

DESIGN NOTES

1. DESIGN SPECIFICATIONS: "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1996, INCLUDING THE 1997 THROUGH 2001 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL.

2. DESIGN DATA:

- LIVE LOADING - HS25 AND THE ALTERNATE MILITARY LOADING
- SUPERIMPOSED DEAD LOADS - ASPHALT OVERLAY - 3 1/2" THICK (AVG.)
RAILING WEIGHT - 90 PLF PER RAIL (TST-1-99)
FWS - 60 PSF
- DEAD LOAD - DIAPHRAGM WEIGHT IS BASED ON 3'-0" LONG DIAPHRAGMS.
- CONCRETE - MIN. COMPRESSIVE STRENGTH AT 28 DAYS $f'_c = 7000$ P.S.I.
MIN. COMPRESSIVE STRENGTH AT TIME OF INITIAL PRESTRESS $f'_c = 5000$ P.S.I.
- REINFORCING STEEL - GRADE 60
MINIMUM YIELD STRENGTH 60,000 P.S.I.
- PRESTRESSING STEEL - ASTM A416
1/2" DIAMETER
 $A_s = 0.167$ SQ. IN.
 $f_s = 270,000$ P.S.I.
 $E_s = 28,500$ K.S.I.
 $R_H = 70\%$
INITIAL STRESS $0.75 f_s = 202,500$ P.S.I.
INITIAL TENSION LOAD = 33,818 LBS/STRAND

3. PRESTRESS LOSSES HAVE BEEN COMPUTED IN ACCORDANCE WITH AASHTO ARTICLE 9.16.2. TOTAL LOSSES DETERMINED BY THIS METHOD MAY BE EXPRESSED AS $\Delta f_s = 11,175 + (25,650/E_c) + (11.4) f_{cir} - 6.65 f_{cfs}$

4. INTERMEDIATE DIAPHRAGMS:

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

5. CAMBER DATA GIVEN IS THE CALCULATED CAMBER AT TIME OF PAVING (1.8B - 1.85C), WHERE B = CAMBER DUE TO PRESTRESSING AT RELEASE AND C = DEFLECTION DUE TO WEIGHT OF BEAM INCLUDING DIAPHRAGMS. D = CALCULATED DEFLECTION AT MIDSPAN DUE TO A 3 1/2" THICK ASPHALT WEARING SURFACE AND TWO (2) BRIDGE RAILS WEIGHING 90LB/FT. PER RAIL. THE VALUE SHOWN IS THE MAXIMUM INITIAL SUPERIMPOSED DEAD LOAD DEFLECTION FOR GROUP C ROADWAY WIDTHS.

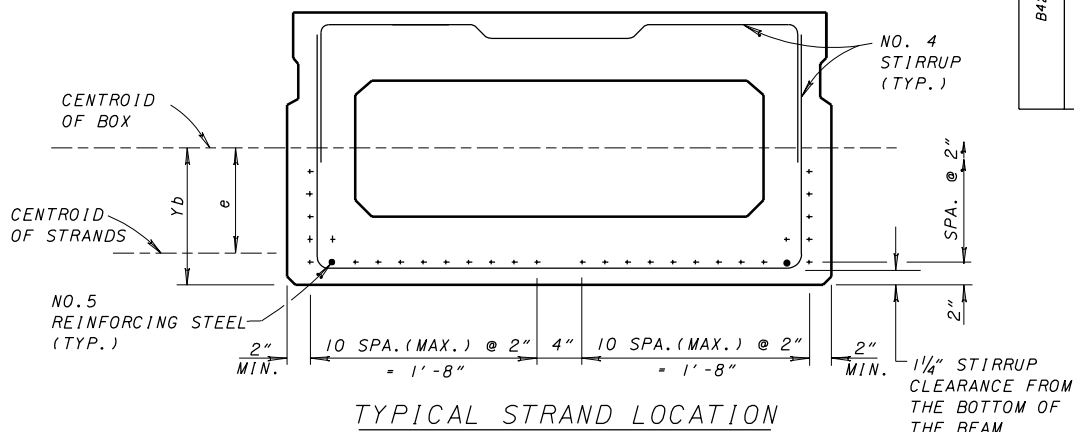
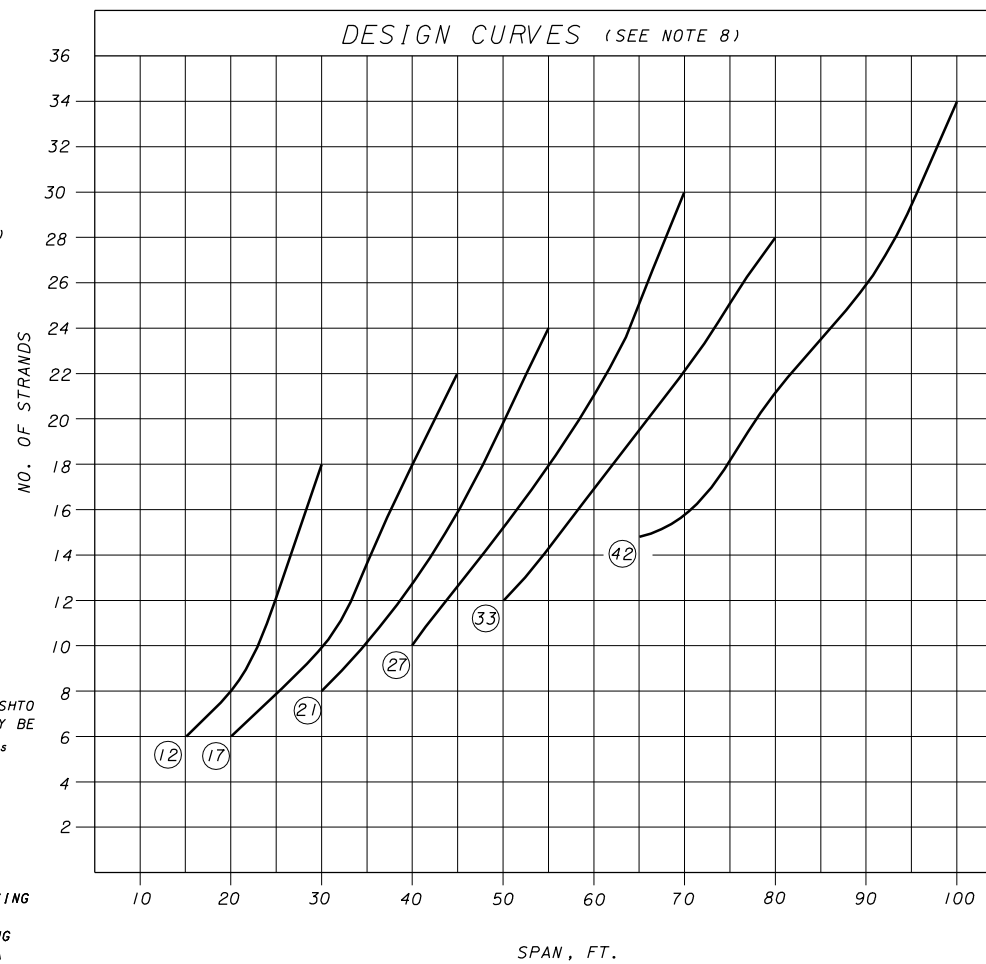
6. THIS DRAWING PROVIDES INFORMATION FOR THE DESIGNER AND IS NOT INTENDED FOR USE AS A STANDARD DRAWING. REFERENCE SHALL BE MADE TO STANDARD DRAWING PSBD-1-93 FOR DETAILS OF BEAMS.

7. ROADWAY WIDTH: THE BEAMS ON THIS SHEET ARE DESIGNED FOR THE FOLLOWING ROADWAY WIDTHS, MEASURED BETWEEN FACE OF BRIDGE RAILS:

- GROUP C
- 48 FT. < WIDTH ≤ 72 FT.

8. 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. HOWEVER, THE NUMBER OF STRANDS USED SHALL ALWAYS BE ROUNDED UP TO THE NEAREST EVEN NUMBER. 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.

9. 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.



STRANDS SHALL BE PLACED PER BDM 302.5.1.2.b AND SHALL BE DISTRIBUTED SYMMETRICALLY OVER THE BEAM WIDTH. STRAND PATTERN AND THE DEBONDED LENGTHS SHALL BE SYMMETRICAL ABOUT VERTICAL \bar{c} 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. A LAP OF 3'-3" FOR #5 BARS AND 4'-0" FOR #6 BARS SHOULD BE PROVIDED WITHIN THE OUTER QUARTER OF THE SPAN, IF NEEDED.

GROUP C DESIGN DATA (SEE NOTE 7)

BOX	SPAN c/c BRG. FT.	MID-SPAN e in.	NO. OF STRANDS	STRAND LOCATION FROM BOTTOM OF BOX								NUMBER AND LENGTH OF STRANDS DEBONDED		TENSILE BARS AT BOTTOM		TENSILE BARS AT TOP				CAMBER/DEFLECTION DATA IN. (SEE NOTE 5)				
				2"	4"	6"	8"	10"	12"	14"	1'-6"	2'-6"	3'-6"	4'-6"	NO.	SIZE	FULL LENGTH		ADDITIONAL BARS EACH END		B	C	1.8B-1.85C	D
																	NO.	SIZE	NO.	SIZE				
B12-48	15	3.97	6	6																0.105	0.023	0.146	0.006	
	20	3.97	8	8																0.250	0.072	0.317	0.020	
	25	3.97	12	12																0.581	0.177	0.718	0.048	
	30	3.53	18	14	4								2							1.100	0.367	1.301	0.099	
B17-48	20	6.55	6	6																0.116	0.028	0.157	0.007	
	25	6.55	8	8																0.242	0.070	0.306	0.018	
	30	6.55	10	10																0.435	0.142	0.520	0.037	
	35	6.55	14	14																0.818	0.261	0.990	0.069	
	40	6.33	18	16	2															1.314	0.443	1.546	0.117	
B21-48	45	6.37	22	20	2								2		2					2.012	0.706	2.316	0.188	
	30	8.57	8	8																0.259	0.090	0.300	0.021	
	35	8.57	10	10																0.439	0.165	0.485	0.039	
	40	8.57	14	14																0.793	0.278	0.913	0.066	
	45	8.57	16	16																1.142	0.444	1.234	0.106	
	50	8.17	20	16	4															1.666	0.672	1.756	0.161	
B27-48	55	8.24	24	20	4								2		2					2.405	1.010	2.461	0.236	
	40	11.61	10	10																0.392	0.160	0.410	0.033	
	45	11.61	14	14																0.686	0.254	0.765	0.053	
	50	11.61	16	16																0.964	0.385	1.023	0.081	
	55	11.61	18	18																1.308	0.584	1.274	0.119	
	60	11.43	22	20	2															1.854	0.821	1.818	0.168	
	65	10.99	26	20	4	2								2						2.456	1.122	2.345	0.231	
B33-48	70	10.14	30	20	4	2	2	2					2		2					3.019	1.500	2.659	0.311	
	50	14.61	12	12																0.552	0.253	0.526	0.048	
	55	14.61	16	16																0.881	0.388	0.868	0.071	
	60	14.61	18	18																1.175	0.543	1.110	0.100	
	65	14.61	20	20																1.527	0.742	1.376	0.138	
	70	14.43	22	20	2															1.919	0.990	1.623	0.186	
	75	13.99	26	20	4	2														2.506	1.296	2.113	0.245	
	80	13.61	28	20	4	2	2													2.985	1.728	2.176	0.317	
B42-48	65	19.13	16	16																0.884	0.467	0.727	0.075	
	70	19.13	18	18																1.150	0.622	0.919	0.101	
	75	19.13	20	20																1.462	0.813	1.128	0.134	
	80	18.95	22	20	2															1.808	1.089	1.240	0.173	
	85	18.80	24	20	4															2.203	1.376	1.420	0.220	
	90	18.51	26	20	4	2														2.631	1.717	1.559	0.277	
	95	17.66	30	20	4	2	2	2												3.210	2.116	1.863	0.344	
100	16.54	34	20	4	2	2	2	2	2	2									3.762	2.582	1.995	0.422		

▲ - LENGTH MEASURED FROM ENDS OF BEAM

SECTION PROPERTIES

BOX	A IN. ²	I IN. ⁴	Yb IN.	S _t IN. ³	S _b IN. ³
B12 - 48	567.8	6850	5.97	1136	1147
B17 - 48	554.3	18307	8.55	2167	2141
B21 - 48	606.3	32456	10.57	3112	3071
B27 - 48	678.8	64649	13.61	4828	4750
B33 - 48	733.5	108150	16.61	6599	6511
B42 - 48	823.5	198418	21.13	9507	9390

REVISED	STATE OF OHIO DEPARTMENT OF TRANSPORTATION OFFICE OF STRUCTURAL ENGINEERING		3 / 6
ORIGINAL DESIGN PREPARED BY: URS CORPORATION - OHIO			
DESIGN DATA FOR PRESTRESSED CONCRETE BRIDGE GROUP C ROADWAY WIDTH NON-COMPOSITE 48" ADJACENT BOX BEAMS WITH STRAIGHT STRANDS			
DESIGNED MDP	DRAWN SFW	CHECKED MAC	REVIEWED RSC
			DATE 12/20/02