



Florida Department of Transportation

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STRUCTURES DESIGN BULLETIN 16-06

(FHWA Approved: June 28, 2016)

DATE: June 30, 2016

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Structures Design Engineers, District Structures Maintenance Engineers, Structures Manual Holders

FROM: Robert V. Robertson, P.E. State Structures Design Engineer

COPIES: Brian Blanchard, Phillip Gainer, Tim Lattner, David Sadler, Rudy Powell, Amy Tootle, Daniel Scheer, Bruce Dana, Gregory Schiess, Trey Tillander, SDO Staff, Jeffrey Ger (FHWA)

SUBJECT: Design Criteria and Standards for Single-Slope Traffic Railings for Structures

This bulletin is a follow-up to [Structures Design Bulletin 16-04](#) and introduces the following *Developmental Design Standards* and their associated *Instructions for Developmental Design Standards*:

- Index D426 - 36" Single-Slope Median Traffic Railing
- Index D427 - 36" Single-Slope Traffic Railing
- Index D428 - 42" Single-Slope Traffic Railing
- Index D20900 - Approach Slabs (Flexible Pavement Approaches)
- Index D20910 - Approach Slabs (Rigid Pavement Approaches)

This bulletin also includes changes to the *Structures Design Guidelines* that are associated with the use of these new *Developmental Design Standards* on bridges and retaining walls.

REQUIREMENTS

1. Use *Developmental Design Standards* D426, D427 and D428 in accordance with [Structures Design Bulletin 16-04](#), their associated *Instructions for Developmental Design Standards*, and this bulletin. Follow the process outlined in the "[Developmental Design Standards - Usage Process](#)".
2. Use *Developmental Design Standards* D20900, D20910 and their associated *Instructions for Developmental Design Standards* when using *Developmental Design Standards* D426, D427 or D428. Follow the process outlined in the "[Developmental Design Standards - Usage Process](#)".

3. Replace the cover requirements for traffic railings as shown in *Structures Design Guidelines* Table 1.4.2-1 with the following:

Component	Concrete Cover (inches)	
	Slightly or Moderately Aggressive	Extremely Aggressive
All components and surfaces not included above (including wall copings and traffic and pedestrian railings which are not allowed to be constructed using the slip forming method)	2	
Front and back surfaces of pedestrian railings and traffic railings other than single-slope traffic railings which may be constructed using the slip forming method	3	
Front and back surfaces of single-slope traffic railings which may be constructed using the slip forming method	2.5	

4. Replace *Structures Design Guidelines* Section 1.6.2.D Commentary Paragraph 6 with the following:

6. *36" Single-Slope and 32" F-Shape traffic railing retrofits, utilizing reinforcing configurations substantially similar to **Developmental Design Standard Index D427** and **Design Standard Index 420**, respectively, need only meet the design strength of the steel anchor (18.6 kips), except that the adhesive bonding material strength for the tension reinforcing within three feet of an open joint should meet 125% of the yield strength (23.25 kips). This recommendation is based on test results from FHWA/TTI Report No. 05/9-8132-3 (March, 2005).*

5. Add the following to *Structures Design Guidelines* Table 2.2-1 in the Traffic Railings section:

Item	Unit	Load
36" Single-Slope Median (Index D426)	Lb/ft	645
36" Single-Slope (Index D427)	Lb/ft	430
42" Single-Slope (Index D428)	Lb/ft	580

6. Add the following to *Structures Design Guidelines* Table 4.2.5-1:

Traffic Railing (Test Level)	Minimum Deck Thickness ¹ (inches)	Railing located adjacent to Coping Line		Railing located inboard of the exterior beam or girder ²
		Maximum Deck Overhang Measured from CL Beam or Girder ² (except as noted) (feet)	Minimum A _s ³ (sq in / linear ft)	Minimum A _s (sq in / linear ft)
36" Single-Slope Median (MASH TL-4)	8	N/A	N/A	0.51
36" Single-Slope (MASH TL-4)	8	6	0.80	0.48
42" Single-Slope (MASH TL-5)	10	6	0.93	0.56

7. Add the following to *Structures Design Guidelines* Table 4.2.5-2:

Traffic Railing (Test Level)	Railing located adjacent to Coping Line		Railing located inboard of the exterior beam or girder, or exterior web of Florida U-beams		Lc (ft)
	Mc (kip-ft/ft)	Tu (kips/ft)	Mc (kip-ft/ft)	Tu (kips/ft)	
36" Single-Slope Median (MASH TL-4)	N/A	N/A	12.5	4.8	5.4
36" Single-Slope (MASH TL-4)	15.8	9.4	9.5	5.6	5.5
42" Single-Slope (MASH TL-5)	27.5	11.0	16.5	6.6	11.1

8. Replace *Structures Design Guidelines* Section 6.7.1.B with the following:

B. The traffic railings shown on *Design Standards* Indexes 420-425, 470-483, 5200 and 5212 have been determined to meet the *NCHRP Report 350* crashworthiness requirements for permanent installations as listed above. The traffic railings shown on *Developmental Design Standards* Indexes D426, D427 and D428 have been determined to meet the *MASH* crashworthiness requirements for permanent installations as listed above. Use these standard traffic railings for permanent installations on bridges and retaining walls as shown in *PPM*, Volume 1 unless approval to use a non-standard or modified traffic railing is obtained per *SDG* 6.7.2. The traffic railings shown on *Design Standards* Indexes 412 and 414 have been determined to meet the crashworthiness requirements for temporary installations as listed above. Use these standard traffic railings for temporary installations on bridges and retaining walls as shown on the standards.

9. Add the following to *Structures Design Guidelines* Section 9.2.1.G.4:

36" Single-Slope	\$221
42" Single-Slope	\$240

10. Add the following to *Structures Design Guidelines* Section 9.2.2.E.1 in the traffic railings section:

36" Single-Slope Median	\$93
36" Single-Slope	\$71
42" Single-Slope	\$97

11. Add the following to *Structures Design Guidelines* Section 9.4:

36" Single-Slope Median Traffic Railing	0.159
36" Single-Slope Traffic Railing	0.107
42" Single-Slope Traffic Railing	0.143

COMMENTARY

See the *Instructions for Developmental Design Standards* corresponding to each new *Developmental Design Standard* for additional information including design criteria, assumptions and limitations, plan content requirements and pay item information.

BACKGROUND

See *Structures Design Bulletin* 16-03 and *Structures Design Bulletin* 16-04.

IMPLEMENTATION

See *Structures Design Bulletin* 16-04 for the overall implementation plan of single-slope bridge and retaining wall mounted traffic railings.

Developmental Design Standards Indexes D426, D427, D428, D20900 and D20910, and their associated *Instructions for Developmental Design Standards* and CADD Cells are available on the *Developmental Design Standards* website.

Use *Developmental Design Standards* D20900, D20910 and their associated *Instructions for Developmental Design Standards* when using *Developmental Design Standards* D426, D427 or D428.

Specification 521-4.3 will be revised to change the slip forming cover tolerance from 1¼" to ¾" and will be included in the July 2017 Workbook. If *Developmental Design Standards* Indexes D426, D427 or D428 are used on projects let before the July 2017 Workbook is implemented, prepare a Modified Special Provision for *Specification* 521-4.3 that specifies a ¾" slip forming cover tolerance.

Developmental Design Standards Indexes D426, D427, D428, D20900 and D20910 will be migrated to the *Design Standards FY2018-19* eBook using the same index numbers for lettings after June 30, 2018. Any changes to other associated *Design Standards* will be made at that time.

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