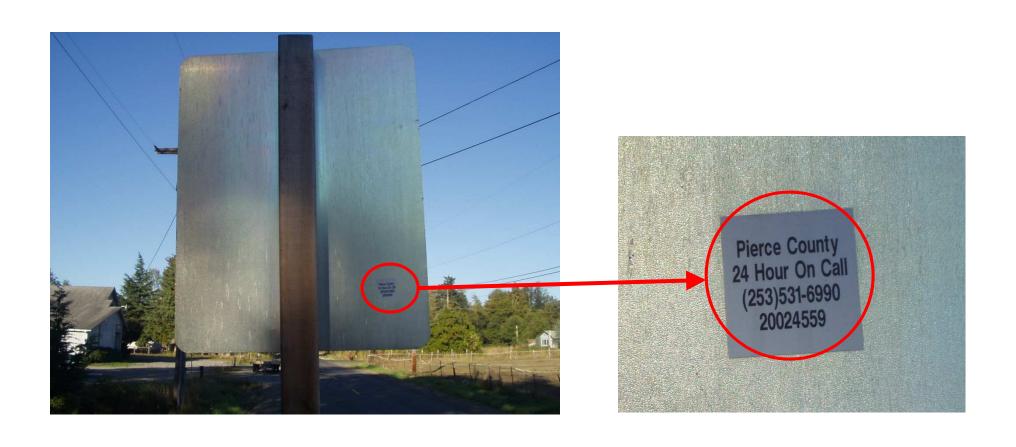
- Sheeting cost as part of overall cost of installed sign
- Anticipated sign life
- Current budget

Type III & IV? (ground)

Type IX? (overhead)

Blanket
Replacement
(by area or by roadway)?

The Value of Serial Number Tagging



Signs left by vandals... where do they belong?



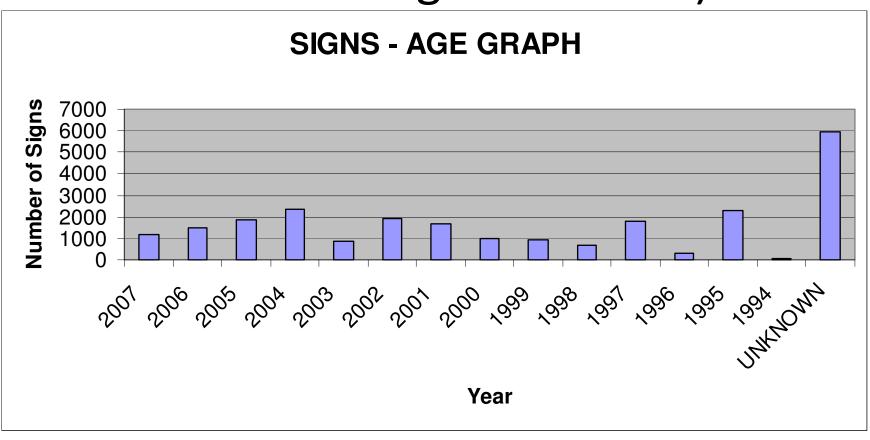
Date stamping within serial number

RT#	POS#	STRUCT	ON STREET	DIST DR	REF ST	BN	0	SIZE	CODE	VAR	LEGEND	SER #
SP106	702	71350	PARK AV S	93 N	133 ST S	N	R	24x10	S4-2		WHEN CHILD PRES	S2002035
SP106	4525	71459	YAKIMA AV S	175 N	138 ST S	N	R	24x30	R2-1	25	SPEED LIMIT	99100237
SP106	300	71342	PARK AV S	100 N	132 ST S	S	R	12x18	R7-1	L	NO PARKING ANYT	99100077
SP106	4925	71470	010 AV S	320 N	138 ST S	N	R	30x30	W15-1		PLAYGROUND	99060723
SP106	5000	71472	010 AV S	45 N	136 ST S	N	R	12418	H7-1	В	NO PARKING ANYT	99050346
SP106	1951	71381	CSTS	24 S	TULE LAKE RD S	N	R	12x6	R1-3	4	X-WAY TAB	99030446
SP106	4250	71451	136 ST S	16 E	CSTS	_					STOP	98060145
SP106	4650	71464	137 ST S	252 W	008 AV CT \$	0		1 N	023	3	END OF ROAD MAR	98030163
SP106	1551	71372	138 ST S	83 W	SR-7	J	J	IU	UZ,	J	ADVISORY SPEED	97011675
SP106	1550	71372	138 ST S	83 W	SR-7						REVERSE TURN	97011674
SP106	1451	71370	138 ST S	37 E	CSTS						ADVISORY SPEED	97011673
SP106	1450	71370	138 ST S	37 E	CSTS						REVERSE TURN	97011672
SP106	8100	71541	010 AV S	206 N	138 ST S	~	230300	1000	2303000		NO PARKING ANYT	96082936
SP106	2050	71383	133 ST S	154 E	CSTS	E	R	24x30	R2-1	25	SPEED LIMIT	96071845
SP106	1500	71371	138 ST S	398 E	CSTS	E	Lis.	48x24	W1-6	Ĺ	LARGE ARROW BO	95052938
SP106	3900	71444	YAKIMA AV S	17 N	134 ST S	N	L	48x24	W1-7		DOUBLE ARROW E	95050795
SP106	6850	71520	138 ST S	394 E	SPANAWAY LOOP RD	Ε	R	12x36	W12-401	R	LATERAL CLEARAN	95040173
SP106	6875	1000000000	138 ST S	414 E	SPANAWAY LOOP RD	Ε	L	12x36	W12-401	Ĺ	LATERAL CLEARAN	95040154
SP106	6625	71516	138 ST S	418 E	SPANAWAY LOOP RD	W	L	12x36	W12-401	L	LATERAL CLEARAN	95040153
SP106	4100	71448	135 ST S	18 E	CSTS	W	R	30x30	R1-1		STOP	9501231X
SP106	1051	71361	TULE LAKE RD S	30 W	CSTS	E	B	12x6	R1-3	4	X-WAY TAB	95011469
SP106	1401	71369	CSTS	24 N	138 ST S	S	B	12x6	R1-3	4	X-WAY TAB	95011465
SP106	4301	71452	138 ST S	21 W	CSTS	Ε	R	12x6	R1-3	4	X-WAY TAB	95011463
SP106	1651	71374	138 ST S	15 E	CSTS	W	R	12x6	R1-3	4	X-WAY TAB	95011461
SP106	5500	71487	134 ST CT S	18 E	010 AV S	W	R	30x30	R1-1		STOP	95011421
SP106	5400	71484	135 ST CT S	24 E	010 AV S	W	R	30x30	R1-1		STOP	95011419
SP106	4500	71457	YAKIMA AV S	24 N	138 ST S	S	R	30x30	R1-1		STOP	95011418
SP106	4450	71455	006 AV CT S	27 N	138 ST S	S	R	30x30	R1-1		STOP	95011417

Database query for oldest signs

RT#	POS#	STRUCT	ON STREET	DIST DR	REF ST	BN	0	SIZE	CODE	VAR	LEGEND	SER#
SP106	1500	71371	138 ST S	398 E	CSTS	E	L	48x24	W1-6	L	LARGE APPOW BO	95052238
SP106	3900	71444	YAKIMA AV S	17 N	134 ST S	N	L	48x24	W1-7		DOUBLE ARROW'S	95050795
SP106	6850	71520	138 ST S	394 E	SPANAWAY LOOP RD	Ε	R	12x36	W12-491	R	LATERAL CLEARAN	95040173
SP106	6875		138 ST S	414 E	SPANAWAY LOOP RD	Ε	L	12.20	W12-401		LATERAL CLEARAN	95040154
SP106	6625	71516	138 ST S	418 E	SPANAWAY LOOP RD	W	L	950	52938		LATERAL CLEARAN	95040153
SP106	4100	71448	135 ST S	18 E	CSTS	W	R	8			STOP	9501231X
SP106	1051	71361	TULE LAKE RD S	30 W	CSTS	E	R	950	050795		X-WAY TAB	95011469
SP106	1401	71369	CSTS	24 N	138 ST S	S	R	950	040173		X-WAY TAB	95011465
SP106	4301	71452	138 ST S	21 W	CSTS	E	R	32	040154		X-WAY TAB	95011463
SP106	1651	71374	138 ST S	15 E	CSTS	W	R				X-WAY TAB	95011461
SP106	5500	71487	134 ST CT S	18 E	010 AV S	W	R	950)40153		STOP	95011421
SP106	5400	71484	135 ST CT S	24 E	010 AV S	W	R	950)1231X		STOP	95011419
SP106	4500	71457	YAKIMA AV S	24 N	138 ST S	S	B	98	_		STOP	95011418
SP106	4450	71455	006 AV CT S	27 N	138 ST S	S	R	950	011469		STOP	95011417
SP106	5025	71473	136 ST S	19 E	010 AV S	W	R	950	11465		STOP	95011416
SP106	950	71358	PARK AV S	25 S	TULE LAKE RD S	N	R	050	011463		STOP	95011412
SP106	1050	71361	TULE LAKE RD S	30 W	CSTS	E	R				STOP	95011402
SP106	3050	71416	130 ST S	18 W	010 AV S	E	R	950)11461		STOP	95010690
SP106	6500	71513	014 AV S	21 N	138 ST S	S	R	950	011421		STOP	95310889
SP106	3100	71419	130 ST S	28 E	010 AV S	W	R	E .	_		STOP	95010881
SP106	2875	71409	131 ST S	15 W	010 AV S	Е	B	950	011419		STOP	95010880
SP106	2300	71393	132 ST S	26 W	PARK AV S	E	R	950	11418		STOP	95010878
SP106	2275	71391	132 ST S	18 E	PARK AV S	W	R	950	011417		STOP	95010877
SP106	2100	71384	133 ST S	10 E	CSTS	W	R	2			STOP	95010874
SP106	3700	71437	133 ST S	24 E	PARK AV S	W	R	950	011416		STOP	95010873
SP106	600	71348	PARK AV S	25 S	134 ST S	N	R	950	11412		TOP	95010869
SP106	1400	71369	CSTS	24 N	138 ST S	S	R		- · · · · · · ·	_/	STOP	95010866
SP106	3600	71433	134 ST S	12 E	CSTS	W	R	30x30	R1-1		STOP	95010865

Agency Signs by Age (Possible Use for Expected Sign Life & Control Signs methods)



The Value of a Sign Inventory

- For maintenance purposes FIRST
- Maintenance personnel buy-in
- Foundation for programming sign replacement & preparing budgets & setting priorities
- Asset management



The Value of Documenting All Sign Maintenance Activities

- Scheduling & monitoring work
- Risk management & tort liability
- Tracking of maintenance (preferably by function)



Asset management

Retroreflectivity data and calculations

	A		В		C		D	Е	F		G	Н	(i)	J	K	L		M	N	0
1							Sig	n i	Testing I	Results	s fo	r Ret	rore	lectivi	ty					
2	_	_	_				1775								2000					
3	Route	P	os	On S	tree	t	DIST	DR	Referen	nce St	BN	Offset	Size	ign cod	VAR	Seri	al#	#	Sequence	Result Date
4	DD004	\geq	\leq	AGUEDUG		E (0)	-	Ē	COLDENIA		2100	3	20.00	41.0		0.500	2557	1		rarch 6, 200
12 13	BR001	000	50	AQUEDUC	ai dr	E (8)	23	Ε	GULDENT	NENRUE	W	R	30x30	R1-1		9502	J557	-	e Average	310 41
14		Н																2	/-yeraye	March 6, 200
22	BR001	4	75	121 ST E			- 1 //			_					/ D		1007	Vhit	e Average	295
23		H	4		5	seri	al#		#	Sequ	uer	ice	Ke	esult /	Da	ite			Average	50
24 29	BR001	5	597	GOLDEN					_								2704	3 Yello	w Average	March 6, 200 231
30		Г	1						1				Ma	arch 6	, 20	07		4		March 6, 200
38	BR001	6	75	122 ST E				-								0558	7 (S-10.2 ft	e Ave age	302	
39		H	-		Ç	502	2055 [°]	7	Whit	e Ave	rac	ae		310		_		\$50,000	Perage	40
40 48	BR001	10	000	124 ST C				-				,					0560	5	e Average	March 6, 200 301
49	STATULE TO THE REAL PROPERTY.	3623	DRIVE.						Red Average					41					Average	38
50	\$1,000,000,000	2723	0.056340	V0000000000000000000000000000000000000						AVCI	ug						0.000000	6	1000000000	March 6, 200
58	BR001	10	075	124 ST CT	E		23	Е	008 AV E	_	W	R	30x30	R1-1		95021	181	100	e Average	306
59 60		Н	Se	erial#	#	Seq	uence	F	Result / Date	-								Hec	Average	40 March 6, 200
68	BR001	4					'			1	N	R	30x30	R1-1		95011	0126	Vhic	e Average	266
69	17.40.111.11110				1				March 6, 2007		15575							See Life Con-	Average	37
70		,			W 000001/1		000001/1 316		2748			a L egerus		0504040		8		March 6, 200		
78 79	BR001	Ĭ.			147	0000	204/0		200	-	S	R	30x30	R1-1		95010	17.25	1000000	e Average	282 38
80		Н			W	0000	001/2		300									9	Average	March 6, 200
81	BR001	8			W	0000	001/3		313		N	B	24x30	R2-1	25	2006	1232			N/A
82	100000000000000000000000000000000000000	28				0000	001/4		44	#221@452M	9249	а	3535565	428/3 (0		1023013	TRUSH	10		March 6, 200
90	BR001	1	95	020557	R	0000	00 1/4		41	EN RD E	E	R	30x30	R1-1		95020)563	A-3153F-5	e Average	318
91 92		Н		02000.	R	0000	001/5		41	-				_	10.		_	Hec 11	Average	43 March 6, 200
00	BR001	8			R	0000	001/6		40	EN RD E	E	R	30x30	R1-1		95012	231		e Average	322
01					n	0000	001/6		40									CHIVAL III	Average	39
02		57					RATIO		7.6	- 1	141	120	SECURE	18404000				12	Se .	March 6, 200
110 111	BR001	I			11/1	ito A	orace.		310		W	R	30x30	R1-1		95012	134	10/8/000	e Average	317
		~			VVI	iile AV	erage	_	310				W //					Hed	Average	41
					Re	ed Ave	erage		41											

Which Method? You Choose

- Flexibility in the MUTCD –
 different methods available
- Tie-in to Table 2A.3 values
- Gauge by most effective use of in-agency resources & expertise

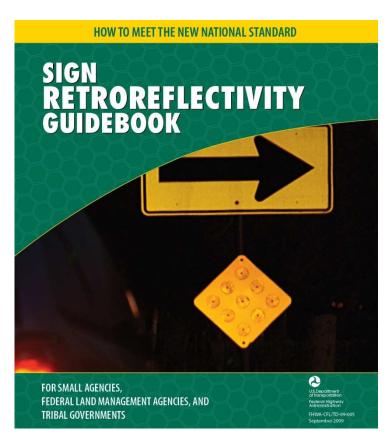
Training a key



MUTCD Compliance Sign Retroreflectivity

"Compliance...is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3.... even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time."

Sign Retroreflectivity Toolkit



- Primarily for agencies with <u>no</u> traffic engineer on staff
- Provides step-by-step instruction to select the best method for you
- Includes CD with additional help
 - Helps develop sign replacement budget
 - Provides sample forms

FHWA-CFL / TD-09-005
report.center@dot.gov or your LTAP center

Comments on Proposed Requirements for Maintained Minimum Retroreflectivity Levels of Pavement Markings



James W. Ellison, P.E.
Consulting Traffic Engineer
Federal Way, WA

Applies to these longitudinal markings

- Required or recommended center lines
- Required or recommended lane lines
- Required or recommended edge lines
- Any optional edge line markings used to qualify for lower minimum retro levels in Table

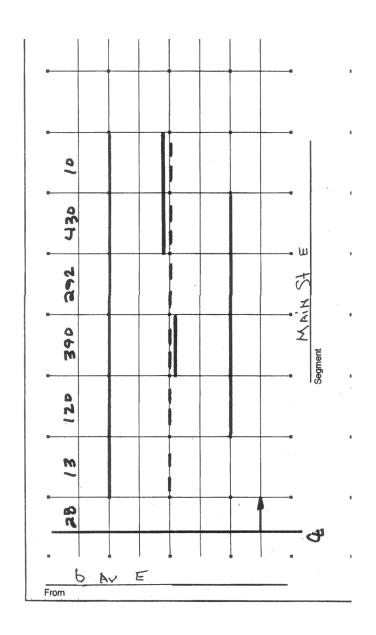
Pavement Marking Management Systems

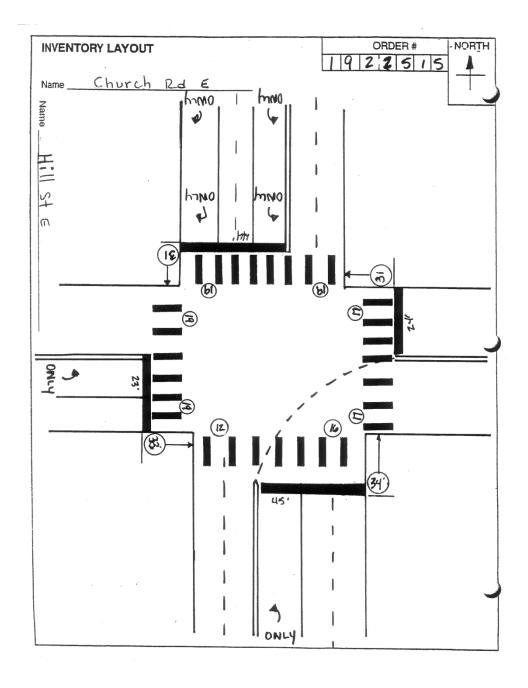
Key Elements

- Inventory
- Documentation of work
- Regular, periodic inspections









Methods for maintaining pavement marking retroreflectivity

- Calibrated Visual Nighttime Inspection
- Consistent Parameters Visual Nightime Inspection
- Service Life Based on Monitored Markings
- Measured Retroreflectivity
- Blanket Replacement
- Other methods



Pavement Marking Management Systems

Prioritization approach

- Maintain highest needs first/earlier
- Set frequency of striping (annually or ?)
- Durable material vs. paint?

Compliance Support Statement

Agencies would be in compliance if they:

- Have a method in place & are using it
- Maintain minimum levels in Table
- "Even if there are markings that do not meet the minimum retroreflectivity levels at a particular location or at a particular point in time"

Resources

- Your local LTAP Center
 - Some might have retroreflectometers for loan
- Methods for Maintaining Traffic Sign Retroreflectivity, 2007
 - FHWA-HRT-08-026
 - http://safety.fhwa.dot.gov/roadway_dept/retro/hrt08026/
- FHWA <u>fhwa.dot.gov/retro</u>
- ATSSA <u>www.retroreflectivity.net</u>
- James W. Ellison, P.E. Jim@jameswellison.com

Summary of Sign Retroreflectivity Maintenance Methods

						MENT EDS			ECTOR MTS		ME ANDS
imp	len	iente	d must be d and in use ary 2012	Retrore- flectometer	Inspection Vehicle	Must Know Sheet Type	Inventory	Lained		At Night	Must Stop At Signs
	I Procedures	Calibration Signs	CIAVE		Any				Any		
	of These 3 Visua	Comparison Panels	NA NA		Any				Any		Only Marginal Signs
	Select Any 1	Consistent Parameters			PU or SUV				60+		
	Measured Retro								Any		Every Sign
		Sign Life									
		TO T									
		Subjection	CONTROLSIGN	To Check Control Signs							Only Control Signs

⁽¹⁾ Not required in MUTCD, but might be beneficial

⁽²⁾ Need training on operation of retroreflectometer