

Estimated Quantities				
Item		Substr.	Superstr.	Total
Removal of Miscellaneous ACM (Non-Friable)	sq. foot		27	27
Class 1 Excavation	cu. yard	75		75
Removal of Bridges (A3808)	lump sum			1
Bridge Approach Slab (Major)	sq. yard		162	162
Drilled Shafts (5 ft. 0 in. Dia.)	linear foot	249.0		249.0
Rock Sockets (4 ft. 6 in. Dia.)	linear foot	60.0		60.0
Video Camera Inspection	each	6		6
Foundation Inspection Holes	linear foot	120.0		120.0
Sonic Logging Testing	each	6		6
Galvanized Structural Steel Piles (12 in.)	linear foot	939		939
Pile Point Reinforcement	each	15		15
Class B Concrete (Substructure)	cu. yard	211.0		211.0
Slab on Concrete I-Girder	sq. yard		996	996
Type D Barrier	linear foot		529	529
Type 6 (54 in.), Prestressed Concrete I-Girder	linear foot		1133	1133
Reinforcing Steel (Bridges)	pound	86,080		86,080
Protective Coating - Concrete Bents and Piers (Epoxy)	lump sum	1		1
Steel Intermediate Diaphragm for P/S Concrete Girders	each		12	12
Vertical Drain at End Bents	each			2
Laminated Neoprene Bearing Pad (Tapered)	each		30	30

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete I-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete I-Girder.

All reinforcement in the intermediate bent concrete diaphragms except reinforcement embedded in the beam cap is included in the Estimated Quantities for Slab on Concrete I-Girder.

All concrete above the intermediate beam cap is included in the Estimated Quantities for Slab on Concrete I-Girder.

Cost of L4x4 ASTM A709 Grade 36 HP pile anchors and 3/4-inch diameter ASTM F3125 Grade A325 Type 1 bolts, complete in place, will be considered completely covered by the contract unit price for Galvanized Structural Steel Piles (12 in.).

Estimated Quantities for Slab on Concrete I-Girder		
Item		Total
Class B-2 Concrete	cu. yard	360
Reinforcing Steel (Epoxy Coated)	pound	89,430

The table of Estimated Quantities for Slab on Concrete I-Girder represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard longitudinally from end of slab to end of slab and transversely from out to out of bridge slab (or with the horizontal dimensions as shown on the plan of slab). Payment for stay-in-place corrugated steel forms, conventional forms, all concrete and epoxy coated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

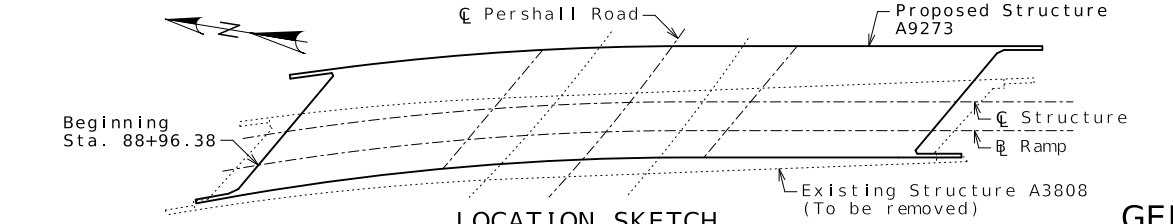
Slab shall be cast-in-place with conventional forms or stay-in-place corrugated steel forms. Precast prestressed panels will not be permitted.

Corrugated steel forms, supports, closure elements and accessories shall be in accordance with grade requirement and coating designation G165 of ASTM A653. Complete shop drawings of the permanent steel deck forms shall be required in accordance with Sec. 1080.

Corrugations of stay-in-place forms shall be filled with an expaned polystyrene material. The polystyrene material shall be placed in the forms with an adhesive in accordance with the manufacturer's recommendations.

Form sheets shall not rest directly on the top of girder flanges. Sheets shall be securely fastened to form supports with a minimum bearing length of one inch on each end. Form supports shall be placed in direct contact with the flange. Drilling holes in the girder flanges will not be permitted. All steel fabrication and construction shall be in accordance with Sec 1080 and 712. Certified field welders will not be required for welding of the form supports.

The design of stay-in-place corrugated steel forms is per manufacturer which shall be inaccordance with Sec 703 for false work and forms. Maximum actual weight of corrugated steel forms allowed shall be 4 psf assumed for girder loading.



Detailed Sep. 2024
Checked Sep. 2024

Note: This drawing is not to scale. Follow dimensions.

General Notes:

Design Specifications:
2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)
2023 AASHTO Guide Specifications for LRFD Seismic Bridge Design 3rd Ed.)
Seismic Design Category = B (Seismic Details plus Abutment Seismic Design)
Design earthquake response spectral accceleration coeffieint at 1.0 second period, $SD_1 = 0.222$
Acceleration Coefficient (effective peak ground acceleration coefficient), $A_s = 0.195$

Design Loading:
Vehicular = HL-93
Future Wearing Surface = 35 lb/sf
Earth = 120 lb/cf
Equivalent Fluid Pressure = 45 lb/cf (Min.)
Superstructure: Simply-Supported, Non-composite for dead load.
Continuous Composite for live load.

Design Unit Stresses:
Class B Concrete (Substructure) $f'c = 3,000$ psi

Class B-2 Concrete (Drilled Shafts & Rock Sockets) $f'c = 4,000$ psi

Class B-2 Concrete (Superstructure, except Prestressed Beams and Barrier) $f'c = 4,000$ psi

Class B-1 Concrete (Barrier) $f'c = 4,000$ psi

Reinforcing Steel (ASTM A706 Grade 60) $fy = 60,000$ psi

Structural Steel HP Pile (ASTM A709 Grade 50) $fy = 50,000$ psi

For prestressed girder stresses, see Sheets No. 16 & 17.

Neoprene Pads:
Neoprene bearing pads shall be 60 durometer and shall be in accordance with Sec 716.

Joint Filler:
All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1 1/2" unless otherwise shown.

Traffic Handling:
Vertical clearance for Pershall Road traffic during construction shall be 15'-6" minimum over a 24'-0" wide horizontal opening of the roadway.

Structure to be closed during construction. Traffic to be maintained on other routes. See roadway plans for traffic control.

Concrete Protective Coatings:
Protective coating for concrete bents and piers (Epoxy) shall be applied as shown on the bridge plans and in accordance with Sec. 711.

Miscellaneous:
MoDOT Construction personnel will indicate the type of joint filler option used under the precast panels for this structure:

- ☐ Constant Joint Filler
☐ Variable Joint Filler

Foundation Data					
Type	Design Data	Bent Number			
		1	2	3	4
Load Bearing Pile	Pile Type and Size	HP 12x53	---	---	HP 12x53
	Number ea	8	---	---	7
	Approximate Length Per Each ft	57	---	---	69
	Pile Point Reinforcement ea	All	---	---	All
	Min. Galvanized Penetration (Elev.) ft	Full Length	---	---	Full Length
	Pile Driving Verification Method	DF	---	---	DF
	Resistance Factor	0.4	---	---	0.4
	Minimum Nominal Axial Compressive Resistance kip	428	---	---	488
Rock Socket	Foundation Material	---	Weak Rock	Weak Rock	---
	Elevation Range ft	---	507-497	504-494	---
	Minimum Nominal Axial Compressive Resistance (Side Resistance) ksf	---	10.6	---	---
	Minimum Nominal Axial Compressive Resistance (Tip Resistance) ksf	---	164.3	196.1	---

DF = FHWA-modified Gates Dynamic Pile Formula

Minimum Nominal Axial Compressive Resistance = $\frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$

Minimum Nominal Axial Compressive Resistance = $\frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$ (Side Resistance + Tip Resistance)

HP piles are anticipated to be driven to refusal on rock. Review all borings for depth of rock and restrict driving as appropriate to comply with hard rock driving criteria in accordance with Sec 702. When pile refusal on rock occurs, as approved by the engineer, the minimum nominal axial compressive resistance is verified and no additional pile driving verification method is required.

All piles shall be galvanized down to the minimum galvanized penetration (elevation).

Pile point reinforcement need not be galvanized. Shop drawings will not be required for pile point reinforcement.

The contractor shall make every effort to achieve the minimum galvanized penetration (elevation) shown on the plans for all piles. Deviations in penetration less than 5 feet of the minimum will be considered acceptable provided the contractor makes the necessary corrections to ensure the minimum penetration is achieved on subsequent piles.

Sonic logging testing shall be performed on all drilled shafts and rock sockets.

STATE OF MISSOURI

ALEX BENZ

NUMBER PE-2018003121

PROFESSIONAL ENGINEER

Alex C. Benz

01/06/2025 7:28:37 AM

Alex Benz - Civil

MO PE-2018003121

DATE PREPARED

1/4/2025

ROUTE

I - 170

STATE

MO

DISTRICT

BR

SHEET NO.

2

COUNTY

ST. LOUIS

JOB NO.

J613624B

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

A9273

DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MoDOT

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1-888-ASK-MODOT (1-888-275-6636)

EFK Moen

Civil Engineering Design

13523 Barrett Parkway Dr Suite 250 St. Louis, MO 63021

Phone 314-394-3100 Fax 314-394-3199

Missouri Certificate of Authority: 001578

REV.

GENERAL NOTES AND QUANTITIES

Sheet No. 2 of 35

REVISED

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@ abt. 12" cts.
 @ 12" cts
 @ abt. 12" cts.

8'-6" 17'-0" 17'-0" 8'-6"

2" U Bars (Spaced as shown in Elevation) 2"

3" (B) 12" (C) 3" 3" (B) 12" (C) 3" 3" (D) 12" (C) 3" 3" (D) 12" (C) 3"

8-#6-H203 6-#6-H202 3"x6" Key (Typ.)

5'-0" 2'-6" 2'-6"

Bent, C Key, Columns, Drilled Shaft C Rock Socket

4'-6" 6'-6" 5'-0" 6'-0" 5'-5" 5'-6" 5'-11" 5'-0" 7'-2"

9'-0" 11'-0" 11'-0" 11'-0" 9'-0"

51'-0"

12-#10-H200 (Top) 12-#8-H201 (Bottom)

Diagram illustrating the cross-section of a bridge deck, showing two spans (25'-6" each) and various structural components and dimensions.

Span Dimensions and Components:

- Span Length: 25'-6"
- Girder Spacing: 11'-5 1/2"
- Span 1 (Left): 25'-6"
- Span 2 (Right): 25'-6"
- Span 3 (Right): 25'-6"

Structural Components and Details:

- Girders:** 5 girders are shown, labeled 1 through 5.
- Bent & Key:** Located at the left end of the first span.
- Bearing:** Located at the left end of the first span.
- Joint Filler (Typ.):** Located at the ends of the spans.
- Fill area under girder with joint filler (Typ.):** Located under the girders.
- 8" x 22 1/2" Tapered Laminated Neoprene Bearing Pad (Typ.):** Located under the girders.
- 1 Layer of 30-lb (Min.) Roofing Felt or Bit. Pile Paint (Typ.):** Located on the top surface of the deck.
- Structure:** Located in the center of the spans.
- Ramp:** Located on the right side of the spans.

Dimensions and Angles:

- Span 1 (Left): 25'-6"
- Span 2 (Right): 25'-6"
- Span 3 (Right): 25'-6"
- Span 4 (Right): 25'-6"
- Span 5 (Right): 25'-6"
- Span 6 (Right): 25'-6"
- Span 7 (Right): 25'-6"
- Span 8 (Right): 25'-6"
- Span 9 (Right): 25'-6"
- Span 10 (Right): 25'-6"
- Span 11 (Right): 25'-6"
- Span 12 (Right): 25'-6"
- Span 13 (Right): 25'-6"
- Span 14 (Right): 25'-6"
- Span 15 (Right): 25'-6"
- Span 16 (Right): 25'-6"
- Span 17 (Right): 25'-6"
- Span 18 (Right): 25'-6"
- Span 19 (Right): 25'-6"
- Span 20 (Right): 25'-6"
- Span 21 (Right): 25'-6"
- Span 22 (Right): 25'-6"
- Span 23 (Right): 25'-6"
- Span 24 (Right): 25'-6"
- Span 25 (Right): 25'-6"
- Span 26 (Right): 25'-6"
- Span 27 (Right): 25'-6"
- Span 28 (Right): 25'-6"
- Span 29 (Right): 25'-6"
- Span 30 (Right): 25'-6"
- Span 31 (Right): 25'-6"
- Span 32 (Right): 25'-6"
- Span 33 (Right): 25'-6"
- Span 34 (Right): 25'-6"
- Span 35 (Right): 25'-6"
- Span 36 (Right): 25'-6"
- Span 37 (Right): 25'-6"
- Span 38 (Right): 25'-6"
- Span 39 (Right): 25'-6"
- Span 40 (Right): 25'-6"
- Span 41 (Right): 25'-6"
- Span 42 (Right): 25'-6"
- Span 43 (Right): 25'-6"
- Span 44 (Right): 25'-6"
- Span 45 (Right): 25'-6"
- Span 46 (Right): 25'-6"
- Span 47 (Right): 25'-6"
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- Span 90 (Right): 25'-6"
- Span 91 (Right): 25'-6"
- Span 92 (Right): 25'-6"
- Span 93 (Right): 25'-6"
- Span 94 (Right): 25'-6"
- Span 95 (Right): 25'-6"
- Span 96 (Right): 25'-6"
- Span 97 (Right): 25'-6"
- Span 98 (Right): 25'-6"
- Span 99 (Right): 25'-6"
- Span 100 (Right): 25'-6"

Angles:

- 41°32'04" (Typ.)
- 46°18'38" (Typ.)

[illegible]

5'-0"

12-#10-H200

6'-6"-H204

(4)

#4-U203

4'-11" (Min.)

6-#6-H204 (Each face)

4'-9 1/2" (Min.)

#5-U201

16" x 16" x 2" Const. Jt. Key.

10-#10 V203
V204 & V205

12-#8-H201

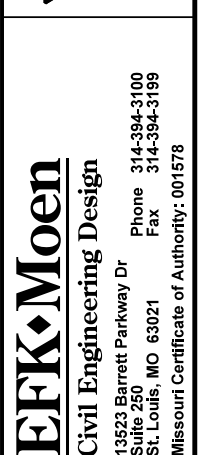
6"

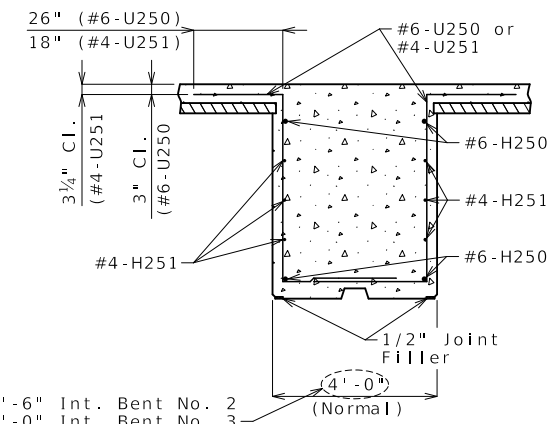
(Typ.)

Diagram of Section C-C showing reinforcement details. The section is 5'-0" wide and 5'-0 3/4" (Min.) high. Reinforcement includes 12-#10-H200, 6-#6-H204, 12-#8-H201, 6-#6-H202 (Each face), #4-U203, and 5-U200.

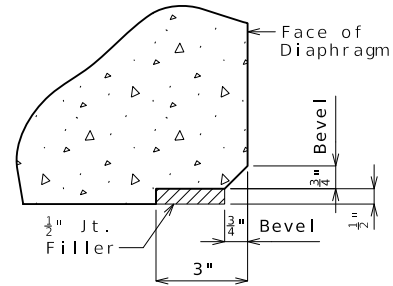
1 REVISED

For steps 2" or more, use 2 1/4" x 1/2" joint filler up vertical face.

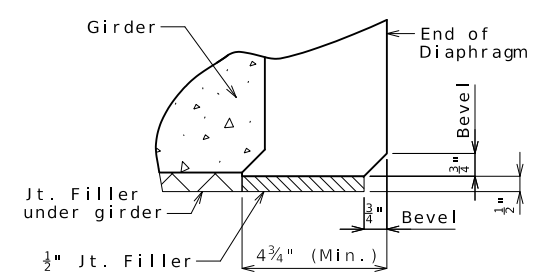




SECTION A-A
Int. Bent No. 2 shown,
Int. Bent No. 3 similar



EDGE DETAIL



END DETAIL

1 REVISED

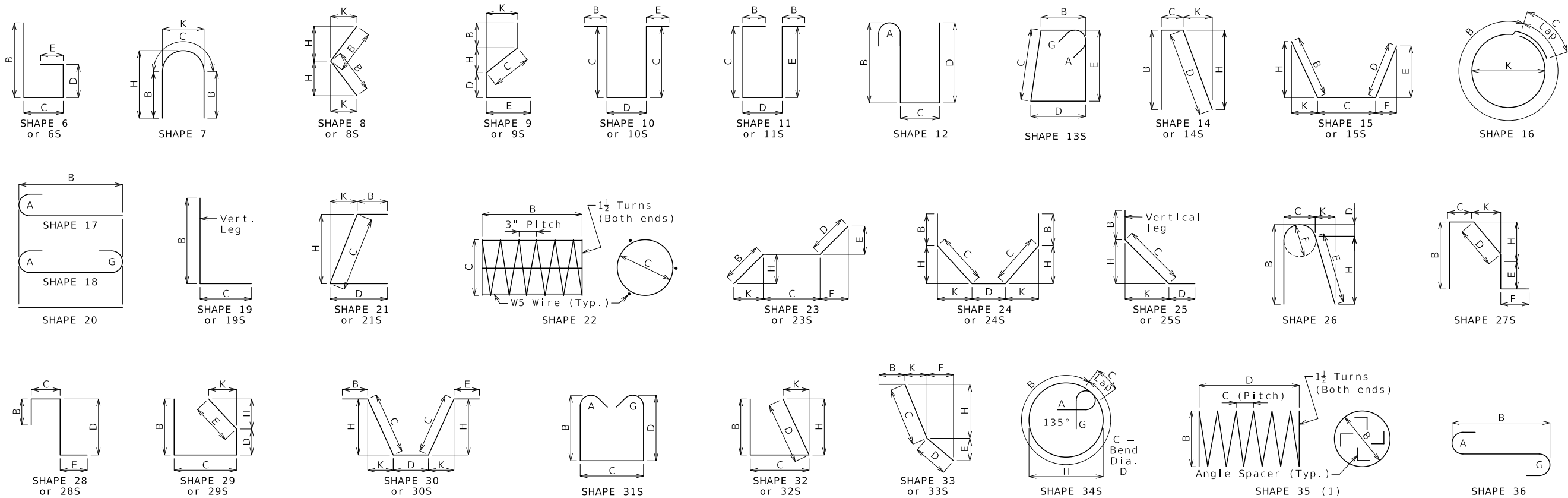
Detailed Sep. 2024
Checked Sep. 2024

Note: This drawing is not to scale. Follow dimensions.

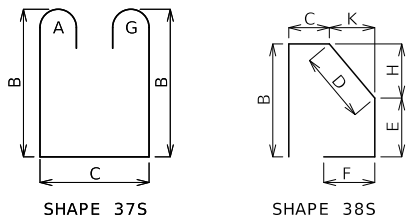
Sheet No. 19 of 35

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REV.



Finished Bend Dimensions D and Hook Dimensions							
Standard Pin Bend Shapes							
Size	Case	D	A or G		J		
			90°	180°	180°	180°	
#4	1	3"	8"	6"	4"		
#5	1	3 3/4"	10"	7"	5"		
#6	1	4 1/2"	12"	8 1/4"	6"		
#7	2	5 1/4"	14"	9 3/4"	7"		
	3	7"	15"	11 1/2"	8 3/4"		
#8	2	6"	16"	11"	8"		
	3	8"	17"	13 1/4"	10"		
#9	1	9 1/2"	19 1/2"	15 1/2"	11 3/4"		
#10	1	10 3/4"	22"	17 1/2"	13 1/4"		
#11	1	12"	24 1/2"	19 1/2"	14 7/8"		
#14	1	18 1/4"	31 1/4"	27 1/2"	21 5/8"		
#18	1	24"	41 1/2"	36 1/4"	28 1/2"		
Stirrup Pin Bend Shapes (S)							
Size	Case	D	A or G			H	
			90°	135°	180°	135°	180°
#4	2	2"	4 1/2"	4 1/2"	5"	2 7/8"	3"
	3	3"	5"	5 1/4"	6"	3"	4"
#5	2	2 3/4"	5 3/4"	5 3/4"	5 3/4"	3 3/8"	3 3/4"
	3	3 3/4"	6 1/4"	6 1/4"	7"	3 3/8"	5"
#6	1	4 1/2"	12"	7 3/4"	8 1/4"	4 3/8"	6"
Applicable for all grades of steel. Case 1 applies to all reinforcement. Case 2 applies to all reinforcement except for galvanized bars. Case 3 applies to galvanized bars only.							



BENDING DIAGRAMS

All dimensions are out to out. (1) Shall be a deformed or plain spiral bar or wire.

Shapes ending with an S shall be bent in accordance with stirrup pin bend shapes.

Unless otherwise noted, finished bending diameter D is the same for all bends of a shape.

Four angle or channel spacers are required for each column spiral. Spacers are to be placed on inside of spirals. Length and weight of column spirals do not include splices or spacers.

Reinforcing Steel Totals (Pounds)								
By Size	Substructure		Superstructure				Entire Bridge	
	Size	Plain	Epoxy	Slab		Slip Form	Plain	Epoxy
				Plain	Epoxy			
	W5	0	0	0	0	0	0	0
	4	462	0	0	1,726	0	462	1,726
	5	14,018	0	0	36,246	13,661	14,018	50,508
	6	8,597	0	0	40,404	0	8,597	40,404
	7	0	0	0	9,546	0	0	9,546
	8	3,156	0	0	1,511	0	3,156	1,511
	9	54,462	0	0	0	0	54,054	0
	10	5,387	0	0	0	0	5,387	0
	11	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0
By Type		86,082	0	0	89,433	13,661	86,082	89,433

All superstructure reinforcing steel shall be epoxy coated unless otherwise specified.

BENDING DIAGRAMS AND REINFORCING STEEL TOTALS

Detailed Sep. 2024
Checked Sep. 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 30 of 35

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Alex C. Benz
01/06/2025 7:29:16 AM
Alex Benz - Civil
MO PE-2018003121

DATE PREPARED
1/4/2025

ROUTE	STATE
I - 170	MO
DISTRICT	SHEET NO.
BR	30

COUNTY
ST. LOUIS

JOB NO.
J613624B

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9273

DESCRIPTION

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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