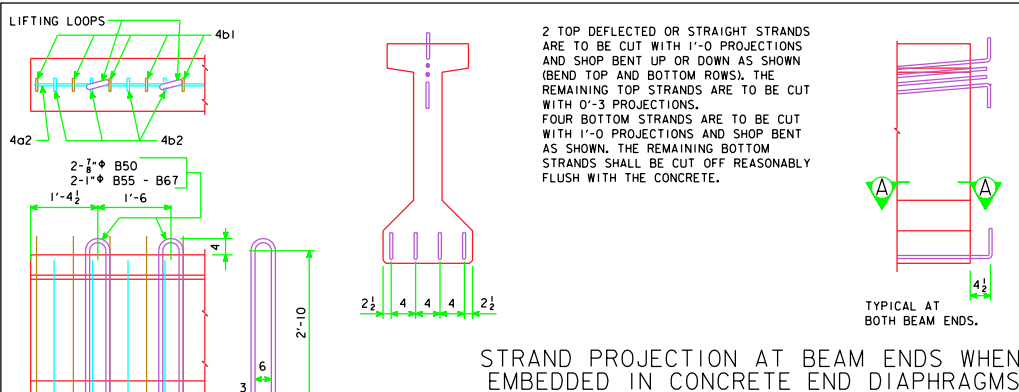
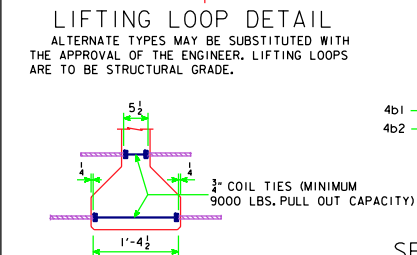


REVISED 10-09 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



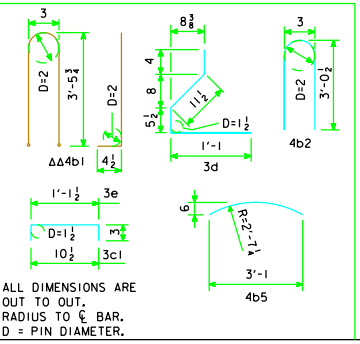
STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



COIL TIE DETAIL
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.

ΔΔ4b1 BARS TO BE EPOXY COATED.
** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

REINFORCING BAR LIST											
BEAM	SPAN	B50	50'-10	B55	55'-0	B59	59'-2	B63	63'-4	B67	67'-6
BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
601		4	27'-3	4	29'-4	4	31'-5	4	33'-6	4	35'-7
4a2		2	4'-2	2	4'-2	2	4'-2	2	4'-2	2	4'-2
4b1		44	7'-10	46	7'-10	50	7'-10	52	7'-10	56	7'-10
4b2		12	6'-2	12	6'-2	12	6'-2	12	6'-2	12	6'-2
4b5								12	3'-3	12	3'-3
3c1		44	1'-5	46	1'-5	50	1'-5	52	1'-5	56	1'-5
3d		112	2'-10	116	2'-10	124	2'-10	128	2'-10	136	2'-10
3e		24	1'-8	24	1'-8	24	1'-8	24	1'-8	24	1'-8



ALL DIMENSIONS ARE OUT TO OUT.
RADIUS TO C. BAR.
D = PIN DIAMETER.

B BEAM DATA																							
BEAM	SPAN LENGTH ℓ-ℓ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS	DEFLECTED	TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)			DEFLECTION (in.) Δ _D				PERMISSIBLE SPACING				WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL (1-D)		
								AT RELEASE	AFTER LOSSES	IMMEDIATE ^① (ELASTIC) Δ _i	TIME (PLASTIC) Δ _T		HL93 LOADING	CONC. STEEL DIAPH. DIAPH.	STEEL DIAPH. DIAPH.	STEEL DIAPH. DIAPH.							
B50	50'-10"	51'-10"	0.60	8	2	425	10.8	0.67		1.24		0.43	0.39	0.11	0.10			7'-6"	7'-6"	10.3		5.10	607
#B55	55'-0"	56'-0"	0.60	8	3	468	14.1	0.85		1.51		0.58	0.54	0.14	0.13			7'-6"	7'-6"	11.2		5.51	635
#B59	59'-2"	60'-2"	0.60	10	3	554	13.2	1.12		1.99		0.82	0.77	0.21	0.19			7'-6"	7'-6"	12.0		5.92	680
#B63	63'-4"	64'-4"	0.60	12	3	639	12.3	1.30		2.32		0.91	0.84	0.23	0.21			7'-6"	7'-6"	12.8		6.33	733
#B67	67'-6"	68'-6"	0.60	14	3	724	11.6	1.69		2.98		1.16	1.09	0.29	0.27			7'-6"	7'-6"	13.6		6.74	778

- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (2270 #) OR ONE STEEL DIAPHRAGM (285 #) AT ℓ OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.
- ② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.
- TOTAL BEAM DEFLECTIONS AT ℓ OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) Δ_D = Δ_i + Δ_t FOR SIMPLE SPAN.
(B) Δ_D = Δ_i + 1/2 Δ_t FOR END SPANS OF CONTINUOUS BRIDGE.
(C) Δ_D = Δ_i + 1/4 Δ_t FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
- ③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f'_s,
f'_s = 270 ksi and A_s = 0.217 sq. in.
- * MINIMUM CONCRETE f'_c (AT 28 DAYS) SHALL BE 7,000 psi.
MINIMUM f'_c AT RELEASE SHALL BE 6,000 psi.

SPECIFICATIONS:
CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.
DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS.

DESIGN STRESSES:
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007:
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 5, f'_c = 5000 psi (EXCEPT AS NOTED)
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f'_s = 270,000 psi.

NOTES:
THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 lb. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.
HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION.
ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.
TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS 1M570.
BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.
THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.03, 1, OF THE STANDARD SPECIFICATIONS.
ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.
IF THE STEEL DIAPHRAGM OPTION IS ALLOWED AND USED, HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.
IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.
0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE Δ BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

LATEST REVISION DATE
10-09

APPROVED BY BRIDGE ENGINEER

STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
AUGUST, 2009

B BEAM DETAILS

H40-34-06