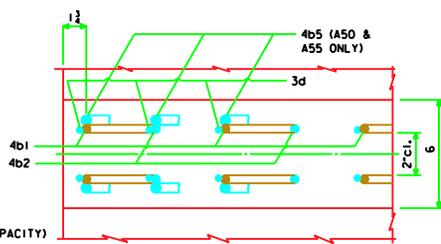
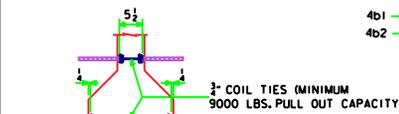
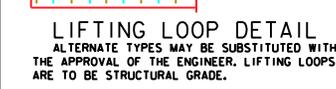
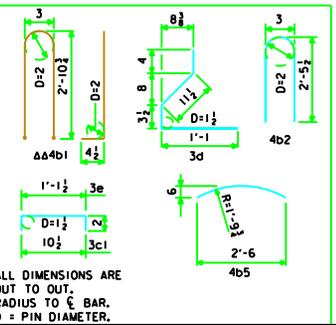


STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



REINFORCING BAR LIST							
BEAM	A42	A46	A50	A55			
SPAN	42'-6"	46'-8"	50'-10"	55'-0"			
BAR SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	
501	4	22'-10"	4	24'-11"	4	27'-0"	
402	2	3'-3"	2	3'-3"	2	3'-3"	
4b1	38	6'-8"	42	6'-8"	44	6'-8"	
4b2	8	5'-0"	10	5'-0"	8	5'-0"	
4b5	—	—	—	8	2'-9"	12	2'-9"
3c1	38	1'-3"	42	1'-3"	44	1'-3"	
3d	92	2'-8"	104	2'-8"	104	2'-8"	
3e	18	1'-6"	20	1'-6"	18	1'-6"	



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

A BEAM DATA

BEAM	SPAN LENGTH	OVERALL BEAM LENGTH (L)	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS (KIPS) ①	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) Δ <sub>0</sub>		PERMISSIBLE SPACING		WEIGHT (TONS)		CONCRETE (C.Y.)	REINFORCING STEEL (LBS)	
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE (ELASTIC) Δ <sub>1</sub>		TIME (PLASTIC) Δ <sub>T</sub>		HL93 LOADING				
										CONC. DIAPHR.	STEEL DIAPHR.	CONC. DIAPHR.	STEEL DIAPHR.	CONC. DIAPHR.	STEEL DIAPHR.			
A42	42'-6"	43'-6"	0.6"	7	2	383	9.3	0.70	1.24	0.38	0.35	0.09	0.09	7'-6"	7'-6"	7.1	3.49	416
AA46	46'-8"	47'-8"	0.6"	8	2	426	8.5	0.76	1.35	0.50	0.47	0.13	0.12	7'-6"	7'-6"	7.7	3.82	464
AA50	50'-10"	51'-10"	0.6"	9	3	510.9	11.7	1.02	1.82	0.69	0.65	0.17	0.16	7'-6"	7'-6"	8.4	4.15	490
AA55	55'-0"	56'-0"	0.6"	10	3	553.4	10.8	1.29	2.30	0.94	0.88	0.23	0.22	7'-6"	7'-6"	9.1	4.49	533

- 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 (1912 #) OR ONE STEEL DIAPHRAGM (285 #) AT  $\frac{1}{4}$  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  $\frac{1}{4}$  OF SPAN, Δ<sub>0</sub>, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:  
 (A) Δ<sub>0</sub> = Δ<sub>1</sub> + Δ<sub>T</sub>; FOR SIMPLE SPAN.  
 (B) Δ<sub>0</sub> = Δ<sub>1</sub> + 3Δ<sub>T</sub>; FOR END SPANS OF CONTINUOUS BRIDGE.  
 (C) Δ<sub>0</sub> = Δ<sub>1</sub> + 2Δ<sub>T</sub>; FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
- ③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f'<sub>s</sub>, f'<sub>s</sub> = 270 ksi AND A<sub>s</sub> = 0.217 sq. in.

\* MINIMUM CONCRETE f'<sub>c</sub> (AT 28 DAYS) SHALL BE 7,000 psi. MINIMUM f'<sub>ci</sub> 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 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'<sub>c</sub> = 5000 psi (EXCEPT AS NOTED).  
 PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f'<sub>s</sub> = 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 SUFFICIENT 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 0 BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

LATEST REVISION DATE	<i>Thomas E. McQuinn</i> APPROVED BY BRIDGE ENGINEER	
		STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006 <span style="float: right;">HL93 LOADING</span>
		A BEAM DETAILS <span style="float: right;">H40-32-06</span>