Standard Slab Bridge – General Instructions

Makeup of Plans

1. General Plan

See Section 3, *Bridge Design Details* manual. General notes have been placed on the Slab Reinforcement Details sheet.

2. Deck Contour

See Section 4, *Bridge Design Details* manual.

3. Foundation Plan

See Section 5, *Bridge Design Details* manual.

4. Abutments and Bent Details

See Section 6 & 7, *Bridge Design Details* manual. Wingwalls on Standard Plan B0-1 will usually be satisfactory. Bent caps for spans 24' and less should be detailed in the usual manner (plan, elevation and section). The dropped portion should be squared off at the ends, 1'-0" minimum from edge of deck. Plan, elevation and sectional views are still desirable. For flush caps, the width of stirrups must be indicated.

5. Deck Details

Plan views of both top and bottom slab reinforcement are required. Indicate length, total number and placement data for each class of main reinforcing bars. Also show the typical section, the camber diagram, main reinforcing bars and diagram for payment of concrete. A longitudinal deck sectional view is unnecessary.

6. Slab Reinforcement Details

Insert this 'Standard' sheet as part of the plans for every slab bridge.

7. Slab Hinge Details

Insert this 'Standard' sheet where a hinge is required. Detail joint seal data, 'A' bar size, and elastomeric bearing pad size. Use the steel hinge *only* when matching an existing one in a widening.

8. **Piles**

Insert the appropriate 'Standard' sheet. At locations where aesthetics are not important, allow the steel shell to be used full height by modifying the standard sheet with a note to that effect. The shell should extend 1" into the soffit.

9. **Railing Details**

Refer to book of Standard Plans or insert appropriate sheets.

10. **Reference to book of Standard Plans**

These sheets will always be required: A62-C 'Limits of Payment for Excavation and Backfill Bridge', B0-1 and B0-3 'Bridge Details'. Others should be referred to when required.

11. **Log of Test Borings**

Insert as usual.

Basis of Design

1. **Design Method**

Load factor design based on Bridge Design Specifications. See 'Slab Reinforcement Details' for general notes.

2. **Distribution of Wheel Loads**

Distribution of wheel loads conform to Article 3.24.3.2 of the 1983 AASHTO. E = 4 + 0.06S (max = 7').

3. **Slab Thickness**

The thickness of the slab is designed in accordance with Article 8.9.2 and Table 8.9.2 of the 1983 AASHTO. L/300 was used as a maximum deflection criteria.

4. **Environmental Factor Z**

170 kip/in.

5. **Span Length**

Actual span lengths are shown for all except 'D' spans. If a span configuration of 18-24-18 is desired, the chart values for L = 24' should be used for all 3 spans. 'D' span values in the chart are

based on (0.75) L or 18' in this case. Criteria for intermediate span lengths may be interpolated from the values given in these standards.

6. Skew

The charts for superstructure design may be used for skews up to 50 degrees. A special design should be used when the skew angle exceeds 50 degrees. Piles may have to be added at the abutments to support the obtuse corners of the slab. See 'Support Design Data' and 'Typical Support Calculations' sheets.

7. End Diaphragm Abutment

Designers will determine the longitudinal force based upon Memo to Designers 5-2. To determine longitudinal force, divide total force by effective abutment width.

8. Hinges

Two types of hinges are available. The hinge at bent should be used on the shorter spans where dropped caps are normally required or on the longer spans where appearance is not a factor. The hinge at L/6 is for use on spans without dropped caps and where it is desired to have the soffit line remain unbroken for aesthetic purposes.

9. Piles

The following limitations apply.

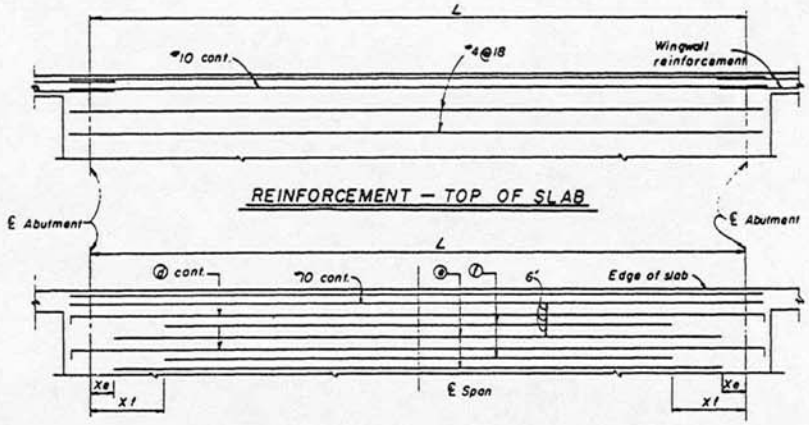
a. Relatively uniform unsupported heights between 8 and 25 feet, before and after considering scour.
b. Compact sandy soil or better and/or stiff clay or better.
c. Expansion joints shall be located at approximately 250 feet on centers.
d. Exceptions to the above will necessitate a design analysis.

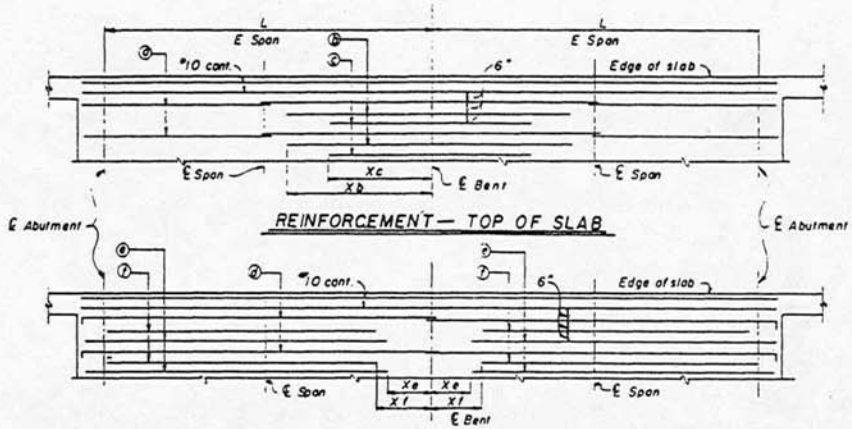
10. Drainage

Scuppers or deck drains must be specially detailed when necessary.

11. Quantities

Approximate slab quantities are given for one lineal foot of slab width. The reinforcement for caps and end diaphragms as well as the concrete extending outside the slab limits are not included in these charts.





L = Length of Span			16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
REINFORCEMENT	Bottom of Slab	Ⓐ bars	Size	#8	#8	#8	#8	#8	#8	#9	#9	#9	#9	#9	#9	#10	#10
			Length	Continous													
		Ⓑ bars	Size	#7	#7	#8	#8	#8	#8	#8	#9	#9	#9	#9	#9	#9	#9
			Length	16'-0"	17'-0"	19'-0"	21'-0"	23'-0"	25'-0"	27'-0"	28'-0"	30'-0"	32'-0"	34'-0"	36'-0"	38'-0"	40'-0"	41'-0"
			Xe	0'-0"	0'-6"	0'-6"	0'-6"	0'-6"	0'-6"	0'-6"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"
		Ⓒ bars	Size	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#9	#9	#9	#9
			Length	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	19'-0"	20'-0"	22'-0"	23'-0"	23'-0"	25'-0"	28'-0"	28'-0"	29'-0"	30'-0"
			Xf	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	3'-6"	4'-0"	4'-0"	4'-6"	5'-6"	5'-6"	5'-0"	6'-0"	6'-6"	7'-0"
Distribution Steel Spacing				11"	11"	11"	11"	11"	11"	11"	11"	11"	11"	11"	11"	11"	11"	11"
T = Thickness of Slab Ⓔ				12 1/2"	13 1/2"	14 1/2"	15 1/2"	16 1/2"	17 1/2"	18"	19"	20"	21"	22"	23"	24 1/2"	26 1/2"	28"
Approximate Quantities per foot of width			Conc. ft³	18.2	21.9	26.0	30.4	35.1	40.1	44.3	49.9	55.8	62.1	68.8	75.7	84.7	96.1	106.2
			Steel-lbs	105	115	135	150	160	190	215	235	260	275	290	330	340	380	400
Ultimate Deflection at Midspan Δ				.01'	.02'	.02'	.03'	.04'	.05'	.06'	.07'	.08'	.09'	.11'	.12'	.13'	.14'	.15'

Ⓔ Add 1/2" for "Corrosion Protection" & adjust concrete quantity.

SLAB DETAILS — SINGLE SPAN

Live Loading: HS 20-44 and Alternative and Permit Design Load.

L = Length of Span			16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
REINFORCEMENT	Top of Slab	Ⓐ bars	Size	#7	#7	#7	#7	#8	#8	#8	#8	#8	#9	#9	#9	#9	#10
			Length	39'-8"	43'-8"	47'-8"	51'-8"	56'-8"	63'-2"	67'-2"	71'-2"	75'-2"	82'-0"	86'-0"	90'-0"	94'-0"	98'-0"	107'-4"
		Ⓑ bars	Size	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#9	#9	#9	#9	#10
			Length	13'-0"	14'-0"	15'-0"	17'-0"	15'-0"	15'-0"	16'-0"	18'-0"	20'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"	24'-0"
			Xb	6'-6"	7'-0"	7'-6"	8'-6"	7'-6"	7'-6"	8'-0"	9'-0"	10'-0"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	12'-0"
		Ⓒ bars	Size	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#9	#9	#9	#9
			Length	7'-0"	7'-0"	7'-0"	8'-0"	7'-6"	8'-0"	8'-0"	9'-0"	10'-0"	11'-0"	11'-0"	12'-0"	12'-0"	13'-0"	13'-0"
			Xc	3'-6"	3'-6"	3'-6"	4'-0"	3'-6"	4'-0"	4'-0"	4'-6"	5'-0"	5'-6"	5'-6"	6'-0"	6'-0"	6'-6"	6'-6"
	Bottom of Slab	Ⓐ bars	Size	#7	#7	#8	#8	#8	#8	#8	#8	#8	#8	#8	#9	#9	#9	#9
			Length	39'-5"	43'-5"	48'-3"	52'-3"	56'-3"	60'-3"	64'-3"	68'-3"	72'-3"	76'-3"	80'-3"	86'-6"	90'-6"	94'-6"	98'-6"
		Ⓑ bars	Size	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#8	#8	#8	#8
			Length	15'-0"	16'-6"	17'-6"	18'-0"	20'-6"	22'-0"	23'-6"	24'-6"	26'-6"	28'-0"	29'-0"	28'-6"	29'-6"	31'-6"	32'-6"
			Xe	2'-0"	2'-6"	3'-0"	3'-0"	3'-6"	4'-0"	4'-0"	5'-0"	5'-6"	6'-0"	6'-0"	8'-0"	9'-0"	9'-0"	9'-6"
		Ⓒ bars	Size	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#7	#7	#7	#8
			Length	11'-0"	12'-6"	12'-6"	14'-0"	15'-6"	15'-0"	16'-6"	17'-0"	19'-0"	21'-0"	21'-6"	22'-0"	21'-0"	23'-0"	25'-0"
			Xf	4'-0"	4'-6"	5'-6"	6'-0"	6'-6"	7'-6"	8'-0"	9'-0"	9'-6"	10'-0"	10'-0"	12'-0"	13'-6"	13'-6"	14'-0"
Distribution Steel Spacing				12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
T = Thickness of Slab Ⓔ				10 1/2"	11 1/2"	12"	13"	13 1/2"	14 1/2"	15"	16"	17"	17 1/2"	18 1/2"	19"	20"	21"	21 1/2"
Approximate Quantities per foot of width			Conc. ft³	14.7	18.0	20.8	24.7	27.8	32.3	35.9	41.0	46.4	50.7	56.7	61.4	67.9	74.8	80.2
			Steel-lbs	140	160	180	195	215	230	265	290	325	350	375	420	430	450	535
Ultimate Deflection at Midspan Δ				.01'	.01'	.02'	.02'	.02'	.03'	.04'	.04'	.05'	.06'	.06'	.07'	.08'	.09'	.10'

Ⓔ Add 1/2" for "Corrosion Protection" & adjust concrete quantity.

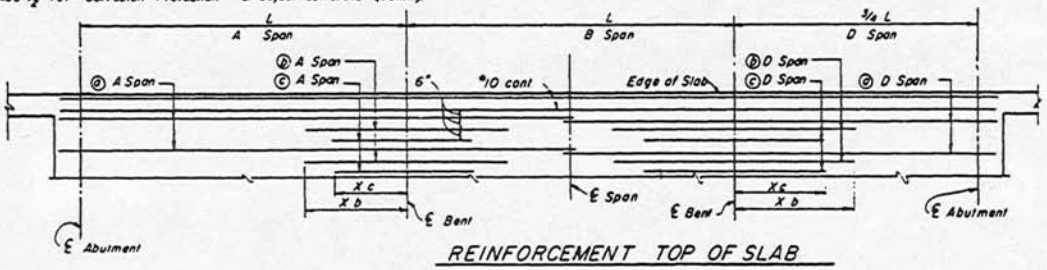
Live Loading: HS 20-44 and Alternative and Permit Design Load.

SLAB DETAILS — 2 SPANS

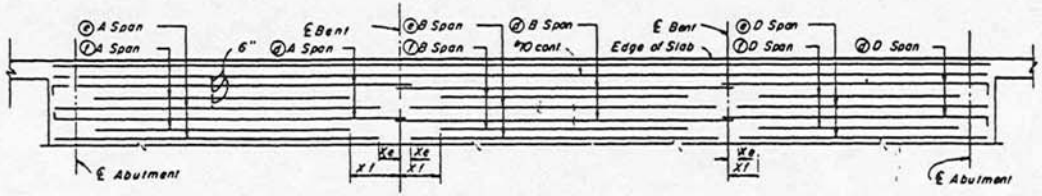
STANDARD SLAB BRIDGE
SLAB DETAILS - SINGLE & 2 SPAN

L = Length of Span			16'			18'			20'			22'			24'			26'			28'			30'			32'			34'			36'			38'			40'			42'			44'		
Type of Span			A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D
REINFORCEMENT	Top of Slab	a bars	Size	#7	—	#6	#7	—	#6	#7	—	#7	#7	—	#7	#7	—	#7	#7	—	#7	#8	—	#7	#8	—	#7	#8	—	#7	#9	—	#7	#9	—	#8	#9	—	#8	#9	—	#8	#9	—	#8	#10	—	#9
			Length	26'-3"	—	22'-0"	29'-3"	—	24'-6"	32'-3"	—	27'-3"	35'-3"	—	29'-9"	38'-3"	—	32'-3"	41'-3"	—	35'-6"	45'-1"	—	37'-10"	48'-7"	—	40'-6"	51'-1"	—	42'-10"	54'-10"	—	45'-6"	57'-10"	—	48'-1"	61'-3"	—	50'-7"	64'-3"	—	53'-1"	67'-3"	—	55'-7"	70'-3"	—	58'-10"
		b bars	Size	#7	—	#6	#7	—	#6	#7	—	#6	#7	—	#6	#7	—	#6	#7	—	#7	#7	—	#7	#7	—	#7	#8	—	#7	#8	—	#7	#8	—	#7	#9	—	#7	#9	—	#8	#9	—	#8	#9	—	#8
			Length	11'-6"	—	13'-0"	12'-0"	—	13'-6"	14'-6"	—	11'-6"	15'-6"	—	12'-0"	17'-0"	—	12'-6"	18'-0"	—	13'-0"	17'-0"	—	17'-0"	19'-0"	—	17'-0"	20'-0"	—	17'-0"	19'-6"	—	18'-6"	19'-0"	—	18'-6"	23'-6"	—	18'-0"	23'-6"	—	18'-0"	23'-6"	—	20'-6"	24'-0"	—	20'-0"
			XD	5'-0"	—	8'-0"	5'-0"	—	7'-8"	6'-6"	—	6'-6"	7'-0"	—	6'-6"	7'-6"	—	6'-6"	8'-6"	—	8'-0"	8'-0"	—	9'-6"	8'-6"	—	9'-0"	9'-0"	—	9'-0"	9'-0"	—	10'-6"	9'-0"	—	9'-6"	11'-0"	—	10'-0"	11'-0"	—	10'-0"	11'-6"	—	11'-0"	10'-6"	—	10'-0"
		c bars	Size	#8	—	#6	#8	—	#6	#7	—	#6	#6	—	#6	#7	—	#6	#7	—	#6	#7	—	#6	#7	—	#6	#7	—	#6	#7	—	#7	#8	—	#7	#8	—	#7	#9	—	#7	#9	—	#8	#9	—	#8
			Length	7'-0"	—	7'-6"	8'-0"	—	7'-0"	8'-0"	—	7'-0"	7'-0"	—	7'-0"	8'-6"	—	7'-0"	10'-0"	—	7'-6"	10'-6"	—	8'-0"	10'-6"	—	8'-0"	10'-6"	—	8'-0"	10'-0"	—	10'-0"	12'-6"	—	10'-0"	15'-0"	—	10'-0"	15'-0"	—	10'-0"	16'-0"	—	12'-6"	16'-0"	—	12'-6"
			XC	3'-6"	—	4'-0"	4'-0"	—	3'-6"	4'-0"	—	3'-6"	3'-6"	—	3'-6"	4'-0"	—	3'-6"	5'-0"	—	3'-9"	4'-6"	—	4'-0"	4'-6"	—	4'-0"	4'-6"	—	4'-0"	4'-6"	—	5'-0"	6'-0"	—	5'-0"	7'-6"	—	5'-0"	7'-6"	—	5'-0"	8'-0"	—	6'-6"	7'-6"	—	6'-0"
	Bottom of Slab	a bars	Size	#7	#6	#6	#7	#6	#6	#8	#7	#6	#8	#7	#6	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#9	#7	#7	#9	#7	#7	#9	#7	#7	#9	#8	#7	#9	#8	#7
			Length	19'-10"	16'-10"	15'-3"	21'-10"	20'-10	16'-11"	24'-2"	23'-3"	18'-3"	26'-2"	25'-3"	19'-11"	28'-2"	27'-3"	21'-10"	30'-2"	29'-3"	23'-4"	32'-2"	31'-3"	24'-10"	34'-2"	33'-3"	26'-4"	36'-2"	35'-3"	28'-10"	38'-2"	37'-3"	29'-4"	40'-2"	39'-3"	32'-4"	42'-4"	41'-3"	32'-4"	44'-4"	43'-3"	35'-10"	47'-4"	45'-3"	35'-10"	48'-3"	47'-3"	38'-10"
		b bars	Size	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#8	#6	#6	#8	#6	#6	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#9	#7	#7	#9	#7	#7
			Length	14'-6"	13'-0"	11'-0"	16'-0"	15'-0"	12'-6"	16'-6"	15'-0"	14'-0"	20'-0"	17'-0"	14'-0"	23'-0"	18'-0"	16'-0"	23'-0"	20'-0"	17'-0"	26'-0"	22'-0"	19'-6"	27'-6"	23'-0"	20'-0"	29'-0"	24'-0"	21'-0"	31'-6"	26'-0"	23'-0"	33'-0"	27'-0"	23'-6"	34'-6"	28'-0"	24'-6"	35'-0"	30'-0"	26'-0"	37'-0"	31'-0"	27'-0"	38'-0"	31'-0"	26'-0"
			XB	1'-6"	1'-6"	1'-0"	2'-0"	1'-6"	1'-0"	1'-0"	3'-0"	2'-6"	1'-6"	2'-6"	1'-0"	2'-0"	3'-0"	2'-0"	2'-0"	3'-0"	2'-6"	3'-0"	3'-0"	2'-0"	3'-0"	4'-0"	2'-6"	3'-6"	4'-0"	3'-0"	4'-0"	5'-0"	3'-0"	4'-6"	4'-6"	3'-6"	6'-0"	5'-0"	4'-0"	6'-6"	5'-0"	4'-0"	6'-0"	5'-6"	4'-6"	6'-6"	6'-6"	5'-0"
		c bars	Size	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#8	#6	#6	#8	#6	#6	#8	#6	#6	#8	#6	#6	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7
			Length	10'-6"	10'-0"	9'-0"	12'-6"	11'-0"	9'-6"	13'-0"	11'-0"	10'-6"	15'-0"	13'-0"	12'-6"	15'-6"	14'-0"	12'-0"	16'-0"	15'-0"	13'-0"	16'-6"	15'-0"	13'-0"	20'-6"	15'-0"	13'-0"	21'-6"	18'-0"	14'-0"	23'-0"	19'-0"	16'-0"	23'-0"	19'-0"	12'-6"	24'-0"	21'-0"	18'-0"	25'-0"	21'-0"	18'-6"	24'-6"	22'-0"	19'-6"	27'-0"	22'-0"	21'-6"
			XI	4'-0"	3'-0"	3'-6"	4'-0"	3'-6"	3'-0"	5'-0"	4'-6"	3'-0"	5'-0"	4'-6"	3'-0"	6'-0"	6'-0"	4'-6"	7'-0"	5'-6"	4'-6"	8'-0"	6'-6"	5'-6"	7'-0"	7'-6"	6'-6"	7'-6"	7'-0"	7'-0"	8'-0"	8'-6"	6'-0"	8'-6"	6'-6"	8'-0"	10'-0"	8'-6"	7'-6"	11'-0"	9'-6"	7'-6"	12'-6"	10'-0"	8'-6"	12'-6"	11'-0"	8'-6"
Distribution Steel Spacing				12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
T = Thickness of Slab (1)				10 1/2"			11 1/2"			12"			13"			13 1/2"			14 1/2"			15"			16"			17"			17 1/2"			18 1/2"			19"			20"			21"			21 1/2"		
Approximate Quantities per foot of width		Conc. ft³		14.7	14.1	11.2	18.0	17.3	13.7	20.8	20.0	15.8	24.7	23.8	18.7	27.8	27.0	21.1	32.4	31.4	24.0	36.1	35.0	27.3	41.7	40.0	31.7	47.1	45.3	35.8	51.4	49.6	39.0	57.4	55.5	43.6	62.2	60.2	47.1	68.8	66.7	52.1	75.7	73.5	57.3	81.1	78.8	61.4
		Steel lbs		145	65	100	165	75	105	190	90	120	205	95	130	235	105	150	255	110	170	285	125	185	325	130	195	330	145	205	390	155	225	410	160	270	485	180	280	515	190	300	560	215	320	630	225	360
Ultimate Deflection @ Midspan Δ			ABA Spans	.01'	—	—	.02'	—	—	.02'	—	—	.03'	—	—	.04'	—	—	.04'	—	—	.05'	—	—	.06'	—	—	.07'	—	—	.08'	—	—	.09'	.01'	—	.10'	.01'	—	.11'	.01'	.00'	.13'	.01'	—
			DBD Spans	—	—	—	—	.01'	—	—	.01'	—	—	.01'	—	—	.02'	—	—	.02'	.01'	—	.02'	.01'	—	.03'	.01'	—	.04'	.02'	—	.04'	.02'	—	.04'	.02'	—	.05'	.02'	—	.05'	.02'	—	.06'	.03'
			ABD Spans	.01'	—	—	.02'	.01'	.01'	.02'	.01'	.01'	.03'	.01'	.01'	.03'	.01'	.01'	.04'	.01'	.01'	.05'	.02'	.01'	.05'	.02'	.01'	.07'	.02'	.02'	.07'	.02'	.02'	.09'	.03'	.02'	.10'	.03'	.03'	.11'	.03'	.03'	.12'	.04'	.04'

(1) Add 1/2" for "Corrosion Protection" & adjust concrete quantity



REINFORCEMENT TOP OF SLAB



REINFORCEMENT BOTTOM OF SLAB

* Length includes allowance for one additional splice in 'A' or 'D' Span.

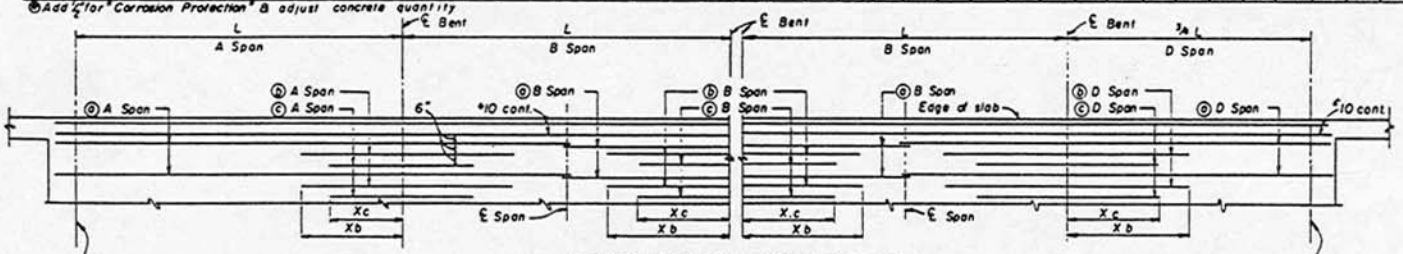
Note :
D Span lengths are actually 3/4 of the length shown in the heading. (Heading 24' : 'A' & 'B' Spans are actually 24', 'D' Span is 18')

Live Loading: HS 20-44 and Alternative and Permit Design Load

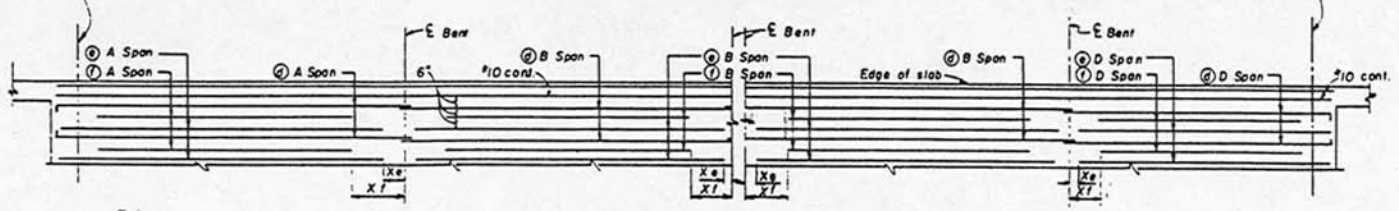
STANDARD SLAB BRIDGE
SLAB DETAILS - 3 SPANS

L = Length of Span			16'			18'			20'			22'			24'			26'			28'			30'			32'			34'			36'			38'			40'			42'			44'		
Type of Span			A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D	A	B	D
REINFORCEMENT	Top of Slab	Size	#7	#6	#6	#7	#6	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#9	#8	#7	#9	#8	#8	#9	#8	#8	#9	#8	#8	#9	#9	#8	#10	#9	#9
		Length	26'-3"	18'-10"	22'-0"	29'-3"	20'-10"	24'-6"	32'-3"	23'-3"	27'-3"	35'-3"	25'-3"	29'-9"	38'-3"	27'-3"	32'-3"	41'-9"	30'-3"	35'-4"	45'-1"	32'-3"	37'-6"	48'-7"	34'-3"	40'-4"	51'-7"	36'-3"	43'-0"	54'-10"	39'-0"	45'-6"	57'-10"	41'-0"	48'-1"	61'-3"	43'-0"	50'-7"	70'-3"	45'-0"	53'-1"	73'-3"	48'-3"	55'-7"	78'-8"	50'-6"	58'-10"
	Bars	Size	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#7	#6	#7	#7	#6	#7	#7	#7	#7	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#8	#7	#9	#8	#8	#9	#8	#8	#9	#9	#8	#9	#9	#8
		Length	11'-6"	10'-0"	10'-0"	12'-0"	11'-0"	13'-6"	14'-10"	11'-0"	11'-6"	15'-6"	12'-0"	12'-0"	17'-0"	13'-0"	12'-6"	19'-0"	14'-0"	15'-0"	17'-0"	15'-0"	17'-0"	19'-0"	16'-0"	17'-0"	20'-0"	18'-0"	17'-0"	19'-6"	17'-0"	18'-6"	19'-0"	17'-0"	16'-6"	21'-6"	19'-0"	19'-0"	22'-6"	21'-0"	19'-0"	22'-6"	19'-0"	20'-6"	24'-0"	22'-0"	22'-0"
		X b	5'-0"	7'-6"	8'-0"	5'-0"	7'-0"	7'-6"	6'-6"	5'-6"	6'-6"	7'-0"	6'-0"	6'-6"	7'-6"	6'-6"	6'-6"	8'-6"	7'-0"	8'-0"	8'-0"	7'-6"	8'-6"	8'-6"	8'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-0"	9'-6"	10'-6"	9'-0"	8'-6"	8'-6"	11'-0"	10'-0"	9'-6"	11'-0"	10'-6"	10'-0"	11'-6"	9'-6"	11'-0"	10'-6"	10'-0"	10'-0"
	Bottom of Slab	Size	#6	#6	#6	#6	#7	#6	#7	#6	#6	#6	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#7	#6	#7	#7	#7	#7	#7	#7	#8	#7	#7	#8	#7	#7	#9	#8	#8	#9	#8	#8
		Length	7'-0"	8'-0"	7'-6"	8'-0"	7'-6"	7'-0"	8'-0"	7'-0"	7'-0"	7'-0"	6'-0"	7'-0"	8'-6"	6'-0"	7'-0"	10'-0"	8'-0"	7'-6"	10'-6"	7'-0"	8'-0"	10'-6"	8'-0"	8'-0"	10'-6"	9'-0"	8'-0"	10'-0"	9'-0"	10'-0"	11'-6"	9'-0"	10'-0"	13'-0"	10'-0"	10'-0"	13'-0"	11'-0"	10'-0"	13'-6"	11'-0"	10'-0"	13'-6"	11'-0"	10'-0"
		X c	3'-6"	4'-0"	4'-0"	4'-0"	3'-9"	3'-6"	4'-0"	3'-6"	3'-6"	3'-6"	3'-0"	3'-6"	4'-0"	3'-0"	3'-6"	5'-0"	3'-0"	3'-9"	4'-6"	3'-6"	4'-0"	4'-6"	4'-0"	4'-0"	4'-6"	4'-6"	4'-0"	4'-6"	4'-6"	5'-0"	6'-0"	4'-0"	5'-0"	6'-6"	5'-0"	5'-0"	6'-6"	5'-0"	5'-0"	6'-6"	5'-0"	6'-0"	7'-6"	5'-0"	6'-0"
	Bottom of Slab	Size	#7	#6	#6	#7	#6	#6	#8	#7	#6	#8	#7	#6	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#9	#7	#7	#9	#7	#7	#9	#8	#7	#9	#8	#7
		Length	19'-0"	16'-0"	15'-3"	21'-0"	20'-0"	18'-11"	24'-3"	23'-3"	18'-3"	26'-2"	23'-3"	19'-11"	28'-2"	27'-3"	21'-10"	30'-2"	29'-3"	23'-4"	32'-2"	31'-3"	24'-0"	34'-2"	33'-3"	25'-4"	36'-2"	35'-3"	27'-10"	38'-2"	33'-3"	29'-4"	40'-2"	39'-3"	30'-10"	43'-4"	41'-3"	32'-4"	45'-4"	43'-3"	33'-10"	45'-4"	43'-3"	35'-10"	49'-4"	45'-8"	36'-10"
		Size	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#8	#6	#6	#8	#6	#6	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#9	#7	#7	#9	#7	#7
		Length	14'-6"	13'-0"	11'-0"	16'-0"	15'-0"	12'-6"	18'-6"	15'-0"	14'-0"	20'-0"	17'-0"	14'-0"	23'-0"	18'-0"	16'-0"	23'-0"	20'-0"	17'-0"	26'-0"	22'-0"	19'-6"	27'-6"	22'-0"	20'-0"	29'-0"	24'-0"	21'-0"	30'-6"	26'-0"	23'-0"	32'-0"	27'-0"	25'-6"	31'-6"	28'-0"	24'-6"	33'-0"	30'-0"	26'-0"	34'-0"	31'-0"	27'-0"	36'-0"	31'-0"	28'-0"
		X e	1'-6"	1'-6"	1'-0"	2'-0"	1'-6"	1'-0"	3'-0"	2'-6"	1'-6"	2'-6"	2'-6"	1'-0"	2'-0"	3'-0"	2'-0"	2'-0"	3'-0"	2'-6"	3'-0"	3'-0"	2'-0"	3'-0"	4'-0"	2'-6"	3'-6"	4'-0"	3'-0"	4'-0"	5'-0"	3'-0"	4'-6"	4'-6"	3'-6"	5'-0"	5'-0"	4'-0"	6'-6"	5'-0"	4'-0"	6'-0"	5'-6"	4'-0"	6'-0"	5'-6"	4'-6"
		Size	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#7	#6	#6	#8	#6	#6	#8	#6	#6	#8	#7	#6	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7	#8	#7	#7
		Length	10'-6"	10'-0"	9'-0"	12'-6"	11'-0"	9'-6"	13'-0"	11'-0"	10'-6"	15'-0"	13'-0"	12'-6"	15'-0"	14'-0"	12'-0"	16'-0"	15'-0"	13'-0"	16'-0"	15'-0"	13'-0"	20'-6"	15'-0"	13'-0"	22'-6"	18'-0"	14'-0"	23'-0"	19'-0"	16'-0"	23'-0"	19'-6"	16'-0"	24'-6"	20'-0"	18'-0"	25'-0"	22'-0"	19'-6"	24'-6"	22'-0"	19'-6"	27'-0"	23'-0"	21'-6"
		X f	4'-0"	3'-0"	3'-6"	4'-0"	3'-6"	3'-0"	5'-0"	4'-6"	3'-0"	5'-0"	4'-6"	3'-0"	6'-0"	5'-0"	4'-6"	7'-0"	5'-6"	4'-6"	8'-0"	6'-6"	5'-6"	7'-0"	7'-6"	6'-6"	7'-6"	7'-0"	7'-0"	8'-0"	7'-6"	6'-0"	8'-6"	8'-6"	8'-0"	10'-0"	8'-6"	7'-6"	11'-0"	9'-6"	7'-6"	12'-6"	10'-0"	8'-6"	12'-6"	11'-0"	8'-6"
Distribution Steel Spacing			12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
T Thickness of Slab ⑥			10 1/2"			11 1/2"			12"			13"			13 1/2"			14 1/2"			15"			16"			17"			17 1/2"			18 1/2"			19"			20"			21"			21 1/2"		
Approximate Quantities per foot of width		Conc. ft³	14.7	14.1	11.2	18.0	17.3	13.7	20.8	20.0	15.8	24.7	23.8	18.7	27.8	27.0	21.1	32.4	31.4	24.0	36.1	33.0	27.3	41.7	40.0	31.7	47.1	45.3	35.8	51.4	49.6	39.0	57.4	55.3	43.6	62.2	60.2	47.1	68.8	66.7	52.1	75.7	73.5	57.5	81.1	78.8	61.4
		Steel lbs.	145	107	100	165	120	105	190	140	120	205	150	130	235	165	150	255	175	170	285	200	185	325	210	195	330	230	205	390	260	225	410	275	270	485	310	280	515	330	300	560	365	320	630	405	360
Ultimate Deflection at Midspan Δ		A B A Spans	.01'	—	—	.02'	—	—	.02'	—	—	.03'	—	—	.04'	—	—	.04'	—	—	.05'	—	—	.06'	—	—	.07'	—	—	.08'	—	—	.09'	.01'	—	.10'	.01'	—	.11'	.01'	.00'	.13'	.01'	—
		D B D Spans	—	—	—	—	.01'	—	—	.01'	—	—	.01'	—	—	.02'	—	—	.02'	.01'	—	.02'	.01'	—	.02'	.01'	—	.03'	.01'	—	.04'	.02'	—	.04'	.02'	—	.05'	.02'	—	.05'	.02'	—	.06'	.03'
		A B D Spans	.01'	—	—	.02'	.01'	.01'	.02'	.01'	.01'	.03'	.01'	.01'	.03'	.01'	.01'	.04'	.01'	.01'	.05'	.02'	.01'	.05'	.02'	.01'	.07'	.02'	.02'	.07'	.02'	.02'	.09'	.03'	.02'	.10'	.03'	.03'	.11'	.03'	.03'	.12'	.04'	.04'

ⓐ Add ½" for "Corrosion Protection" & adjust concrete quantity



REINFORCEMENT–TOP OF SLAB



REINFORCEMENT–BOTTOM OF SLAB

Length includes allowance for one additional splice in 'A' or 'D' Spans.

NOTES:

Top reinforcement for 'B' Span to be modified when adjacent to a hinge. See "Slab Details" sheet.

'D' Span lengths are actually ¾ of the length shown in the heading. (Heading 24' 'A' & 'B' Spans are actually 24', 'D' Spans are 18'.)

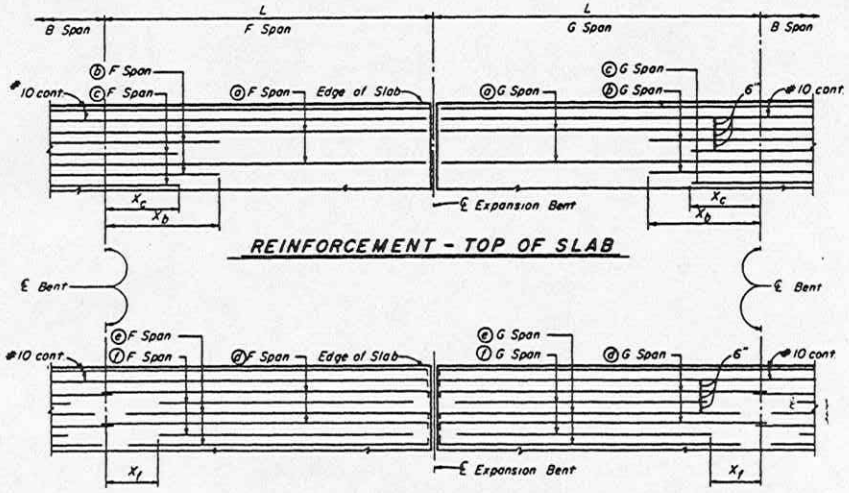
Live Loading: HS 20-44 & alternative and Permit Design Load.

STANDARD SLAB BRIDGE
SLAB DETAILS - MULTI SPAN

L = Length of Span			16'		18'		20'		22'		24'		26'		28'		30'		32'		34'		36'		38'		40'		42'		44'	
Type of Span			F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G
REINFORCEMENT	Top of Slab	ⓐ bars	Size	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#8	#9	#9	#9	#9	#9	#9	#9	#9	#9	#9	#9	#9
			Length	25'-6"	25'-6"	28'-6"	28'-6"	31'-6"	31'-6"	34'-6"	34'-6"	37'-6"	37'-6"	40'-6"	40'-6"	44'-3"	44'-3"	47'-3"	47'-3"	50'-3"	50'-3"	54'-0"	54'-0"	57'-0"	57'-0"	60'-0"	60'-0"	*69'-6"	*69'-6"	*72'-6"	*72'-6"	*75'-6"	*75'-6"
		ⓑ bars	Size	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#8	#8	#8	#9	#9	#9	#9	#9	#9	#9	#9
			Length	11'-6"	11'-6"	12'-0"	12'-0"	13'-0"	13'-0"	13'-6"	13'-6"	15'-0"	15'-0"	16'-0"	16'-0"	14'-6"	14'-6"	15'-6"	15'-6"	16'-0"	16'-0"	15'-0"	15'-0"	15'-0"	15'-0"	16'-6"	16'-6"	18'-0"	18'-0"	19'-6"	19'-6"	21'-0"	21'-0"
			X_b	5'-0"	5'-0"	5'-0"	5'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-6"	6'-6"	7'-0"	7'-0"	6'-6"	6'-6"	6'-6"	6'-6"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	8'-0"	8'-0"	8'-6"	8'-6"	9'-0"	9'-0"	10'-0"	10'-0"
		ⓒ bars	Size	#6	#6	#6	#6	#6	#6	#6	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#9	#9	#9	#9	#9	#9
			Length	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-6"	6'-6"	7'-6"	7'-6"	6'-6"	6'-6"	6'-6"	6'-6"	8'-0"	8'-0"	8'-0"	8'-0"	8'-6"	8'-6"	9'-0"	9'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"
			X_c	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	4'-0"	4'-0"	3'-0"	3'-0"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-6"	4'-6"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"
	Bottom of Slab	ⓓ bars	Size	#7	#7	#7	#7	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#9	#9	#9	#9	#9	#9	#9	#9
			Length	18'-6"	18'-6"	20'-6"	20'-6"	22'-9"	22'-9"	24'-9"	24'-9"	26'-9"	26'-9"	28'-9"	28'-9"	30'-9"	30'-9"	32'-9"	32'-9"	34'-9"	34'-9"	36'-9"	36'-9"	38'-9"	38'-9"	42'-0"	42'-0"	44'-0"	44'-0"	46'-0"	46'-0"	48'-0"	48'-0"
		ⓔ bars	Size	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#9	#9	#9	#9
			Length	15'-3"	15'-3"	16'-9"	16'-9"	17'-9"	17'-9"	19'-9"	19'-9"	21'-6"	21'-6"	23'-6"	23'-6"	25'-0"	25'-0"	26'-6"	26'-6"	28'-6"	28'-6"	30'-0"	30'-0"	31'-6"	31'-6"	32'-0"	32'-0"	33'-6"	33'-6"	35'-9"	35'-9"	37'-0"	37'-0"
			X_e	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		ⓕ bars	Size	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8
			Length	10'-6"	10'-6"	12'-6"	12'-6"	13'-0"	13'-0"	14'-0"	14'-0"	14'-0"	14'-0"	15'-0"	15'-0"	16'-6"	16'-6"	18'-0"	18'-0"	19'-0"	19'-0"	21'-0"	21'-0"	21'-6"	21'-6"	22'-0"	22'-0"	23'-0"	23'-0"	22'-6"	22'-6"	25'-0"	25'-0"
			X_f	4'-0"	4'-0"	4'-0"	4'-0"	5'-0"	5'-0"	5'-6"	5'-6"	7'-0"	7'-0"	7'-6"	7'-6"	8'-0"	8'-0"	8'-6"	8'-6"	8'-6"	8'-6"	9'-0"	9'-0"	9'-6	9'-6"	11'-0"	11'-0"	12'-0"	12'-0"	13'-6"	13'-6"	13'-6"	13'-6"
Distribution Steel Spacing				12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
Approximate Quantities per ft. of width			Conc. ft.³	15.9	15.9	19.1	19.1	21.9	21.9	25.7	25.7	28.9	28.9	33.3	33.3	36.9	36.9	41.9	41.9	47.2	47.2	51.5	51.5	57.4	57.4	62.1	62.1	68.6	68.6	75.4	75.4	80.7	80.7
			Steel-lbs.	150	150	165	165	190	190	205	205	230	230	250	250	285	285	325	325	340	340	385	385	425	425	460	460	510	510	550	550		
Thickness of Slab ⊛				10 1/2"		11 1/2"		12"		13"		13 1/2"		14 1/2"		15"		16"		17"		17 1/2"		18 1/2"		19"		20"		21"		21 1/2"	
Ultimate Dead Load Deflection @ ℄ Span				.01	.01	.02	.02	.02	.02	.03	.03	.04	.04	.04	.04	.06	.06	.06	.06	.07	.07	.09	.09	.10	.10	.12	.12	.13	.13	.14	.14	.16	.16

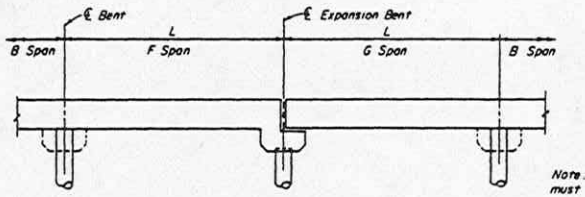
⊛ Add 1/2" for "Corrosion Protection" & adjust concrete quantity.

* Length includes one additional splice in 'F' & 'G' Spans.



REINFORCEMENT - TOP OF SLAB

REINFORCEMENT-BOTTOM OF SLAB



Note: F & G Span "L" must equal B Span "L"

LONGITUDINAL SECTION

See "SLAB HINGE DETAILS" sheet for information regarding cap and bearing seat.

LIVE LOADING: HS 20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD.

STANDARD SLAB BRIDGE

SLAB DETAILS - HINGE AT BENT

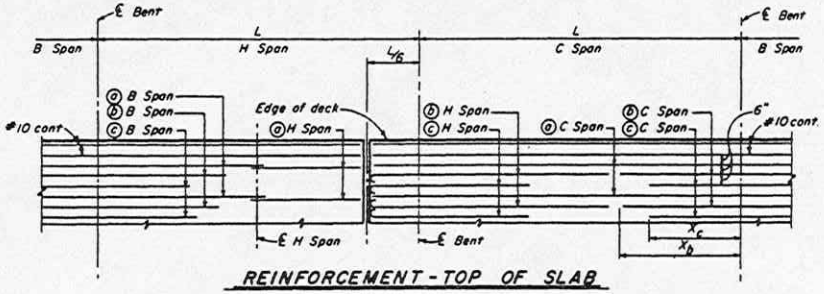
L = Length of Span			16'		18'		20'		22'		24'		26'		28'		30'		32'		34'		36'		38'		40'		42'		44'	
Type of Span			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
REINFORCEMENT	Top of Slab	ⓐ bars	Size	#6	#6	#6	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#8	#8	#8	#8	#9	#8	#9	#9	#9	#9	#9
			Length	5'-7"	29'-3"	7'-3"	31'-3"	8'-2"	36'-6"	8'-10"	39'-9"	9'-6"	43'-0"	10'-8"	47'-6"	11'-4"	51'-0"	12'-0"	54'-3"	12'-8"	58'-9"	13'-8"	61'-6"	14'-4"	64'-9"	15'-0"	68'-3"	15'-8"	71'-6"	17'-1"	76'-3"	17'-9"	79'-6"
		ⓑ bars	Size	#7	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#7	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#8	#9
			Length	10'-9	10'-0"	13'-3"	15'-0"	13'-3"	12'-6"	14'-0"	14'-0"	14'-9"	14'-6"	15'-9"	16'-6"	16'-3"	16'-6"	17'-0"	17'-6"	17'-3"	18'-0"	18'-9"	16'-0"	18'-0"	18'-0"	18'-9"	19'-6"	19'-9"	20'-0"	19'-0"	18'-0"	19'-6"	20'-0"
			X_b	–	4'-0"	–	7'-0"	–	5'-6	–	6'-6"	–	6'-6"	–	7'-0"	–	7'-6"	–	8'-0"	–	8'0"	–	7'-0"	–	8'-0"	–	9'-0"	–	9'-0"	–	8'-0"	–	9'-6"
	Bottom of Slab	ⓒ bars	Size	#6	#6	#6	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#7	#8	#7	#8	#7	#8	#8	#8
			Length	6'-3"	6'-0"	8'-3"	6'-0"	8'-9"	6'-0"	9'-6"	6'-0"	10'-3"	7'-0"	10'-9"	7'-0"	10'-0"	8'-0"	11'-0"	8'-0"	11'-3"	8'-0"	11'-0"	8'-0"	11'-9"	9'-0"	12'-9"	10'-0"	14'-3"	10'-0"	14'-0"	11'-0"	14'-0"	10'-0"
			X_c	–	3'-0"	–	3'-0"	–	3'-0"	–	3'-0"	–	3'-6"	–	3'-6"	–	4'-0"	–	4'-0"	–	4'-0"	–	4'-0"	–	4'-6	–	5'-0"	–	5'-0"	–	5'-0"	–	5'-0"
		ⓓ bars	Size	#6	#7	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#8	#7	#8	#7	#8	#7	#8	#8	#8	#8	#8
			Length	14'-6	20'-3	16'-3"	22'-3	18'-3"	24'-9	19'-9	27'-3"	21'-6	29'-6	23'-3	31'-9	24'-9	34'-9	26'-6	36'-6	28'-3	38'-9	29'-9	41'-3	31'-6	43'-9	33'-3	45'-9	34'-9	48'-6	37'-3	50'-9	38'-6	53'-0"
		ⓔ bars	Size	#6	#7	#6	#7	#6	#7	#6	#7	#7	#7	#7	#7	#7	#8	#7	#8	#7	#8	#7	#8	#7	#7	#7	#8	#7	#8	#7	#8	#7	#8
			Length	13'-0	13'-6"	14'-3"	15'-6"	14'-0"	17'-0"	16'-0"	18'-6"	17'-9	20'-6"	19'-0"	21'-6"	20'-9	23'-0"	21'-9"	24'-6	23'-6	26'-0"	24'-9"	26'-6"	25'-9"	27'-0"	27'-6	29'-0"	28'-0"	30'-0"	29'-0"	31'-0"	30'-6"	33'-6"
			X_e	–	2'-0"	–	3'-0"	–	2'-6"	–	3'-0"	–	3'-0"	–	3'-6"	–	3'-6"	–	4'-0"	–	4'-0"	–	5'-0"	–	6'-0"	–	6'-0"	–	6'-0"	–	7'-0"	–	7'-0"
		ⓕ bars	Size	#6	#6	#6	#6	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7	#7
			Length	9'-0"	9'-6"	10'-6"	10'-6"	10'-6"	13'-0"	11'-0"	13'-6"	11'-0"	14'-6"	12'-0"	16'-6"	14'-0"	16'-0"	13'-0"	17'-0"	16'-0"	17'-0"	17'-6"	19'-6"	18'-6"	21'-0"	19'-6"	19'-6"	21'-0"	21'-0"	19'-6"	21'-6"	21'-0"	24'-0"
			X_f	3'-0"	4'-6"	3'-6"	5'-0"	4'-6"	4'-6"	5'-0"	5'-6"	6'-0"	5'-6"	6'-0"	6'-0"	6'-6"	7'-6"	7'-0"	8'-0"	7'-6"	9'-0"	8'-0"	8'-6"	7'-6"	9'-0"	9'-6"	11'-0"	9'-0"	11'-0"	10'-6"	12'-0"	11'-0"	12'-0"
Approximate Quantities per ft of width			Conc. ft^3	13.8	14.0	17.1	17.3	19.8	20.0	23.6	23.8	26.8	27.0	31.2	31.4	24.8	35.0	39.8	40.0	45.1	45.3	49.3	49.6	55.2	55.5	59.9	60.2	66.4	66.7	73.2	73.5	78.5	78.8
			Steel-lbs.	53	125	100	145	115	180	125	195	145	210	155	225	170	250	195	275	200	290	215	325	225	355	245	415	260	440	280	465	300	495
Thickness of Slab ⊛				10 1/2"		11 1/2"		12"		13"		13 1/2"		14 1/2"		15"		16"		17"		17 1/2"		18 1/2"		19"		20"		21"		21 1/2"	
Ultimate Dead Load Deflection @ ℄ Span				.01	.01	.01	.01	.01	.01	.01	.02	.01	.02	.02	.02	.02	.03	.03	.03	.03	.04	.04	.05	.04	.05	.05	.06	.05	.07	.06	.08	.06	.09

⊛ Add 1/2" for "Corrosion Protection" & adjust concrete quantity.

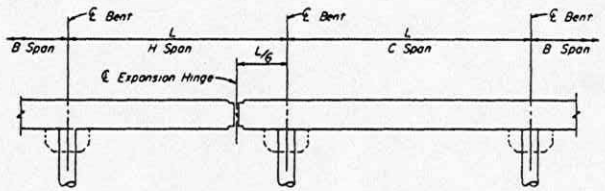
Length includes allowance for one additional splice in 'C' Span

NOTES:

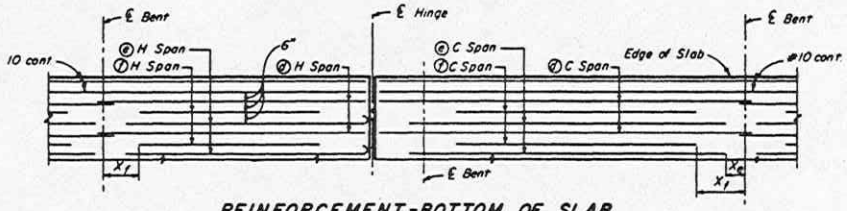
1. Section A-A on the "Slab Hinge Details" sheet illustrates a 1 1/4" opening. The actual amount of expansion provided for is 1". The 1 1/4" opening for example, allows for the expansion in 330 ft. of structure for a 40° temperature change (1"). If a larger opening is required, a revision must be made.
2. H Span deflection is at ℄ between Hinge and Bent.
3. See "Slab Hinge Details" sheet for information regarding the metalwork at the hinge.
4. Distribution Steel spacing, #5 @ 12.



REINFORCEMENT - TOP OF SLAB



LONGITUDINAL SECTION



REINFORCEMENT-BOTTOM OF SLAB

LIVE LOADING : HS 20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD

STANDARD SLAB BRIDGE
SLAB DETAILS - HINGE AT L/6

Unfactored Loads	Support Type	LENGTH OF SPAN "L" 16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
Slab Dead Load Reaction	(I)	1.06	1.29	1.48	1.74	1.96	2.25	2.55	2.82	3.17	3.45	3.83	4.14	4.56	5.00	5.35
	(II)	3.04	3.68	4.24	4.97	5.57	6.44	7.12	8.06	9.06	9.87	10.96	11.84	13.04	14.29	15.28
	(III)	2.70	3.26	3.76	4.42	4.97	5.72	6.33	7.24	8.06	8.87	9.15	10.64	11.71	12.84	13.60
(kips per foot width of slab	(IV)	.74	.90	1.04	1.22	1.37	1.58	1.75	1.97	2.22	2.42	2.69	2.90	3.20	3.51	3.75
Includes 35 #/ft²	(V)	3.32	4.03	4.63	5.49	6.12	7.03	7.78	8.81	9.90	10.78	11.99	12.95	14.24	15.62	16.7
AC surfacing)	(VI)	2.12	2.56	2.94	3.45	3.87	4.45	4.94	5.58	6.28	6.84	7.60	8.20	9.03	9.89	10.58
	(VII)	1.53	1.83	2.16	2.52	2.90	3.30	3.64	4.08	4.56	5.06	5.58	6.13	6.82	7.69	8.47
Live Load Reaction	(I)	40.60	41.42	42.06	42.50	43.03	43.70	45.00	46.50	47.80	49.0	50.1	51.1	52.0	52.9	53.5
	(II)	47.0	49.9	52.6	55.4	57.5	59.5	61.0	62.3	63.4	64.3	65.1	65.8	66.4	66.9	67.1
	(III)	50.2	50.9	52.4	54.7	57.4	59.7	60.4	62.3	63.3	64.7	65.8	66.8	67.7	68.5	69.1
HS 20-44 B alt	(IV)	40.3	41.6	42.7	43.6	44.5	42.0	42.4	42.8	43.1	43.6	44.6	45.6	46.7	47.7	48.6
(kip per lane)	(V)	48.2	51.4	53.5	56.4	58.6	60.4	61.9	63.1	64.0	64.9	65.5	66.2	66.7	67.2	67.4
(no impact)	(VI)	40.9	41.6	42.3	42.9	44.9	47.3	48.2	51.5	50.9	52.0	56.2	55.1	54.9	55.7	56.2
	(VII)	42.0	42.7	43.2	43.6	45.3	46.8	48.0	49.6	51.0	52.2	53.3	54.3	55.2	56.0	56.5
Live Load Reaction	(I)	48.0	48.0	50.8	53.5	56.1	58.5	60.6	62.6	64.4	66.0	67.5	70.2	72.9	75.3	77.5
P-Loads	(II)	55.0	62.6	68.2	72.5	79.2	86.7	93.0	98.4	103.9	110.9	117.5	123.7	129.2	135.7	142.2
	(III)	58.3	61.2	64.6	70.3	75.8	87.8	89.5	95.9	101.9	107.5	114.1	121.0	127.4	133.3	138.7
	(IV)	48.0	48.0	48.0	48.0	48.0	50.2	52.3	54.4	56.4	58.2	59.9	61.5	62.9	64.3	65.5
(kip per lane)	(V)	58.9	66.0	71.0	75.2	83.2	90.8	97.2	102.5	107.9	116.0	122.6	129.1	134.3	141.7	148.6
(no impact)	(VI)	48.0	48.5	52.8	57.4	62.0	66.5	71.0	75.2	79.2	83.1	86.7	91.4	95.9	100.2	104.7
	(VII)	48.0	48.0	52.8	56.7	60.0	62.7	65.2	67.2	69.0	70.6	72.0	75.8	79.2	82.2	84.7
IMPACT		.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30
2 SPANS ONLY	(I)	6.01	6.74	7.48	8.24	9.00	9.75	10.49	11.24	11.99	12.76	13.51	14.26	15.00	15.75	16.50
Uniform Load	(I)	6.40	7.21	8.00	8.80	9.59	10.40	11.21	12.00	12.79	13.59	14.40	15.20	15.99	16.81	17.60
Reaction Coefficient,	(II)	18.31	20.62	22.90	25.19	27.43	29.76	32.01	34.32	36.60	38.87	41.17	43.45	45.75	48.03	50.31
Use for railing,	(III)	16.23	18.28	20.34	22.36	24.41	26.47	28.46	30.50	32.56	34.55	36.62	38.67	40.67	42.73	44.78
curbs, sidewalk	(IV)	4.47	5.06	5.61	6.17	6.73	7.29	7.87	8.40	8.99	9.55	10.09	10.66	11.22	11.79	12.34
(per span)	(V)	19.97	22.52	25.02	27.78	30.01	32.48	34.98	37.48	39.99	42.49	45.02	47.52	49.98	52.14	54.99
	(VI)	12.72	14.31	15.90	17.46	19.00	20.53	22.21	23.73	25.36	26.95	28.53	30.09	31.67	33.25	34.82
	(VII)	8.01	9.00	9.99	11.01	12.01	13.01	14.00	15.01	15.99	17.00	17.99	19.00	20.00	21.00	21.99
Cap dead Load	(I) (IV) (VI)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
(below slab soffit)	(II) (III) (V)	.51	.47	.45	.41	.39	–	–	–	–	–	–	–	–	–	–
(kip per lineal ft)	(VI)	.68	.68	.68	.68	.68	.68	.68	.68	.68	.68	.68	.68	.68	.68	.68
"b" (in inches)*	(II) (III)	36	36	36	36	36	52	54	57	60	61	64	66	69	72	73
	(V)	36	36	36	36	36	52	54	57	60	61	64	66	69	72	73
	Support Type	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
		LENGTH OF SPAN "L"														

* See Support Design Data No. 2 sheet.

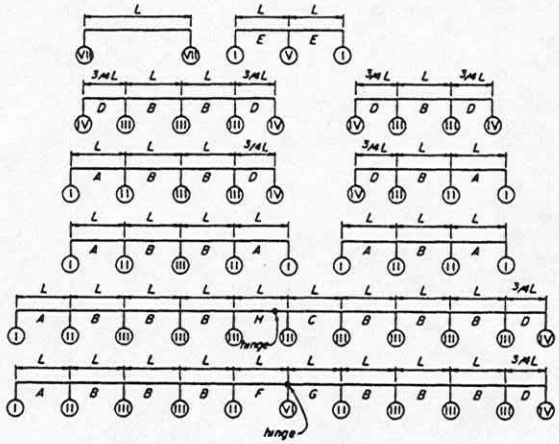
Support Type	Assumed Total Depth of Section
(I) (IV) (VII)	"T" plus 60"
(II) (III) (V) Spans 16'-24'	24"
(II) (III) (V) Spans 26'-44'	"T"
(VI)	"T" plus 18"

LIVE LOADING: HS 20-44 B ALTERNATIVE
AND PERMIT DESIGN LOAD

Skew Angle (in degree)	"K"
20-26	.34
27-32	.36
33-38	.38
39-44	.40
45-50	.42

REACTION COEFFICIENT "K"
SKEWED BRIDGES

To be used in pile calculation when bridge skew is 20° or more.



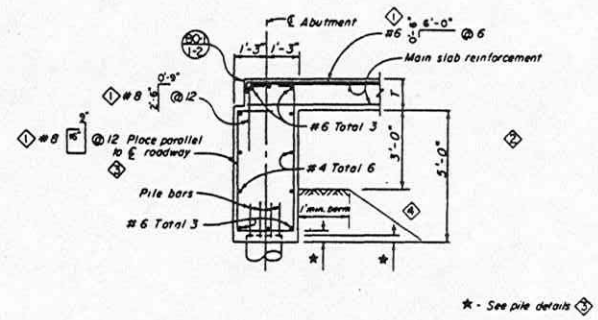
TYPICAL LAYOUTS

For determination of support types. Support type shown thus: ◯
Type of span shown thus: A

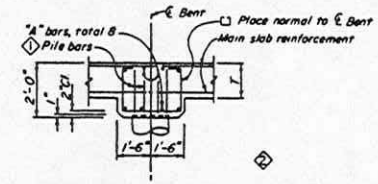
STANDARD SLAB BRIDGE
SUPPORT DESIGN DATA NO. 1

		Support Type	LENGTH OF SPAN "L" 16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
BENT CAP	45T Pile Spacing *	(II)	10'-6"	9'-3"	8'-6"	7'-9"	7'-3"	6'-9"	6'-3"	5'-9"	5'-6"	5'-0"	—	—	—	—	—
	"A" bars (Skew 0°-20°)	(II)	#7	#7	#7	#7	#6	#6	#6	#6	#6	#6	—	—	—	—	—
	"A" bars (Skew 21°-35°)	(II)	#8	#7	#7	#7	#7	#7	#7	#6	#6	#6	—	—	—	—	—
	"A" bars (Skew 36°-50°)	(II)	#9	#8	#8	#7	#7	#8	#7	#7	#7	#6	—	—	—	—	—
	Stirrup Spacing	(II)	#5@10	#5@10	#5@10	#5@10	#5@10	#6@6	#6@6	#6@6	#6@6	#6@6	—	—	—	—	—
	70T Pile Spacing *	(II)	—	—	—	—	10'-6"	9'-6"	9'-3"	8'-6"	8'-0"	7'-6"	7'-0"	6'-6"	6'-0"	5'-6"	5'-6"
	"A" bars (Skew 0°-20°)	(II)	—	—	—	—	#9	#9	#9	#8	#8	#7	#7	#7	#7	#7	#7
	"A" bars (Skew 21°-35°)	(II)	—	—	—	—	#9	#10	#10	#9	#8	#8	#7	#7	#7	#7	#7
	"A" bars (Skew 36°-50°)	(II)	—	—	—	—	#10	#11	#11	#10	#9	#9	#8	#8	#7	#7	#7
	Stirrup Spacing	(II)	—	—	—	—	#6@10	#6@6	#6@6	#6@6	#6@7	#6@7	#6@7	#6@8	#6@8	#6@8	#6@8
	45T Pile Spacing *	(III)	10'-6"	9'-9"	9'-0"	8'-3"	7'-6"	7'-3"	7'-0"	6'-3"	5'-9"	5'-0"	—	—	—	—	—
	"A" bars (Skew 0°-20°)	(III)	#7	#7	#7	#7	#6	#7	#7	#6	#6	#6	—	—	—	—	—
	"A" bars (Skew 21°-35°)	(III)	#8	#7	#7	#7	#7	#7	#7	#6	#6	#6	—	—	—	—	—
	"A" bars (Skew 36°-50°)	(III)	#9	#8	#8	#8	#7	#8	#8	#7	#7	#6	—	—	—	—	—
	Stirrup Spacing	(III)	#5@10	#5@10	#5@10	#5@10	#5@10	#6@6	#6@6	#6@6	#6@6	#6@6	—	—	—	—	—
	70T Pile Spacing *	(III)	—	—	—	—	—	11'-0"	10'-0	9'-3	8'-6"	8'-0"	7'-6"	7'-3"	6'-6"	6'-3"	6'-0"
	"A" bars (Skew 0°-20°)	(III)	—	—	—	—	—	#10	#9	#9	#8	#8	#7	#7	#7	#7	#7
	"A" bars (Skew 21°-35°)	(III)	—	—	—	—	—	#11	#10	#9	#9	#8	#8	#8	#7	#7	#7
	"A" bars (Skew 36°-50°)	(III)	—	—	—	—	—	#14	#11	#10	#10	#9	#8	#8	#8	#7	#7
	Stirrup Spacing	(III)	—	—	—	—	—	#6@6	#6@6	#6@6	#6@7	#6@7	#6@7	#6@8	#6@8	#6@8	#6@8
	45T Pile Spacing *	(V)	9'-9"	8'-9"	8'-0"	7'-6"	7'-3"	6'-3"	5'-9"	5'-0"	—	—	—	—	—	—	—
	"A" bars (Skew 0°-20°)	(V)	#7	#7	#7	#6	#6	#6	#6	#6	—	—	—	—	—	—	—
	"A" bars (Skew 21°-35°)	(V)	#7	#7	#7	#7	#7	#7	#6	#6	—	—	—	—	—	—	—
	"A" bars (Skew 36°-50°)	(V)	#8	#8	#8	#7	#7	#7	#7	#6	—	—	—	—	—	—	—
	Stirrup Spacing	(V)	#5@10	#5@10	#5@10	#5@10	#5@10	#6@6	#6@6	#6@6	—	—	—	—	—	—	—
	70T Pile Spacing *	(V)	—	—	—	—	10'-6"	9'-3"	8'-6"	8'-0"	7'-6"	7'-3"	6'-6"	6'-0"	5'-6"	5'-3"	5'-0"
	"A" bars (Skew 0°-20°)	(V)	—	—	—	—	#9	#9	#8	#8	#7	#7	#7	#7	#7	#7	#7
	"A" bars (Skew 21°-35°)	(V)	—	—	—	—	#10	#10	#9	#8	#8	#8	#7	#7	#7	#7	#7
	"A" bars (Skew 36°-50°)	(V)	—	—	—	—	#11	#11	#10	#10	#9	#9	#8	#7	#7	#7	#7
	Stirrup Spacing	(V)	—	—	—	—	#6@10	#6@5	#6@6	#6@6	#6@7	#6@7	#6@7	#6@8	#6@8	#6@8	#6@8
	45T Pile Spacing *	(VI)	12'-0"	11'-9"	10'-6"	9'-9"	9'-0"	8'-3"	7'-6"	7'-3"	7'-0"	6'-3"	6'-0"	5'-9"	5'-0"	—	—
	"A" bars (Skew 0°-20°)	(VI)	#9	#9	#8	#8	#8	#7	#7	#7	#7	#6	#6	#6	#6	—	—
	"A" bars (Skew 21°-35°)	(VI)	#10	#10	#9	#9	#8	#8	#7	#7	#7	#7	#7	#7	#6	—	—
	"A" bars (Skew 36°-50°)	(VI)	#11	#11	#10	#10	#9	#9	#8	#8	#8	#8	#8	#7	#7	—	—
	Stirrup Spacing	(VI)	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	#5@7	—	—
	70T Pile Spacing *	(VI)	—	—	—	—	—	—	—	10'-6"	10'-0"	9'-3"	9'-0"	8'-0"	8'-0"	7'-6"	7'-3"
	"A" bars (Skew 0°-20°)	(VI)	—	—	—	—	—	—	—	#10	#9	#9	#9	#9	#9	#8	#8
	"A" bars (Skew 21°-35°)	(VI)	—	—	—	—	—	—	—	#10	#10	#10	#10	#9	#9	#9	#9
	"A" bars (Skew 36°-50°)	(VI)	—	—	—	—	—	—	—	#14	#11	#11	#11	#10	#10	#10	#10
	Stirrup Spacing	(VI)	—	—	—	—	—	—	—	#6@6	#6@6	#6@6	#6@6	#6@6	#6@6	#6@6	#6@6
ABUTMENT	45T Pile Spacing *	(I)	12'-0"	11'-6"	11'-3"	10'-6"	10'-6"	10'-0"	9'-6"	9'-3"	8'-9"	8'-6"	8'-0"	7'-9"	7'-6"	7'-3"	7'-0"
	70T Pile Spacing *	(I)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	45T Pile Spacing *	(V)	12'-0"	12'-0"	11'-6"	11'-3	11'-0"	11'-0"	10'-9"	10'-6"	10'-3"	10'-0"	9'-6"	9'-3"	8'-9"	8'-6"	8'-3"
	70T Pile Spacing *	(V)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	45T Pile Spacing *	(VI)	11'-0"	10'-6"	10'-3"	9'-9"	9'-3"	8'-9"	8'-6"	8'-0"	7'-6"	7'-3"	6'-9"	6'-6"	6'-3"	5'-9"	5'-6"
	70T Pile Spacing *	(VI)	—	—	—	—	—	—	—	—	11'-9"	11'-3"	10'-9"	10'-3"	9'-9"	9'-3"	8'-9"
		Support Type	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
			LENGTH OF SPAN "L"														

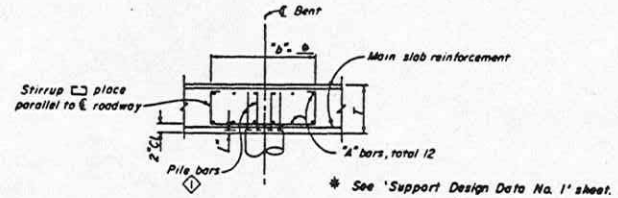
* Note: Pile Spacing Above Are For No Skew Conditions, ie (Normal)



ABUTMENT SECTION



BENT CAP - SPANS 16'-24'



BENT CAP - SPANS 26'-44'

① Rebar revised.
② Notes deleted
③ Note revised.
④ Berm revised

STANDARD SLAB BRIDGE
SUPPORT DESIGN DATA NO. 2

STANDARD SLAB BRIDGE TYPICAL SUPPORT CALCULATIONS

Example No. 1

Bridge width: 35'-6" (32' Roadway)
Length of Span: L = 32'
Type of Support: IV (Abutment)
Allowable Pile value: 45 tons = 90 kips
No Skew
Pile calculations from table: L = 32' Support Type IV
90 kip Pile Spacing = 10'-3"

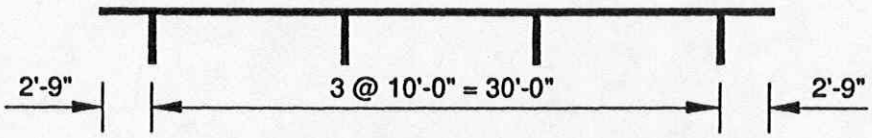
$$\text{No. of Piles required} = \left[\frac{\text{Bridge Width} - (2 \times \text{Edge Distance to Piles})}{10.25}\right] + 1$$

$$= \left[\frac{35.5 - (2 \times 2)}{10.25}\right] + 1$$

$$= 3.07 + 1$$

$$= 4.07$$

USE 4 PILES



PILE SPACING DIAGRAM

Example No. 2

Bridge width: 35'-6" (32' Roadway)
Length of Span: L = 42'
Type of Support: V (Bent)
Allowable Pile value: 70 tons = 140 kips
Skew Angle 46°
Pile calculations from table: L = 42' Support Type V
140 kip Pile Spacing = 5'-3"

$$\text{Skewed Pile Spacing} = \left(\frac{5.25}{\cos 46°}\right) = 7.56$$

Max. edge dist. to support = 0.4 Pile Spacing
= 0.4(7.56)
= 3.00'

$$\text{Length of Support} = \left(\frac{35.5}{\cos 46°}\right) = 51.1$$

$$\text{No. of Piles required} = \left[\frac{\text{Length of Support} - (2 \times \text{Edge Dist. to Pile})}{7.56}\right] + 1$$

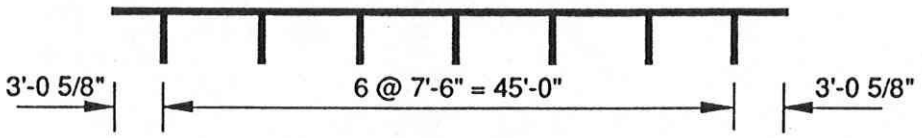
$$= \left[\frac{51.1 - (2 \times 3)}{7.56}\right] + 1$$

$$= 6.97$$

USE 7 PILES

Pile Spacing = 7'-6"

Edge Distance to Exterior Pile = $\left[\frac{51.1 - (6 \times 7.5)}{2}\right] = 3.05'$



PILE SPACING DIAGRAM

Bent Cap Reinforcement: "A" bars #7
Stirrup #6 @ 8

Example No. 3

Bridge width: 58'-3" ave (54'-9" ave Roadway)
Length of Span: L = 32'
Type of Support: II (Bent)
Allowable Pile value: 70 tons = 140 kips
No Skew
Pile calculations from table: L = 32' Support Type II
140 kip Pile Spacing = 8'-0"

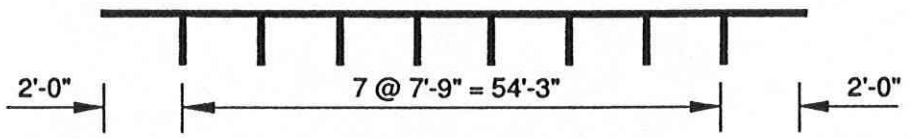
No. of Piles required = $\left[\frac{58.25 - (2 \times 2)}{8}\right] + 1$

$= 7.78$

USE 8 PILES

Pile Spacing = 7'-9"

Edge Distance to Centerline Exterior Pile = $\left[\frac{58.25 - (7 \times 7.75)}{2}\right] = 2.0'$



PILE SPACING DIAGRAM

Bent Cap Reinforcement: "A" bars #8
Stirrup #6 @ 7

Example No. 4

Bridge width: 35'-6" (32' Roadway)
Length of Span: L = 30'
Type of Support: I (Abutment)
Allowable Pile value: 45 tons = 90 kips
Skew Angle: 39°
Pile calculations from table: L = 30' Support Type I
90 kip Pile Spacing = 9'-3"

$$\text{Skewed Pile Spacing} = \left(\frac{9.25}{\cos 39°}\right) = 11.9'$$

$$\text{Length of Support} = \left(\frac{35.5}{\cos 39°}\right) = 45.68'$$

Maximum edge distance to support = 0.4 Pile Spacing, try 3'

$$\text{No. of Piles required} = \left[\frac{45.68 - (2 \times 3)}{11.9}\right] + 1$$

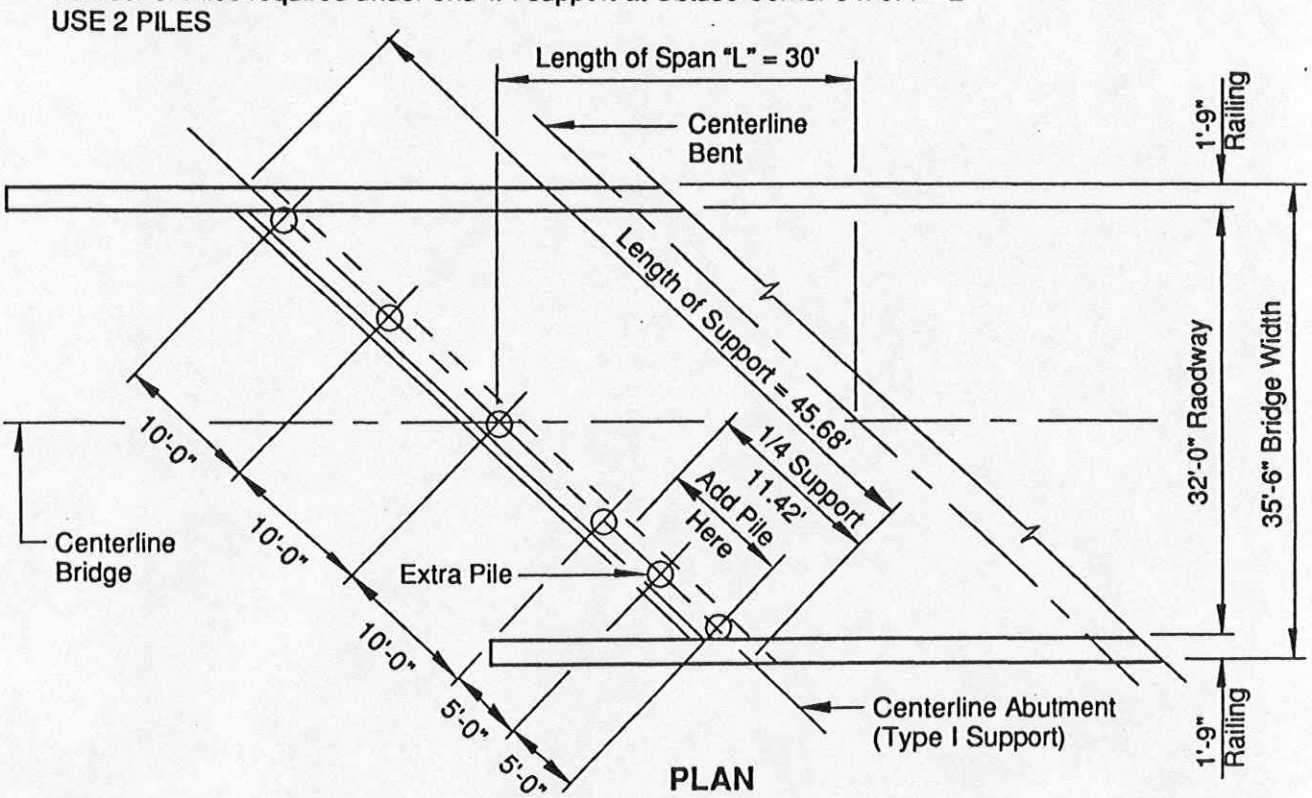
$$= 4.33$$

USE 5 PILES

Pile Spacing = 10'-0"

$$\text{Edge Distance to Centerline Exterior Pile} = \left[\frac{45.68 - (4 \times 10)}{2}\right] = 2.84' = 2'\text{-}10\ 1/8"$$

Skew Angle: 39°
Reaction Coefficient: "K" = 0.40
Number of Piles required under end 1/4 support at Obtuse Corner 5 x 0.4 = 2
USE 2 PILES



PLAN

Example No. 5

Bridge width: 55'-6" (52' Roadway)
Length of Span: L = 24'
Type of Support: V I (Expansion Bent)
Allowable Pile value: 70 tons = 140 kips
Skew Angle: 18° 30'
Pile calculations from table: L = 24' Support Type VI
90 kip Pile Spacing = 9'-0"

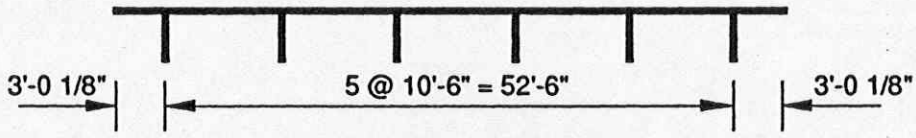
140 kip Pile Spacing $= \left(\frac{9 \times 140}{90}\right) = 14' > 10'\text{-}6''$ max. cap span from chart

Skewed Pile Spacing $= \left(\frac{10.5}{\cos 18.5°}\right) = 11.07'$

Length of Support $= \left(\frac{55.5}{\cos 18.5°}\right) = 58.52'$

Minimum edge distance for Pile into a drop cap $= \left(\frac{2.5}{\cos 18.5°}\right) = 2.64'$

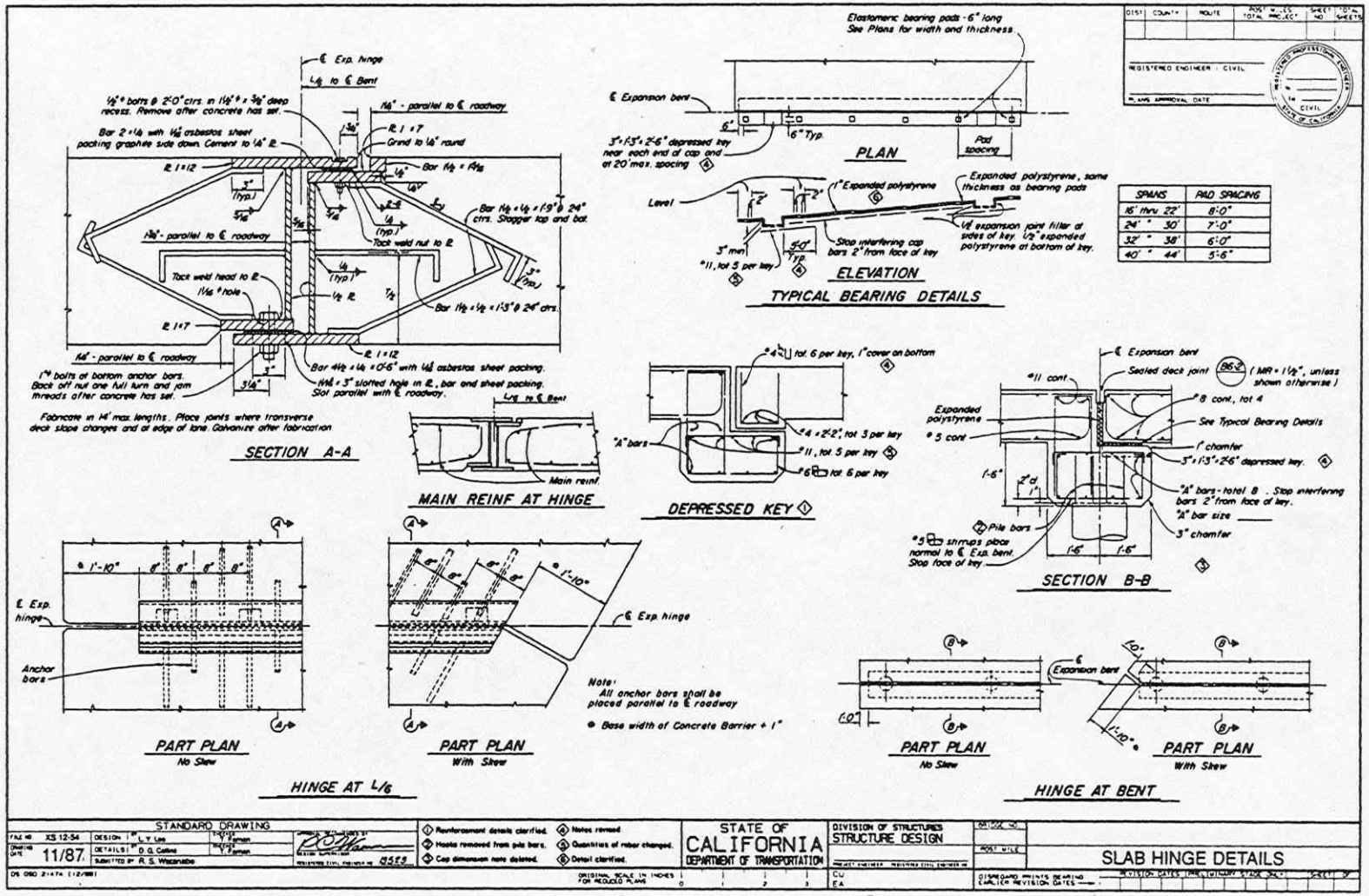
No. of Piles required $= \left[\frac{58.52 - (2 \times 2.64)}{11.07}\right] + 1$
$= 5.80$
USE 6 PILES



PILE SPACING DIAGRAM

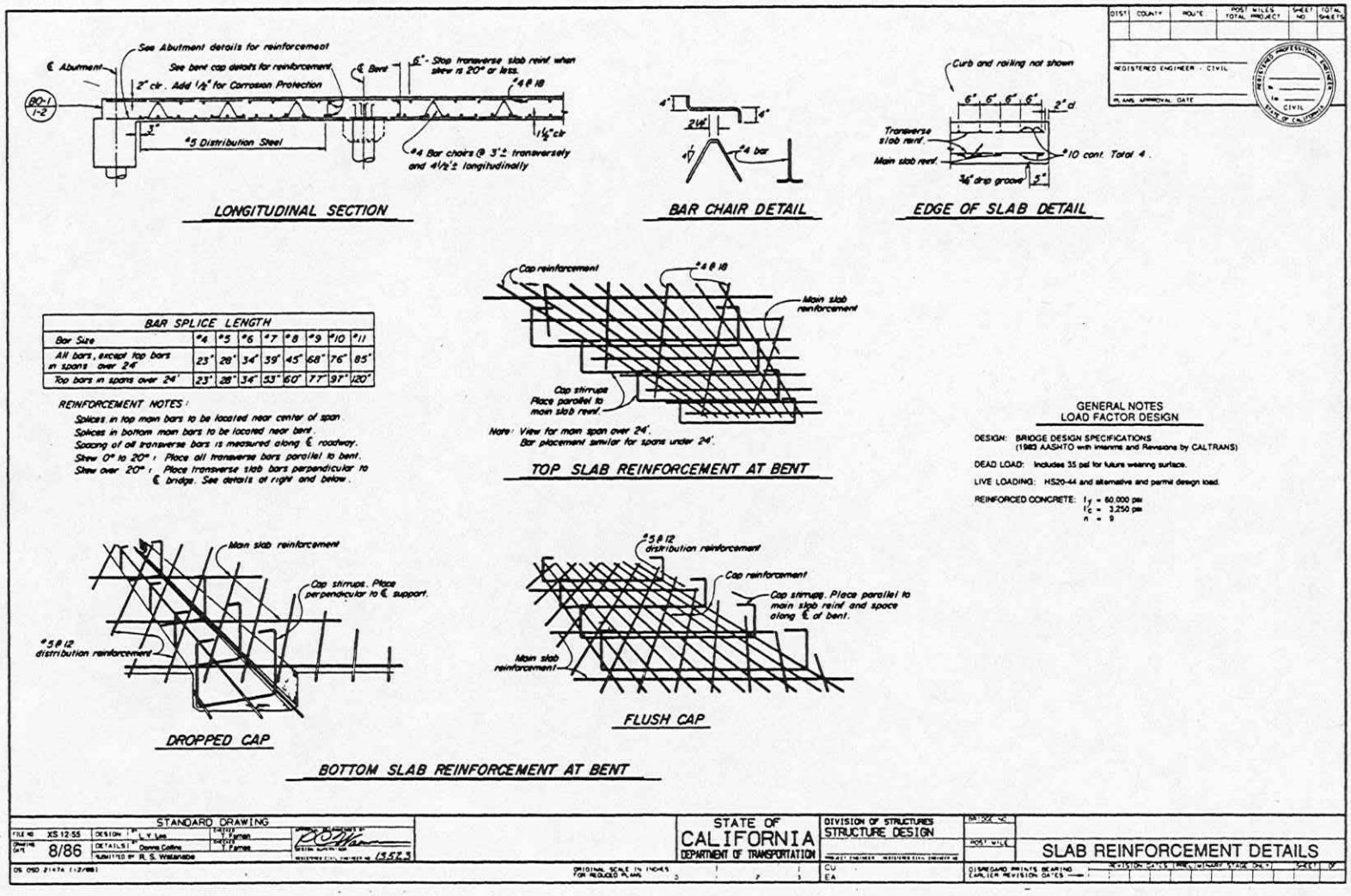
Bent Cap Reinforcement from table: Support Type VI
140 kip Pile Spacing @ 10'-6", "A" Bars #10
Stirrup #6 @ 6

One pile per bent could be saved by designing a larger cap.



SPANS	PAD SPACING
16' thru 22'	8'-0"
24' " 30'	7'-0"
32' " 38'	6'-0"
40' " 44'	5'-6"

Note to Designer: 1'-10" edge clearance of metal assembly is for Concrete Barrier Type 25. Change to 1'-6" when Concrete Barrier Type 27 is used to provide 1" clearance. Specify bearing thickness and width, Joint Seal MR and Waterstop on the detail plans. Use of Steel Hinge Detail at L/6 should be avoided as much as possible.



BAR SPLICE LENGTH								
Bar Size	#4	#5	#6	#7	#8	#9	#10	#11
All bars, except top bars in spans over 24'	23"	28"	34"	39"	45"	68"	76"	85"
Top bars in spans over 24'	23"	28"	34"	53"	60"	77"	97"	120"

REINFORCEMENT NOTES:

Splices in top main bars to be located near center of span.
Splices in bottom main bars to be located near bent.
Spacing of all transverse bars is measured along ℄ roadway.
Skew 0° to 20°: Place all transverse bars parallel to bent.
Skew over 20°: Place transverse slab bars perpendicular to ℄ bridge. See details at right and below.

GENERAL NOTES
LOAD FACTOR DESIGN

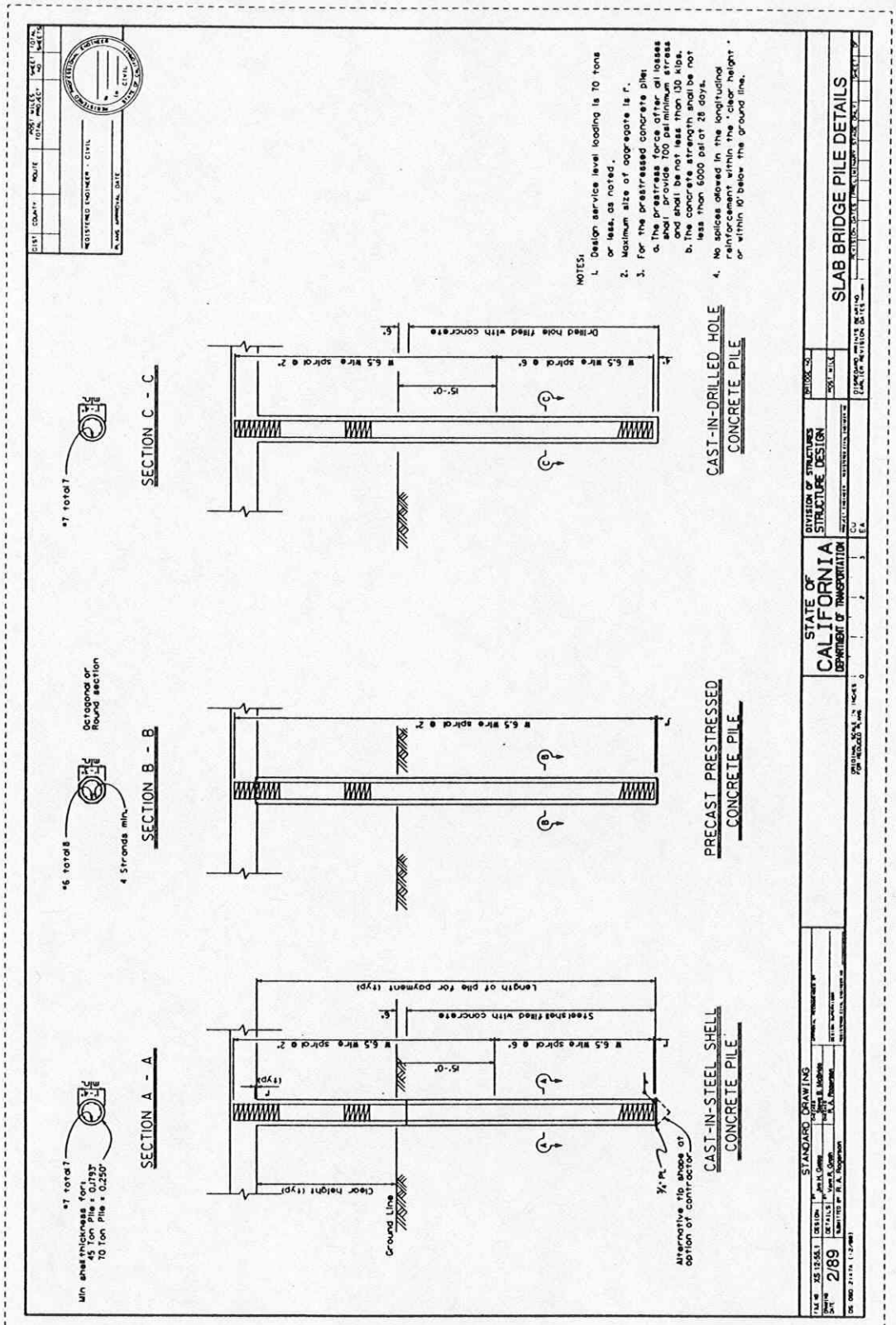
DESIGN: BRIDGE DESIGN SPECIFICATIONS (1983 AASHTO with Interims and Revisions by CALTRANS)

DEAD LOAD: Includes 35 psf for future wearing surface.

LIVE LOADING: HS20-44 and alternative and permit design load.

REINFORCED CONCRETE: f_y = 60,000 psi, f'_c = 3,250 psi, n = 9

Note to Designer: Clearances shown for top reinforcement on longitudinal sections should be increased for Marine Environment.


SECTION A - A
SECTION B - B
SECTION C - C
CAST-IN-STEEL SHELL CONCRETE PILE
PRECAST PRESTRESSED CONCRETE PILE
CAST-IN-DRILLED HOLE CONCRETE PILE
Min shell thickness for: 45 Ton Pile = 0.1793" 70 Ton Pile = 0.250"
#7 total 7
#6 total 8
4 Strands min.
Octagonal or Round section
Ground Line
Clear height (typ)
Length of pile for payment (typ)
Steel shell filled with concrete
Drilled hole filled with concrete
W 6.5 Wire spiral @ 2"
W 6.5 Wire spiral @ 6"
15'-0"
Alternative tip shape at option of contractor
NOTES:
1. Design service level loading is 70 tons or less, as noted.
2. Maximum size of aggregate is 1".
3. For the prestressed concrete pile:
a. The prestress force after all losses shall provide 700 psi minimum stress and shall be not less than 130 kips.
b. The concrete strength shall be not less than 6000 psi at 28 days.
4. No splices allowed in the longitudinal reinforcement within the "clear height" or within 10' below the ground line.
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN
SLAB BRIDGE PILE DETAILS
STANDARD DRAWING
2/89