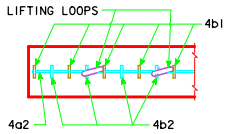
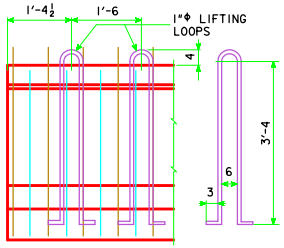
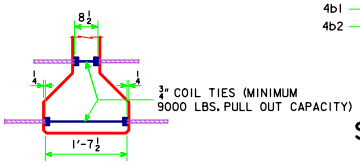




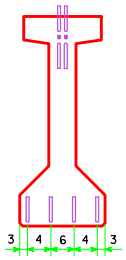
LIFTING LOOP DETAIL

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

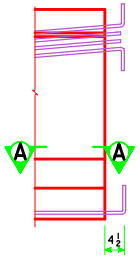


COIL TIE DETAIL

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

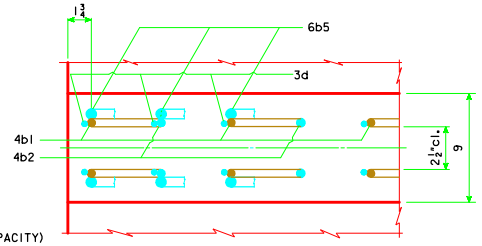


THE TOP STRAIGHT STRANDS OF BEAMS C63 AND C67 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP. THE TOP AND BOTTOM DEFLECTED STRANDS OF BEAMS C71 THROUGH C80 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS.
FOUR 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.



TYPICAL AT BOTH BEAM ENDS

STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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

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 ③ KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.) AT RELEASE	CAMBER (in.) AT RELEASE	CAMBER (in.) AFTER LOSSES	CAMBER (in.) AFTER LOSSES	DEFLECTION (in.) Δ_D IMMEDIATE ① (ELASTIC) Δ_I: CONC. DIAPH.	DEFLECTION IMMEDIATE: STEEL DIAPH.	DEFLECTION TIME ② (PLASTIC) Δ_T: CONC. DIAPH.	DEFLECTION TIME: STEEL DIAPH.	PERMISSIBLE SPACING	PERMISSIBLE SPACING	PERMISSIBLE SPACING HL93 LOADING: CONC. DIAPH.	PERMISSIBLE SPACING HL93 LOADING: STEEL DIAPH.	WEIGHT (TONS)	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 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 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 2403.03, I, 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.

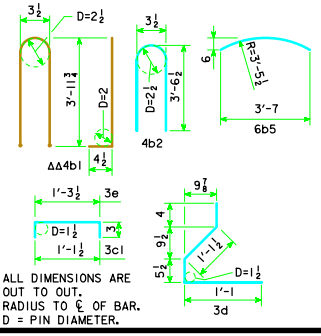
0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE α BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

✱✱ WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

ΔΔ 4b1 BARS TO BE EPOXY COATED.

REINFORCING BAR LIST

	BEAM / SPAN		C63 / 63'-4		C67 / 67'-6		C71 / 71'-8		C75 / 75'-10		C80 / 80'-0	
	BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	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.

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

SEPTEMBER, 2014

C BEAM DETAILS

H40-36-14