DESIGN NOTES

1. DESIGN SPECIFICATIONS: "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANPORTATION OFFICIALS,1992 AND THE OHIO "SUPPLEMENT" TO THESE SPECIFICATIONS.

2. DESIGN DATA:

DESIGN LOADING - HS20-44 AND THE ALTERNATE MILITARY LOADING

SUPERIMPOSED DEAD LOAD 200 LBS. PER LIN. FT.

DIAPHRAGM WEIGHT IS BASED ON 3'-0" LONG DIAPHRAGMS.

CONCRETE - MIN. COMPRESSIVE STRENGTH AT 28 DAYS f'_c = 5500 P.S.I.

MIN. COMPRESSIVE STRENGTH AT TIME OF INITIAL PRESTRESS f'_c = 4000 P.S.I.

REINFORCING STEEL - ASTM A615, A616 OR A617 GRADE 60 UNIT STRESS 24,000 P.S.I.

PRESTRESSING STEEL - ASTM 416 GRADE 270, ½" DIAMETER, SEVEN-WIRE, UNCOATED, LOW RELAXATION STRANDS

A_s = .153 SQ. IN.
f'_s = 270,000 P.S.I.

INITIAL STRESS 0.75 f'_s = 202,500 P.S.I.
INITIAL TENSION LOAD = 30,982 LBS/STRAND
STRESS AT RELEASE = 0.69 f'_s = 186,300 P.S.I.
(ASSUMED AT SECTION OF MAX. MOMENT)

3. PRESTRESS LOSSES HAVE BEEN COMPUTED IN ACCORDANCE WITH ARTICLE 9.16. TOTAL LOSSES DETERMINED BY THIS METHOD MAY BE EXPRESSED AS $\Delta f_s = SH + ES + CR_c + CR_s$. BY SUBSTITUTING APPROPRIATE VALUES THIS EQUATION BECOMES Δf_s = 11,175 +17.98 f_{cir} - 6.65 f_{cds} WHICH IS THE EQUATION FOR TOTAL LOSSES USED FOR THESE DESIGNS.

4. INTERMEDIATE DIAPHRAGMS: BEAMS ARE DESIGNED FOR 3 FT. LONG DIAPHRGMS.

SPAN ≤ 50 FT. ONE DIAPHRAGM
50 FT. < SPAN ≤ 75 FT. TWO DIAPHRAGMS
75 FT. < SPAN THREE DIAPHRAGMS

5. INITIAL CAMBER GIVEN IS AT TIME OF TRANSFER OF STRESS AND INCLUDES DEFLECTION DUE TO WEIGHT OF BEAM BUT DOES NOT INCLUDE AN ALLOWANCE FOR CREEP.

6. REFERENCE SHALL BE MADE TO STANDARD DRAWING PSBD-1-93 FOR DETAILS OF BEAMS.

7. THIS DRAWING PROVIDES INFORMATION FOR THE DESIGNER AND IS NOT INTENDED FOR USE AS A STANDARD DRAWING.

8. ROADWAY WIDTH: THE BEAMS ON THIS SHEET ARE DESIGNED FOR A ROADWAY WIDTH OF 24 FT. BETWEEN FACE OF CURBS, FACE OF GUARDRAILS FOR BRIDGES WITHOUT CURBS, AND TOE OF PARAPETS. THE BEAM DESIGNS ON THIS SHEET SHALL ALSO BE USED FOR THE FOLLOWING ROADWAY WIDTHS:

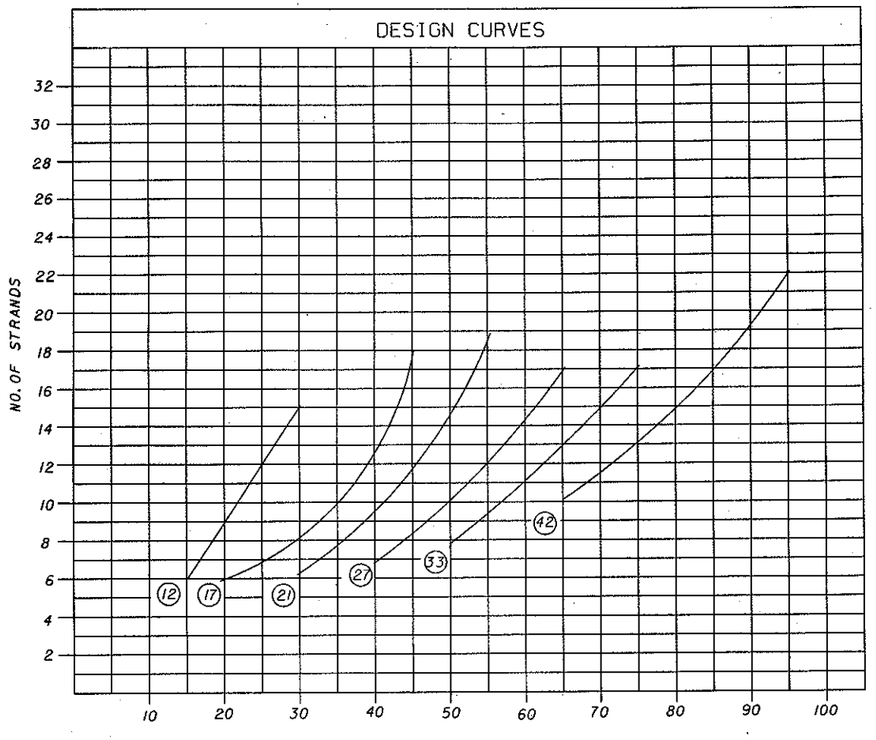
GROUP D
24 FT. TO BUT NOT INCLUDING 30 FT.
36 FT. TO BUT NOT INCLUDING 42 FT.
48 FT. TO BUT NOT INCLUDING 54 FT.
60 FT. TO BUT NOT INCLUDING 69 FT.
72 FT.

48" WIDE BEAMS USED IN THE SAME STRUCTURE WITH THE BEAM DESIGNS ON THIS SHEET, SHALL ALSO BE DESIGNED FOR A ROADWAY WIDTH OF 24 FT.

9. INTERPOLATION: THE DESIGN CURVES SHALL BE USED TO DETERMINE THE NUMBER OF STRANDS REQUIRED FOR BEAM SPANS NOT SPECIFICALLY LISTED IN THE DESIGN DATA TABLE. THE REMAINING DESIGN DATA MAY BE OBTAINED FROM THE TABLE BY USING STRAIGHT LINE INTERPOLATION BETWEEN GIVEN VALUES. DO NOT EXTRAPOLATE BEYOND THE CURVES OR GIVEN DATA.

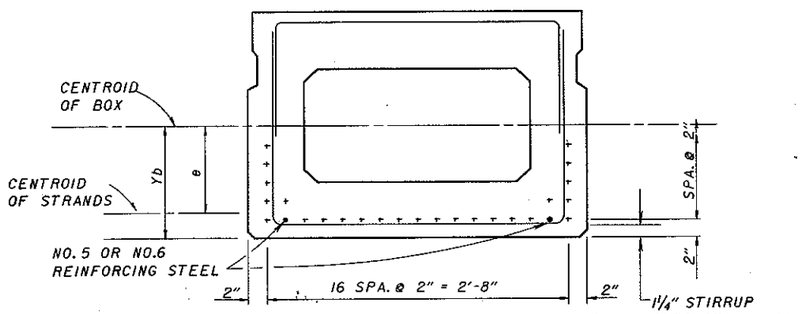
10. NARROW ROADWAY: THESE DESIGNS SHALL NOT BE USED FOR ROADWAY WIDTHS LESS THAN 24 FT. SPECIAL DESIGN IS REQUIRED FOR ROADWAY WIDTHS LESS THAN 24 FT.

DESIGN CURVES



DESIGN DATA

BOX	SPAN c/c BRG. FT.	MID-SPAN e In.	NO. OF STRANDS	STRAND LOCATION FROM BOTTOM OF BOX 2"	4"	6"	8"	10"	NUMBER AND LENGTH OF STRANDS DEBONDED 1'-6"	2'-6"	3'-6"	4'-6"	5'-6"	7'-6"	TENSILE BARS AT BOTTOM NO.	SIZE	TENSILE BARS AT TOP: FULL LENGTH NO.	SIZE	ADDITIONAL BARS EACH END NO.	SIZE	LENGTH	INITIAL CAMBER IN.
B12-36	15	3.96	6	6											6	5	4	5	-	-	-	.11
	20	3.52	9	7	2										4	5	4	5	-	-	-	.25
	25	3.29	12	8	4				2						2	5	4	5	-	-	-	.45
	30	3.43	15	11	4					2	2				2	5	4	5	-	-	-	.80
B17-36	20	6.42	6	6											4	5	4	5	-	-	-	.12
	25	6.42	7	7											2	5	4	5	-	-	-	.20
	30	6.42	8	8											2	5	4	5	-	-	-	.29
	35	6.42	10	10											2	5	4	5	-	-	-	.48
	40	6.42	12	12						2					2	5	4	5	-	-	-	.71
	45	5.98	18	14	4				2		2			2	2	5	4	5	-	-	-	1.33
B21-36	30	8.39	6	6											2	5	4	5	-	-	-	.15
	35	8.39	8	8											2	5	4	5	-	-	-	.27
	40	8.39	10	10											2	5	4	5	1	5	7'-3"	.42
	45	8.39	12	12					2						2	5	4	5	1	5	8'-9"	.61
	50	8.39	14	14					2	2					2	5	4	5	1	5	9'-9"	.84
	55	7.95	18	14	4					2	2				2	5	4	5	1	5	10'-6"	1.16
B27-36	40	11.36	7	7											2	6	4	5	-	-	-	.18
	45	11.36	8	8											2	6	4	5	1	5	5'-3"	.23
	50	11.36	10	10											2	6	4	5	2	5	7'-0"	.36
	55	11.36	12	12											2	6	4	5	3	5	8'-3"	.44
	60	11.36	14	14						2					2	6	4	5	3	5	9-6"	.60
	65	10.89	17	13	4				2	2					2	6	4	5	2	5	10'-0"	.82
B33-36	50	14.28	8	8											2	6	4	5	1	5	5'-6"	.19
	55	14.28	10	10											2	6	4	5	2	5	6'-9"	.24
	60	14.28	11	11											2	6	4	5	3	5	7'-6"	.27
	65	14.28	13	13											2	6	4	5	4	5	9'-0"	.39
	70	14.01	15	13	2				2						2	6	4	5	4	5	9'-9"	.50
	75	13.81	17	13	4					2					2	6	4	5	4	5	10'-6"	.60
B42-36	65	18.72	10	10											2	6	4	5	4	5	7'-3"	.13
	70	18.72	11	11											2	6	4	5	5	5	7'-9"	.14
	75	18.72	13	13											2	6	4	5	6	5	9'-3"	.22
	80	18.45	15	13	2										2	6	4	5	7	5	10'-0"	.24
	85	18.25	17	13	4					2					2	6	4	5	7	5	10'-9"	.31
	90	17.88	19	13	4	2				2					2	6	4	5	7	5	11'-3"	.34
	95	17.45	22	14	4	2	2			2	2				2	6	4	5	6	5	12'-3"	.49



TYPICAL STRAND LOCATION

STRANDS SHALL BE DISTRIBUTED OVER THE BEAM WIDTH AS EVENLY AS POSSIBLE. STRAND PATTERN AND THE DEBONDED LENGTHS SHALL BE SYMMETRICAL ABOUT VERTICAL ℄ OF BEAM. DEBONDED STRANDS SHALL BE IN BOTTOM LAYER. LENGTH OF STRANDS TO BE DEBONDED IS MEASURED FROM ENDS OF BEAM. TWO BOTTOM REINFORCING BARS SHALL BE LOCATED AT THE CORNER OF THE STIRRUPS. ANY ADDITIONAL REQUIRED BOTTOM REINFORCING BARS SHALL BE DISTRIBUTED SYMMETRICALLY OVER THE BEAM WIDTH. A LAP 3'-3" FOR #5 AND 4'-0" FOR #6 BARS SHOULD BE PROVIDED WITHIN THE OUTER QUARTER OF THE SPAN, IF NEEDED. NO TACK WELDING OF THE BOTTOM #5 OR #6 BARS WILL BE PERMITTED.

SECTION PROPERTIES

BOX	A IN.²	I IN.⁴	Yb IN.	Zt IN.³	Zb IN.³
B12 - 36	423.8	5122	5.96	848	859
B17 - 36	426.3	13840	8.42	1613	1644
B21 - 36	479.8	24893	10.39	2346	2396
B27 - 36	539.8	48647	13.36	3567	3641
B33 - 36	594.5	82048	16.28	4907	5040
B42 - 36	684.5	152479	20.72	7165	7359

REVISIONS

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

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DESIGN DATA FOR
PRESTRESSED CONCRETE BRIDGE
GROUP D ROADWAY WIDTH
NON-COMPOSITE
36" ADJACENT BOX BEAMS
WITH STRAIGHT STRANDS

DESIGNED	DRAWN	CHECKED	REVIEWED
MRG	SEM	SEM	LMW