
Maintenance of Signs & Pavement Markings

Presented by::

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MYTH VS. REALITY

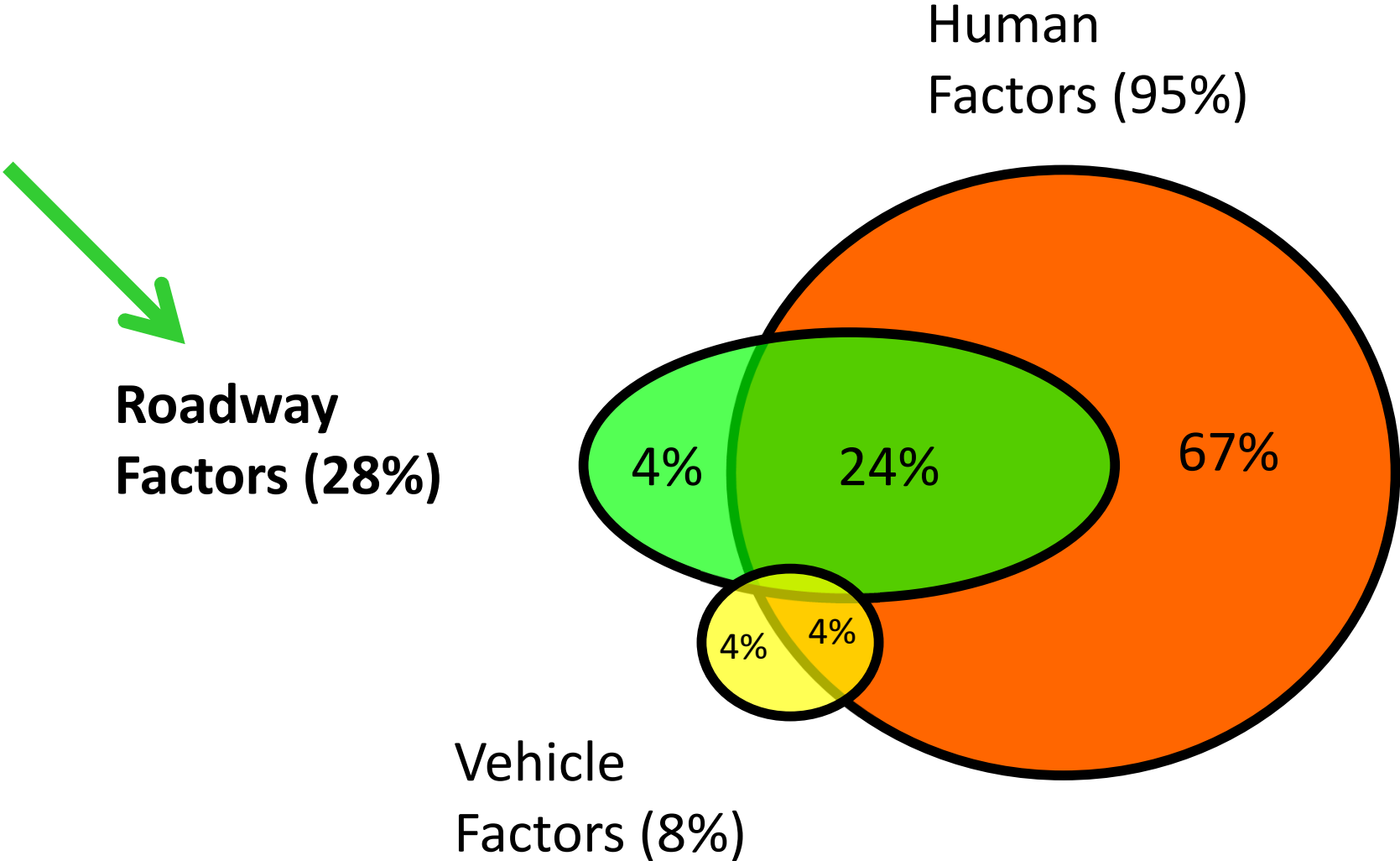
Myth:

Crashes are the driver's fault and there's nothing I can do about it.

Reality:

Crashes have multiple causes (driver, roadway and vehicle)

Crash Causes



TYPICAL REPORTED CRASH CAUSES

LEGAL IMPLICATIONS

- Standard signing according to the Texas Manual on Uniform Traffic Control Devices (TMUTCD).
- TMUTCD is applicable to **ALL** public highways, streets and roads in Texas, whether maintained by TxDOT, or a city or county agency.

PRINCIPLES OF TRAFFIC CONTROL DEVICES

Each Sign Installation or Device Must:

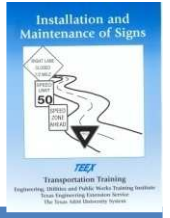
- Fulfill a Need
- Command Attention
- Convey a Clear Message
- Command Respect
- Provide Time to React



15
MPH



WE HAVE A DUTY TO . . .



- Maintain a “Reasonably Safe” Roadway
- Inspect the Facility
- Anticipate Roadway Defects
- Conform with Accepted Engineering Standards and Practices
- Conform to the TMUTCD

WHAT ARE OUR RESPONSIBILITIES TO THE TRAVELING PUBLIC?

Key Safety Principles

- No road is completely safe, only **safer** or less so
- We know how to make roads **safer**

What are some “safer” road features of this road?



How could you make this road safer?



Safer Roads

“Safer” IS your responsibility

Problems Facing County Road Administrators

- **Many county roads began as wagon roads and were never engineered**
- **Roads and signing simply evolved**
- **Lack of funds (need low-cost solutions)**

How can local officials promote Safety?

Develop a proactive safety attitude

Make low cost safety improvements

MYTH VS. REALITY

Myth:

Safety costs
a lot

Reality:

Can do a lot
for little cost

What could make this safer?



What could make this safer?



What could make this safer?



What could make this safer?



What could make this safer?



What could make this safer?



Run-Off-The-Road Crashes

- **40% of Texas Traffic Fatalities**
- **Curves**
- **Fixed Objects**

Warning Signing for Curves

Case Study A: Warning Signs for a Curve

Horizontal Curve “hidden” by vertical crest



**Substantive
Safety
Record**

Warning Signing for Curves

Case Study A: Warning Signs for a Curve

**Crash
Reduction
Factor = 29%**



Warning Signs and Curve Delineation

Warning sign calls attention to the upcoming curve

Advisory speed plate encourages drivers to decrease speed



Warning Signs and Curve Delineation

Chevrons provide guidance while navigating through a curve



Warning Signs and Curve Delineation

Delineators also provide guidance navigating through a curve



Signs and delineation promote safety

Crash reduction factor = 29%



Roadside Hazards



- Trees
- Bridge Ends
- Culvert Ends
- Mail Boxes
- Edge Drop Offs
- Utility Poles

Roadside Hazards

1. Eliminate the hazard
2. Relocate the hazard
3. Make the hazard softer – “cushion” it or design it to breakaway on impact.
4. Shield traffic from the hazard – usually with some type of barrier.
5. **Warn traffic** if the above options are not appropriate – **mark it** to be visible.

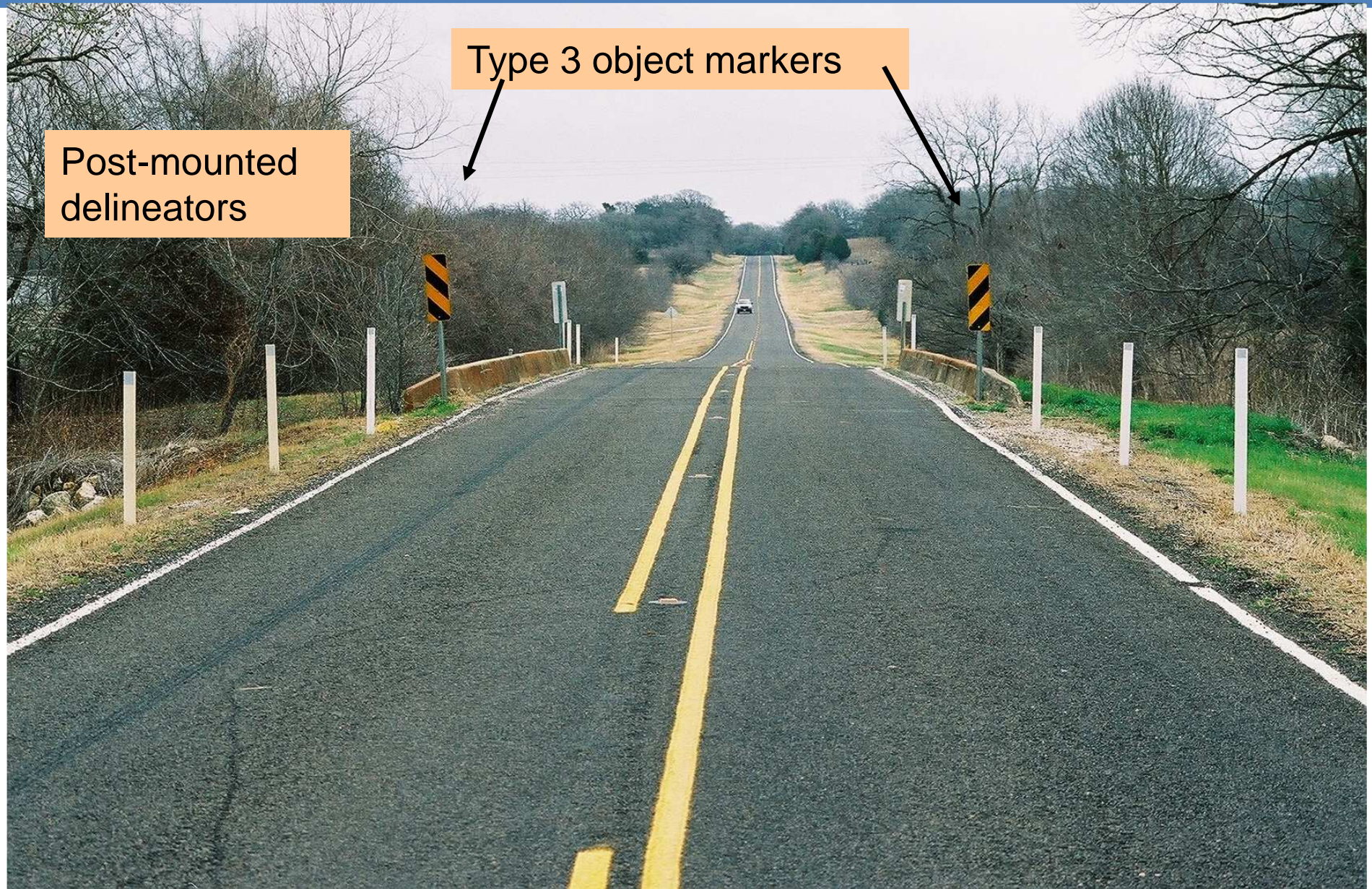
Unmarked Bridge Ends







Safety Markings for Bridge- Ends



Post-mounted delineators

Type 3 object markers



Type 2 object markers used to mark drainage structure



Type 2 object markers used to mark drainage structure



Mark culvert ends



Mark culvert ends

**Install Object Marker:
Reduce Crashes 30%**



Type 2 object marker used to mark a tree



Type 2 object marker used to mark a tree



Mailboxes



Mailboxes



Type 2 object marker on “crashworthy” mailbox support



Reducing Edge Drop-Off Crashes

Edge Drop-Off Resulted in 3 fatalities



Reducing Edge Drop-Off Crashes

Pavement Edge Rutting and Drop-Offs:

- ❑ Edge rutting occurs on all sections of roads
- ❑ Usually a small percentage of road length
- ❑ Can be more common on curves

The Safety Edge – Permanent Safety Feature

...in case of shoulder edge rutting or soil erosion



Pavement edge drop-offs can develop on chip-seal surfaces







Keep the shoulders pulled up flush with the pavement surface.



Routine maintenance



Routine maintenance



Signs must be inspected for retro-reflectivity

Signs fade over time



Texas MUTCD

Manual on Uniform Traffic Control Devices

Revision 2, October 2014



Section 2A.22 Maintaining Minimum Retroreflectivity

Support:

- 01 Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility (see Section 2A.21).

Standard:

- 02 **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-5.**

Support:

- 03 Compliance with the Standard in Paragraph 2 of this Section is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-5. Provided that an assessment or management method is being used, an agency or official having jurisdiction would be in compliance with the Standard in Paragraph 2 of this Section even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.

Guidance:

- 04 *Except for those signs specifically identified in Paragraph 5 of this Section, one or more of the methods described in "Maintaining Traffic Sign Retroreflectivity," (FHWA-SA-07-020, Revised 2013), FHWA, or a method developed based on an engineering study, should be used to maintain sign retroreflectivity at or above the minimum levels in Table 2A-5. Signs that are identified through the agency's method as being below the minimum levels should be replaced.*

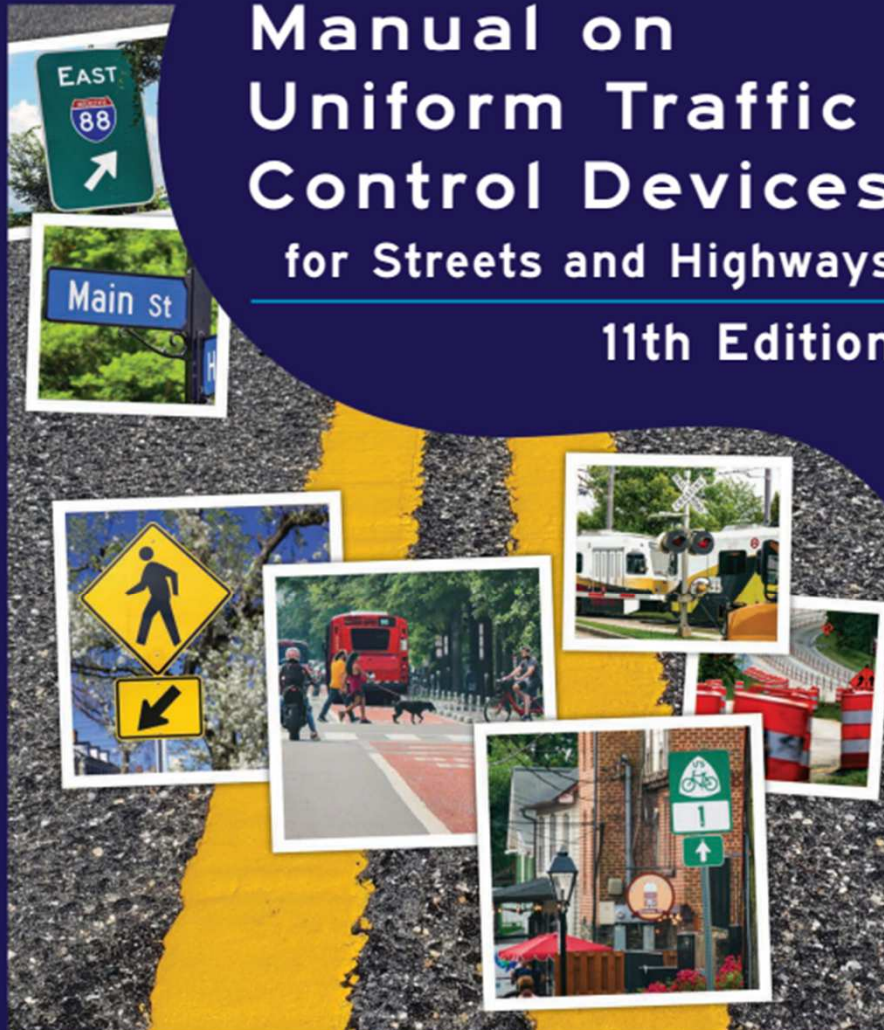
Other devices or treatments that highlight the sign shape, color, or message: Luminous tubing Fiber optics Incandescent light bulbs Luminescent panels	<ul style="list-style-type: none"> • Symbol or word message • Entire sign face
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Table 2A-4. Retroreflection of Sign Elements

Means of Retroreflection	Sign Element
Prismatic reflector "buttons" or similar units	Symbol Word message Border
A material that has a smooth, sealed outer surface over a microstructure that reflects light	Symbol Word message Border Background

Manual on Uniform Traffic Control Devices for Streets and Highways

11th Edition



U.S. Department of Transportation
Federal Highway Administration

December 2023

Section 3A.05 Maintaining Minimum Pavement Marking Retroreflectivity

Standard:

- 01 Except as provided in Paragraph 5 of this Section, a method designed to maintain retroreflectivity at or above 50 mcd/m²/lx under dry conditions shall be used for longitudinal markings on roadways with speed limits of 35 mph or greater.

Sect. 3A.03 to 3A.05

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Guidance:

- 02 *Except as provided in Paragraph 5 of this Section, a method designed to maintain retroreflectivity at or above 100 mcd/m²/lx under dry conditions should be used for longitudinal markings on roadways with speed limits of 70 mph or greater.*
- 03 *The method used to maintain retroreflectivity should be one or more of those described in “Methods for Maintaining Pavement Marking Retroreflectivity” (FHWA-SA-22-028), 2022 Edition, FHWA or developed from an engineering study based on the values in Paragraphs 1 and 2 of this Section.*

Support:

- 04 Retroreflectivity levels for pavement markings are measured with an entrance angle of 88.76 degrees and an observation angle of 1.05 degrees. This geometry is also referred to as 30-meter geometry. The units of pavement marking retroreflectivity are reported in mcd/m²/lx, which means millicandelas per square meter per lux.

Option:

- 05 The following markings may be excluded from the provisions established in Paragraphs 1 and 2 of this Section:
- A. Markings where ambient illumination assures that the markings are adequately visible;
 - B. Markings on streets or highways that have an ADT of less than 6,000 vehicles per day;
 - C. Dotted extension lines that extend a longitudinal line through an intersection, major driveway, or interchange area (see Section 3B.11);
 - D. Curb markings;
 - E. Parking space markings; and
 - F. Shared-use path markings.

- Pavement Marking Retroreflectivity



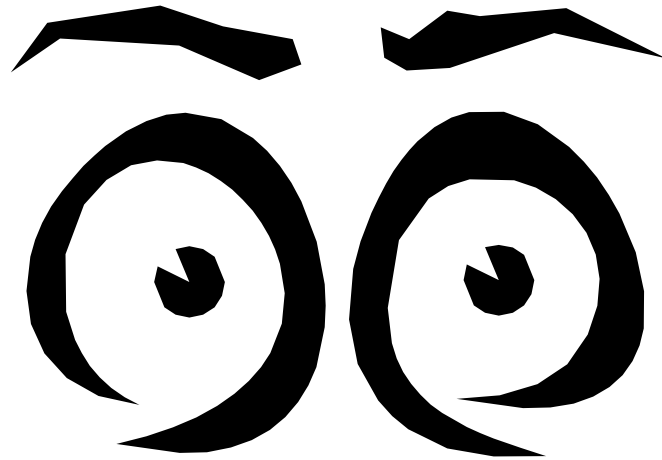
Courtesy of TxDOT

Factors Influencing Pavement Marking Durability



Courtesy of TxDOT

MAINTAIN A SAFETY ATTITUDE



Look for & correct potential safety problems