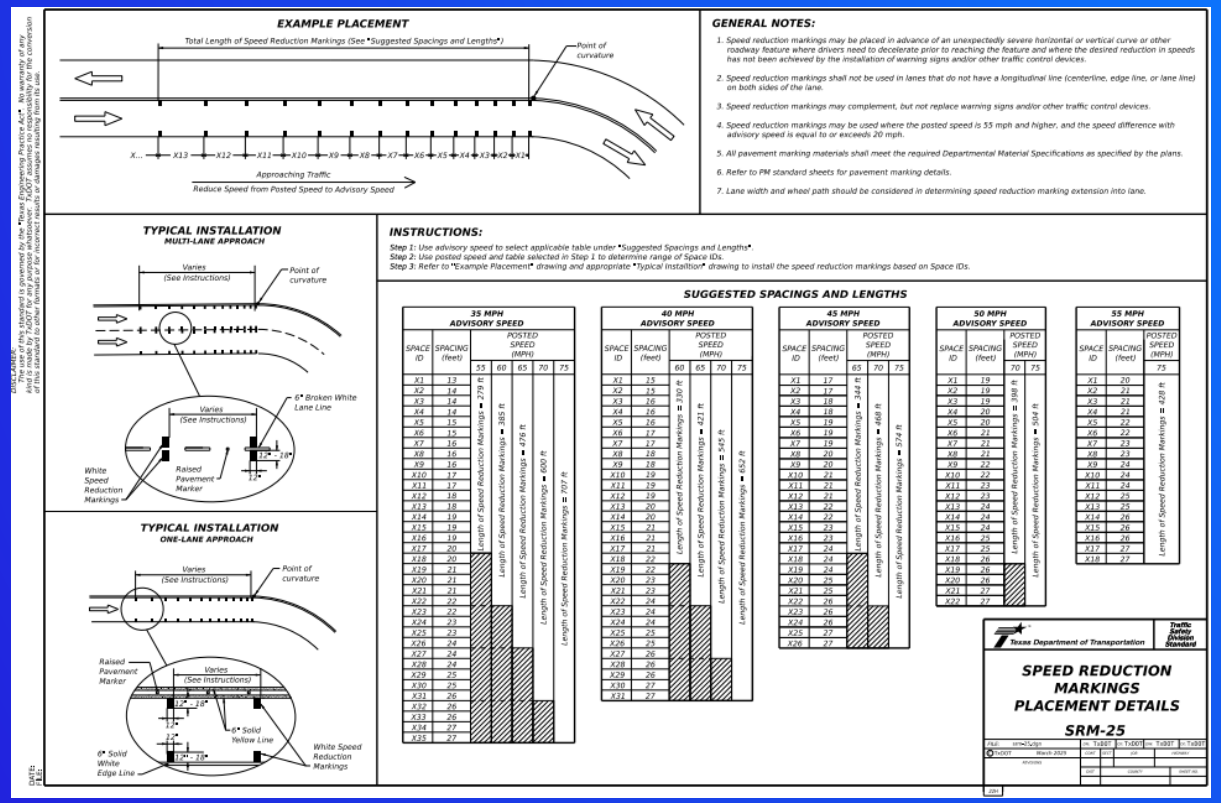
Texas Department of Transportation

Jacobs

Challenging today.
Reinventing tomorrow.

From Research to Practice: TxDOT's SRM-25 Speed Reduction Markings



2026 TexITE District Meeting

Houston

Xin (Juno) Zhang, PE, PTOE

April 10, 2026

Agenda

- What is Speed Reduction Marking (SRM)
- Why Speed Reduction Marking Matters
- Where SRM can be applied
- Research behind the development of SRM-25
- How to use this standard sheets

What is Speed Reduction Markings (SRM)

Definition

Supplemental transverse pavement markings

Visual effect

Progressively reduced spacing creates the impression of increasing speed (which warns drivers and encourages appropriate speed reduction)

Field use

Low-cost markings to slow drivers before severe curves or other key roadway features.

Illustrative Examples of Speed Reduction Markings

Image Source: Texas A&M Transportation Institute (TTI), Technical Report 0-6969-R3. Available at: http://tti.tamu.edu/documents/0-6969-R3.pdf

SRM-25 standardizes the details of this treatment.

Why Speed Reduction Marking Matters

- Road to Zero sets the bigger vision.
- Speed management remains a continuing traffic safety need.
- **Speed Reduction Marking** is practical ,cost-effective, and easy to implement.
- **SRM-25 is one practical tool within a larger safety toolbox**

Toward zero traffic fatalities and serious injuries in Texas

SRM aligns with that direction as one standardized, field-ready treatment.

Where SRM can be applied

Application Conditions

- Unexpectedly severe horizontal or vertical curve, or other roadway feature
- Drivers need to decelerate before reaching the feature
- Warning signs and/or other traffic control devices have not achieved the desired speed reduction

Use Criteria

- ❖ **Posted speed of 55 mph or higher**
- ❖ **Speed difference to advisory speed of 20 mph or greater**

SRM complements, but does not replace, warning signs or other traffic control devices.

Research Behind the Development

SRM-25 was developed by combining guidance, application review, and technical research.

Guidance

MUTCD / TMUTCD

Established the treatment concept and application direction.

Examples:
Dimension, concept and guidance.

MUTCD Guidance Section 3B.28 (11 Edition)

Application Consideration

Texas A&M Transportation Institute (TTI)

Helped evaluate where the treatment may be most appropriate in the field.

Examples: application considerations, speed differential, and context.

Traffic Control Device Analysis, Testing, and Evaluation Program: FY2020 Activities, etc.

Technical Research

Katz research

Provided the foundation for development of marking length and spacing.

Examples:

- Deceleration rate: **6.7 ft/s^2**
- Frequency: **4 bars per second.**
- **Equations for Length and Spacing.**

Peripheral Transverse Pavement Markings For Speed Control
Pavement Markings for Speed Reduction: Final Report

How the spacing and length were developed

1 Perception concept

Progressively reduced spacing creates the impression of increasing speed.

2 Design translation

The concept was converted into practical marking lengths and spacing values for implementation based on technical research.

3 Standardization

Those values were organized into SRM-25 tables for more consistent design use.

Reference Equations And Key Settings Used During Development

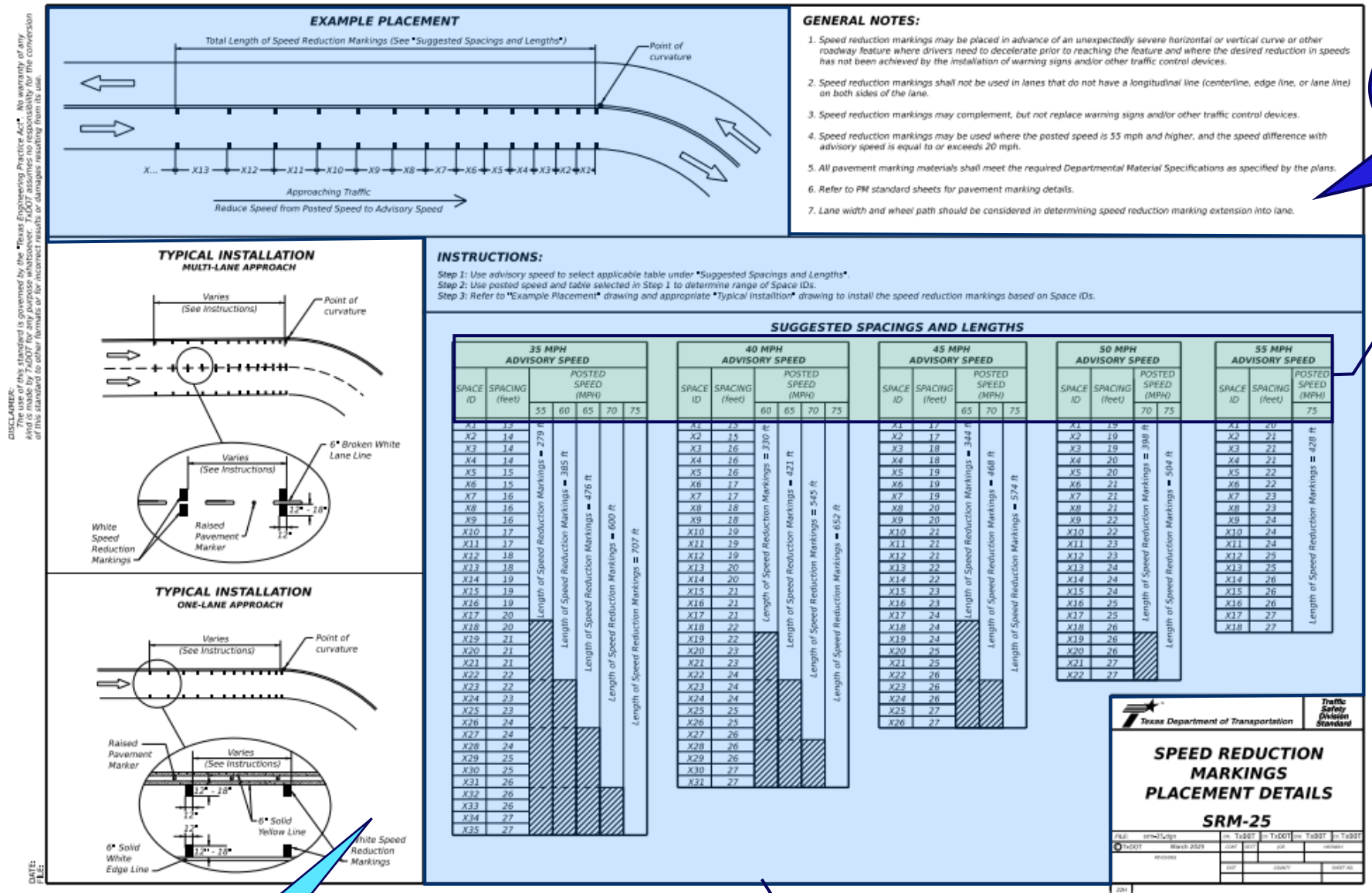
- Deceleration rate: 6.7 ft/s^2
- Speed reduction markings Frequency: 4 bars per second.

$$D = \frac{(v_0^2 - v_1^2)}{2a}$$

$$x = \frac{1}{2} a \left({}^{n}/_{f}\right)^2 + v_0 \left({}^{n}/_{f}\right) + x_0$$

This design principle has been adopted for eight sites in Alabama for SRM's implementation and evaluation.

Overview of the SRM-25



EXAMPLE PLACEMENT

Total Length of Speed Reduction Markings (See "Suggested Spacings and Lengths")

Point of curvature

X... X13 X12 X11 X10 X9 X8 X7 X6 X5 X4 X3 X2 X1

Approaching Traffic

Reduce Speed from Posted Speed to Advisory Speed

GENERAL NOTES:

1. Speed reduction markings may be placed in advance of an unexpectedly severe horizontal or vertical curve or other roadway feature where drivers need to decelerate prior to reaching the feature and where the desired reduction in speeds has not been achieved by the installation of warning signs and/or other traffic control devices.
2. Speed reduction markings shall not be used in lanes that do not have a longitudinal line (centerline, edge line, or lane line) on both sides of the lane.
3. Speed reduction markings may complement, but not replace warning signs and/or other traffic control devices.
4. Speed reduction markings may be used where the posted speed is 55 mph and higher, and the speed difference with advisory speed is equal to or exceeds 20 mph.
5. All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.
6. Refer to PM standard sheets for pavement marking details.
7. Lane width and wheel path should be considered in determining speed reduction marking extension into lane.

TYPICAL INSTALLATION
MULTI-LANE APPROACH

Varies (See Instructions)
Point of curvature
6" Broken White Lane Line
Varies (See Instructions)
12" - 18"
12"
White Speed Reduction Markings
Raised Pavement Marker

TYPICAL INSTALLATION
ONE-LANE APPROACH

Varies (See Instructions)
Point of curvature
Raised Pavement Marker
Varies (See Instructions)
12" - 18"
12"
6" Solid Yellow Line
12"
6" Solid White Edge Line
12" - 18"
White Speed Reduction Markings

INSTRUCTIONS:

Step 1: Use advisory speed to select applicable table under "Suggested Spacings and Lengths".
Step 2: Use posted speed and table selected in Step 1 to determine range of Space IDs.
Step 3: Refer to "Example Placement" drawing and appropriate "Typical Installation" drawing to install the speed reduction markings based on Space IDs.

SUGGESTED SPACINGS AND LENGTHS

35 MPH ADVISORY SPEED							40 MPH ADVISORY SPEED							45 MPH ADVISORY SPEED							50 MPH ADVISORY SPEED							55 MPH ADVISORY SPEED						
SPACE ID	SPACING (feet)	POSTED SPEED (MPH)					SPACE ID	SPACING (feet)	POSTED SPEED (MPH)					SPACE ID	SPACING (feet)	POSTED SPEED (MPH)					SPACE ID	SPACING (feet)	POSTED SPEED (MPH)					SPACE ID	SPACING (feet)	POSTED SPEED (MPH)				
		55	60	65	70	75			60	65	70	75				65	70	75					70	75					75						
X1	13	Length of Speed Reduction Markings = 279 ft					X1	15	Length of Speed Reduction Markings = 330 ft					X1	17	Length of Speed Reduction Markings = 344 ft					X1	19	Length of Speed Reduction Markings = 398 ft					X1	20	Length of Speed Reduction Markings = 428 ft				
X2	14		Length of Speed Reduction Markings = 385 ft				X2	15		Length of Speed Reduction Markings = 421 ft				X2	17		Length of Speed Reduction Markings = 468 ft				X2	19		Length of Speed Reduction Markings = 504 ft				X2	21					
X3	14			Length of Speed Reduction Markings = 476 ft			X3	16			Length of Speed Reduction Markings = 545 ft			X3	18			Length of Speed Reduction Markings = 574 ft			X3	19						X3	21					
X4	14				Length of Speed Reduction Markings = 600 ft		X4	16				Length of Speed Reduction Markings = 652 ft		X4	18						X4	20						X4	21					
X5	15					Length of Speed Reduction Markings = 707 ft	X5	16						X5	19						X5	20						X5	22					
X6	15						X6	17						X6	19						X6	21						X6	22					
X7	16						X7	17						X7	19						X7	21						X7	23					
X8	16						X8	18						X8	20						X8	21						X8	23					
X9	16						X9	18						X9	20						X9	22						X9	24					
X10	17						X10	19						X10	21						X10	22						X10	24					
X11	17						X11	19						X11	21						X11	23						X11	24					
X12	18						X12	19						X12	21						X12	23						X12	25					
X13	18						X13	20						X13	22						X13	24						X13	25					
X14	19						X14	20						X14	22						X14	24						X14	26					
X15	19						X15	21						X15	23						X15	24						X15	26					
X16	19						X16	21						X16	23						X16	25						X16	26					
X17	20						X17	21						X17	24						X17	25						X17	27					
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X30	25						X30	27																										
X31	26						X31	27																										
X32	26																																	
X33	26																																	
X34	27																																	
X35	27																																	

Texas Department of Transportation — Traffic Safety Division Standard

SPEED REDUCTION MARKINGS PLACEMENT DETAILS

SRM-25

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

General Notes: Explains application conditions and use considerations.

Tables include guidance for advisory speeds from 35–55 mph and posted speeds from 55–75 mph.

Typical Installation Layouts Shows how the markings are placed on the roadway approach.

Recommended spacing and length for different speed/advisory combinations, with a placement example.

How to Use SRM-25

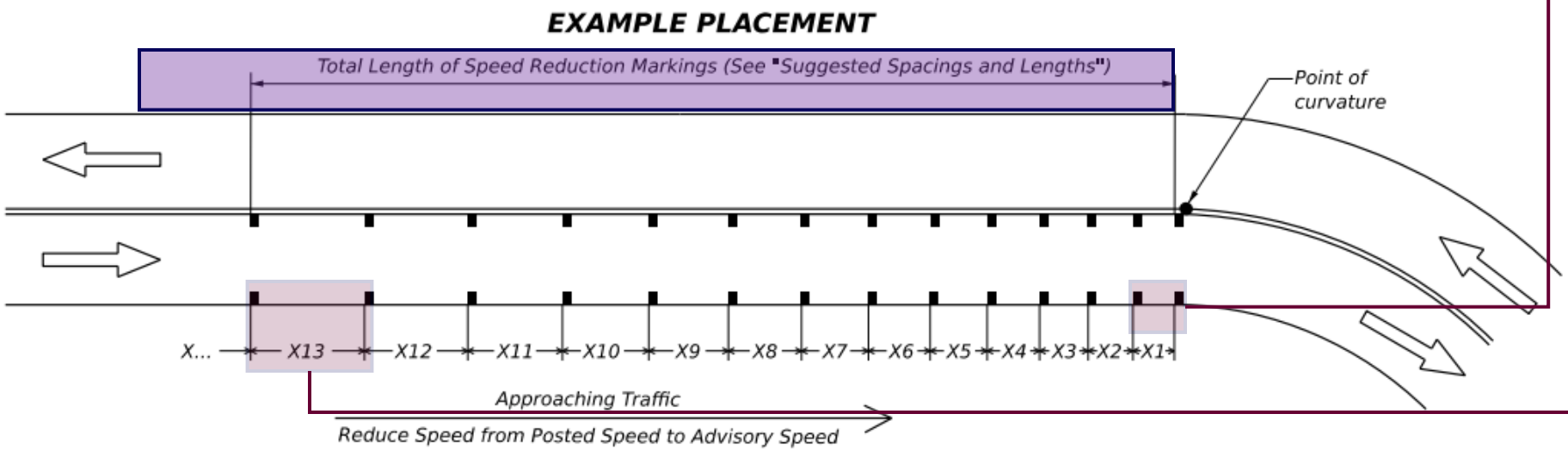
1 Confirm the site condition
Check that the location fits the intended application conditions in the sheet.

2 Check speeds
Identify posted speed and advisory speed.

3 Select the table and layout
Use the matching spacing, length, and typical installation detail.

4 Apply as a supplement
Coordinate with warning signs and other traffic control devices.

Sample Implementation



35 MPH ADVISORY SPEED

SPACE ID	SPACING (feet)	POSTED SPEED (MPH) 55	60	65	70	75
X1	13	Length of Speed Reduction Markings = 279 ft	Length of Speed Reduction Markings = 385 ft	Length of Speed Reduction Markings = 476 ft	Length of Speed Reduction Markings = 600 ft	Length of Speed Reduction Markings = 707 ft
X2	14					
X3	14					
X4	14					
X5	15					
X6	15					
X7	16					
X8	16					
X9	16					
X10	17					
X11	17					
X12	18					
X13	18					
X14	19					
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X23	22					
X24	23					
X25	23					
X26	24					
X27	24					
X28	24					
X29	25					
X30	25					
X31	26					
X32	26					
X33	26					
X34	27					
X35	27					

Summary

1

A standardized option

SRM-25 provides a standardized option for applying speed reduction markings.

2

A research-based process

Its development was supported by guidance, application review, and research.

3

A practical implementation tool

The sheet helps practitioners move from concept to real-world implementation.

Thank you!
Open Discussion