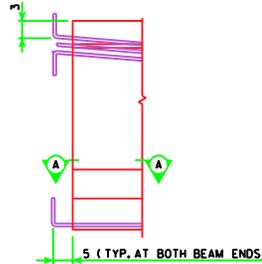


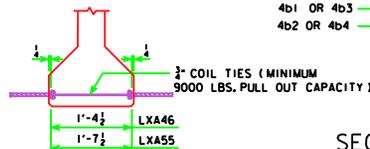
"N" TOP DEFLECTED OR STRAIGHT STRANDS ARE TO BE CUT WITH 1'-0" PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN (BEND TOP AND BOTTOM ROWS). THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-5" PROJECTIONS. FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0" PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

BEAM	"N"
LXA46	2
LXA55	4



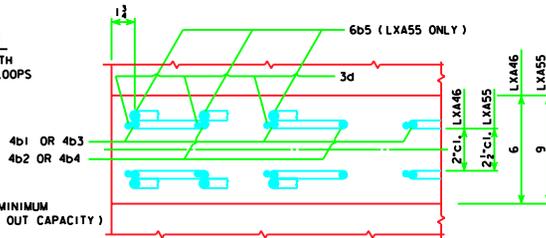
STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

**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 LONGITUDINAL SECTION SHEETS



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

**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., SERIES OF 1989, WITH MINOR MODIFICATIONS.

**DESIGN STRESSES:**

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 1989:

REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.

CONCRETE IN ACCORDANCE WITH SECTION 9,  $f'_c = 5000$  psi.

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 9,  $f'_s = 270,000$  psi.

ΔΔ 4b1 and 4b3 BARS TO BE EPOXY COATED.

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

REINFORCING BAR LIST				
BEAM	SPAN	LXA46	LXA55	
5a1	4	24'-11	4	29'-1
4a2	2	3'-3	2	3'-3
ΔΔ 4b1	42	6'-8	-	-
4b2	8	5'-0	-	-
ΔΔ 4b3	-	-	48	6'-8
4b4	-	-	8	5'-0
6b5	-	-	12	2'-9
3c1	42	1'-3	-	-
3c2	-	-	48	1'-4
3d	100	2'-8	112	2'-10
3e	12	1'-6	14	1'-8

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

**LXA BEAM DATA**

BEAM	SPAN LENGTH E-BEARING	OVERALL BEAM LENGTH (L')	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS-KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) Δ <sub>0</sub>		WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL (TDS.)
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE <sup>①</sup> (ELASTIC) Δ <sub>1</sub>	TIME <sup>②</sup> (PLASTIC) Δ <sub>1</sub>			
LXA46	46'-8	47'-8	1/2"	12	3	450	10.5	0.81	1.44	0.46	0.11	7.7	3.82	449
LXA55	55'-0	56'-0	1/2"	16	6	681.2	13.6	1.01	1.80	0.72	0.18	11.9	5.87	568

**NOTES:**

- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND STEEL DIAPHRAGM.
- ② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.
- TOTAL BEAM DEFLECTIONS AT  $\frac{1}{4}$  OF SPAN, Δ<sub>0</sub>, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:  
Δ<sub>0</sub> = Δ<sub>1</sub> + Δ<sub>2</sub> FOR SIMPLE SPAN.
- ③ TOTAL INITIAL PRESTRESS FOR LXA46 IS BASED ON 72.664%  $f'_s$ , AND FOR LXA55 ON 75%  $f'_s$ .  
 $f'_s = 270$  ksi AND  $A_s = 0.153$  sq. in.

- THESE BEAMS ARE DESIGNED FOR AASHTO HS20 LIVE LOADS 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 I.M. 570.
- BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS.
- THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT 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.
- UNLESS OTHERWISE NOTED ALL BEAMS ARE TO BE INCREASED IN LENGTH BY .0005L TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.
- HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.
- 1/2" DIAMETER STRANDS STRESSED TO NOT MORE THAN 3,000 LBS. EACH MAY BE USED IN LIEU OF THE 3/8" BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.
- BEAMS SHALL BE AT LEAST 28 DAYS OLD BEFORE THE SLAB IS PLACED EXCEPT AS OTHERWISE APPROVED BY THE ENGINEER.

LATEST REVISION DATE :

APPROVED BY

STANDARD DESIGN - 24' ROADWAY, SINGLE SPAN BRIDGE  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
 JANUARY, 2005 HS20-44 LOADING  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
**LXA BEAM DETAILS** H24SI-21-05