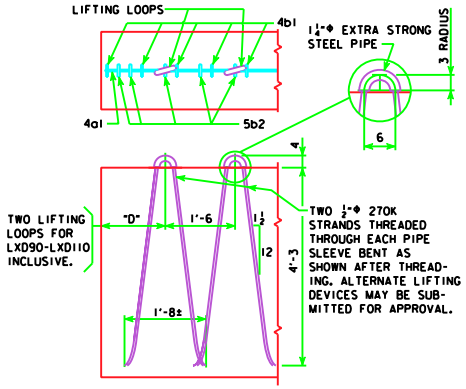
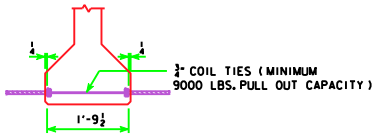


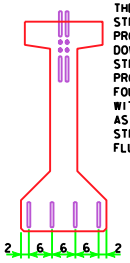
LIFTING LOOP DETAIL

"D" = 1'-3 FOR LXD90
"D" = 3'-9 FOR LXD100
"D" = 8'-2 FOR LXD110

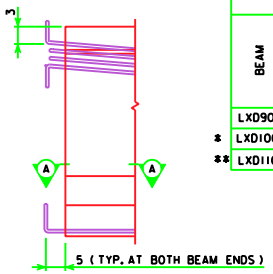


COIL TIE DETAIL

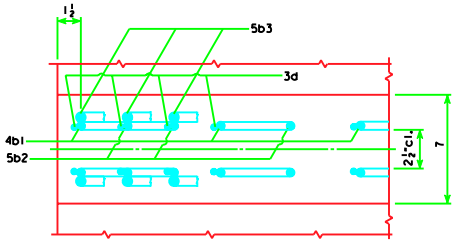
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON LONGITUDINAL SECTION SHEETS



THE TOP AND BOTTOM DEFLECTED STRANDS 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'-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.



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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

LXD BEAM DATA

	BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE	NO. OF STRANDS: STRAIGHT	NO. OF STRANDS: DEFLECTED	TOTAL INITIAL PRESTRESS ③ KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.): AT RELEASE	CAMBER (in.): AFTER LOSSES	DEFLECTION (in.) Δ_0: IMMEDIATE ① (ELASTIC) Δ_I	DEFLECTION (in.) Δ_0: TIME ② (PLASTIC) Δ_T	WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL-(lbs.)
	LXD90	90'-0	91'-0	½"Φ	20	8	867	27.7	1.24	2.17	1.02	0.25	30.4	15.0	1227
*	LXD100	100'-0	101'-0	½"Φ	28	8	1115	24.9	1.89	3.33	1.38	0.35	33.6	16.6	1439
**	LXD110	110'-0	111'-0	½"Φ	32	14	1424	33.7	2.30	4.03	1.86	0.46	36.9	18.2	1581

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 ℄ OF SPAN, Δ_0, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
$\Delta_0 = \Delta_I + \Delta_T$ FOR SIMPLE SPAN.

③ TOTAL INITIAL PRESTRESS FOR LXC90 THRU LXC110 INCLUSIVE IS BASED ON 75% f's.
f's = 270 ksi AND As = 0.153 sq. in.

* MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 6000 PSI.
MINIMUM f'c AT RELEASE SHALL BE 5000 PSI.

** MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 7000 PSI.
MINIMUM f'c AT RELEASE SHALL BE 6000 PSI.

NOTES:

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.

FOR TRANSPORTING, THE OVERHANG SHALL BE IN ACCORDANCE WITH ART. 2407.13 OF STD. SPEC., EXCEPT THE OVERHANG MAY BE INCREASED TO A MAXIMUM OF 9 FEET FOR THE LXD90 AND LXD100 BEAM, AND 12 FEET FOR THE LXD110 BEAM.

IF BEAM CONCRETE STRENGTH f'c = 7500 psi, THEN BEAM OVERHANG MAY BE INCREASED AS FOLLOWS: 12 FEET FOR THE LXD100 BEAM AND 14 FEET FOR THE LXD110 BEAM.

THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE LXD100 AND LXD110 BEAMS DURING HANDLING, TRANSPORTING AND ERECTION BY PROVIDING TEMPORARY BRACING AS NEEDED.

½" DIAMETER STRANDS STRESSED TO NOT MORE THAN 3,000 LBS. EACH MAY BE USED IN LIEU OF THE a 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.

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. (EXCEPT AS NOTED).

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

SPECIFICATIONS:

CONSTRUCTION STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

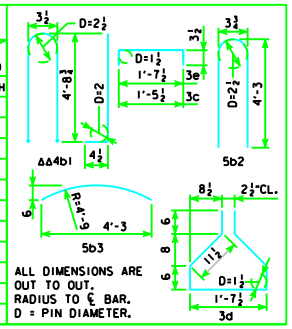
DESIGN: A.A.S.H.T.O., SERIES OF 1989, WITH MINOR MODIFICATIONS.

A/B A=SIZE B=NO.

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

REINFORCING BAR LIST

	BEAM / SPAN		LXD90 / 90'-0		LXD100 / 100'-0		LXD110 / 110'-0	
	BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
	4a1		2	18'-0	2	22'-0	2	26'-6
	a2		5/4	30'-10	6/4	35'-4	6/4	38'-4
	a3		7/2	34'-0	8/2	36'-0	8/2	40'-0
ΔΔ	4b1		74	10-4	81	10'-4	91	10'-4
	5b2		12	8'-8	12	8'-8	12	8'-8
	5b3		20	4'-4	20	4'-4	20	4'-4
	3c		74	2'-1	81	2'-1	91	2'-1
	3d		74	5'-7	81	5'-7	91	5'-7
	3e		14	2'-3	16	2'-3	16	2'-3



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

LATEST REVISION DATE :

APPROVED BY

STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

JANUARY, 2005 HS20-44 LOADING

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

LXD BEAM DETAILS

H30S1-30-05