LIFTING LOOP DETAIL

LIFTING LOOPS

4b1
4a2
4b2

1'-4½" 1'-6"
1"Ø LIFTING LOOPS

3'-4
6
3

ALTERNATE TYPES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. LIFTING LOOPS ARE TO BE STRUCTURAL GRADE.

COIL TIE DETAIL

8½"
¾" COIL TIES (MINIMUM 9000 LBS. PULL OUT CAPACITY)
1'-7½"

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

STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS
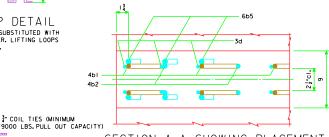
THE TOP STRAIGHT STRANDS OF BEAMS C63 AND C67 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP. THE TOP AND BOTTOM DEFLECTED STRANDS OF BEAMS C71 THROUGH C80 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS.
FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

3 4 6 4 3

TYPICAL AT BOTH BEAM ENDS
4½"

SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM

6b5
3d
4b1
4b2
2½"cl
9

C BEAM DATA

BEAM	SPAN LENGTH ₵ & ₵ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS STRAIGHT	NO. OF STRANDS DEFLECTED	TOTAL INITIAL PRESTRESS KIPS ③	HOLD DOWN FORCE-KIPS	CAMBER (in.) AT RELEASE	CAMBER (in.) AFTER LOSSES	DEFLECTION (in.) Δ_D IMMEDIATE① (ELASTIC) Δ_I CONC. DIAPH.	STEEL DIAPH.	TIME② (PLASTIC) Δ_T CONC. DIAPH.	STEEL DIAPH.	PERMISSIBLE SPACING HL93 LOADING CONC. DIAPH.	STEEL DIAPH.	WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL-(lb)
C63	63'-4	64'-4	0.60	16	—	681	—	0.70	1.24	0.59	0.54	0.15	0.14	7'-6	7'-6	18.9	9.34	536
C67	67'-6	68'-6	0.60	18	—	766	—	0.92	1.62	0.76	0.71	0.19	0.18	7'-6	7'-6	20.1	9.95	576
*C71	71'-8	72'-8	0.60	14	4	766	16	1.21	2.13	0.88	0.82	0.22	0.20	7'-6	7'-6	21.4	10.55	855
*C75	75'-10	76'-10	0.60	14	6	851	22	1.33	2.34	1.07	0.99	0.27	0.25	7'-6	7'-6	22.6	11.16	925
*C80	80'-0	81'-0	0.60	16	6	937	21	1.64	2.90	1.31	1.24	0.33	0.31	7'-6	7'-6	23.8	11.76	1191

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 (2635 #) OR ONE STEEL DIAPHRAGM (285 #) AT ₵ 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 ₵ OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) $\Delta_D = \Delta_I + \Delta_T$ FOR SIMPLE SPAN.
(B) $\Delta_D = \Delta_I + \frac{3}{4}\Delta_T$ FOR END SPANS OF CONTINUOUS BRIDGE.
(C) $\Delta_D = \Delta_I + \frac{1}{2}\Delta_T$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's = 270 ksi AND As = 0.217 sq. in.

* MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 6,000 psi. MINIMUM f'ci AT RELEASE SHALL BE 5,000 psi.

SPECIFICATIONS:

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLE- MENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2004, 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 2004:

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 IM570.

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 2403.14 OF THE 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 a BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.
ΔΔ 4b1 BARS TO BE EPOXY COATED.

REINFORCING BAR LIST

BAR	SHAPE	C63 63'-4 NO.	C63 LENGTH	C67 67'-6 NO.	C67 LENGTH	C71 71'-8 NO.	C71 LENGTH	C75 75'-10 NO.	C75 LENGTH	C80 80'-0 NO.	C80 LENGTH
6a1		—	—	—	—	4	37'-8	4	39'-9	4	41'-10
4a2		2	5'-0	2	5'-0	2	5'-0	2	5'-0	2	5'-0
8a3		—	—	—	—	—	—	—	—	2	40'-0
ΔΔ 4b1		46	8'-10	48	8'-10	54	8'-10	58	8'-10	60	8'-10
4b2		12	7'-2	12	7'-2	12	7'-2	12	7'-2	12	7'-2
6b5		4	3'-9	8	3'-9	8	3'-9	12	3'-9	16	3'-9
3c1		46	1'-8	48	1'-8	54	1'-8	58	1'-8	60	1'-8
** 3d		116	3'-0	120	3'-0	132	3'-0	140	3'-0	144	3'-0
3e		26	1'-10	26	1'-10	26	1'-10	26	1'-10	26	1'-10

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

D=2½   3½
3'-11¼
D=2
ΔΔ4b1   4½

3½
6
D=2½
3'-6½
R=3'-5½
3'-7
6b5
4b2

1'-3½   3e
D=1½
1'-1½   3c1

9⅞
4
9½   1'-1½
5½   D=1½
1'-1
3d