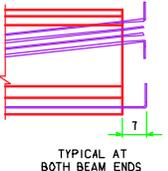


THE TOP AND BOTTOM ROWS OF THE DEFLECTED STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS WHICH ARE TO BE SHOP BENT AS SHOWN. THE REMAINING TOP DEFLECTED STRANDS ARE TO BE CUT WITH 7" PROJECTIONS. SIX BOTTOM STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS WHICH ARE TO BE SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS ARE TO BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



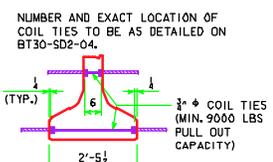
STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

4 - 1/2" NOMINAL DIA. GRADE 270 STRANDS THREADED THROUGH EACH PIPE SLEEVE BENT AS SHOWN AFTER THREADING. ALTERNATE LIFTING DEVICES MAY BE SUBMITTED FOR APPROVAL (SEE LIFTING LOOP TABLE).

LIFTING LOOP DETAIL

LIFTING LOOP TABLE				
BEAMS	LIFTING LOOPS EACH END	# OF STRANDS PER LOOP	D	BEAM OVERHANG (FT.)
BTDI10	2	4	8'-2	12
BTDI15	2	4	8'-3	12
BTDI20	2	4	9'-3	14
BTDI25	2	4	9'-3	16
BTDI30	2	4	9'-3	16

LIFTING LOOPS SHALL CARRY LOADS EQUALLY.



COIL TIE DETAIL

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 1998. REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60. CONCRETE IN ACCORDANCE WITH SECTION 5. PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 270.

SPECIFICATIONS:

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

DESIGN: AASHTO LRFD, SERIES OF 1998, WITH MINOR MODIFICATIONS.

BTD BEAM DATA

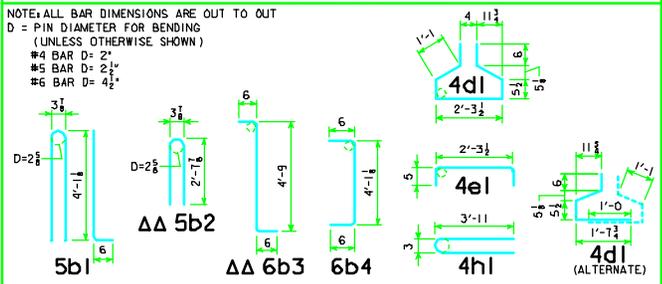
BTD BEAM	SPAN LENGTH @ BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH		STRAND SIZE DIA. (in)	NO. OF STRANDS	NO. OF DEFLECTED PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in)		DEFLECTION (in) Δ _a		PERMISSIBLE MAXIMUM SPACING HL-93 LOADING	WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (WEIGHT-LBS)	
			f'c1 (ksi)	f'c (ksi)					AT RELEASE	AFTER LOSSES	IMMEDIATE (ELASTIC) Δ _i	TIME (PLASTIC) Δ _t					
			STEEL DIAPHRAGM	STEEL DIAPHRAGM					STEEL DIAPHRAGM								
BTDI10	110'-0"	111'-4"	6.50	7.50	0.60	32	6	1617	20.9	2.60	4.57	2.16	0.54	9'-3	43.4	21.4	3219
BTDI15	115'-0"	116'-4"	7.00	7.50	0.60	36	6	1788	20.3	2.89	5.09	2.59	0.65	9'-3	46.4	22.4	3452
BTDI20	120'-0"	121'-4"	7.50	8.00	0.60	38	8	1958	24.4	3.27	6.75	2.97	0.74	9'-3	47.3	23.4	3613
BTDI25	125'-0"	126'-4"	8.00	8.50	0.60	42	12	2297	31.9	3.81	6.71	3.42	0.86	9'-3	49.3	24.3	3814
BTDI30	130'-0"	131'-4"	8.00	9.00	0.60	42	14	2384	33.9	3.95	6.94	3.79	0.95	9'-0	51.2	25.3	3934

- DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB (8 in) AND HAUNCH (1.5 in) WEIGHT OF 0.38 kips/ft FOR 9'-3 BEAM SPACING AND 0.36 kips/ft FOR 9'-0 BEAM SPACING AND ONE STEEL DIAPHRAGM (0.500 KIPS) AT 1/2 OF SPAN FOR BTDI10 TO BTDI20, AND THREE STEEL DIAPHRAGMS (0.500 KIPS) AT 1/4 POINTS OF SPAN FOR BTDI25 AND BTDI30. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.
- DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB. TOTAL BEAM DEFLECTIONS AT 1/2 OF SPAN, Δ₀, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE: Δ₀ = Δ_i + 2Δ_t FOR END SPANS OF CONTINUOUS BRIDGE.
- TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f'_s, f'_s = 270 ksi AND Δ₀ = 0.211 in.
- REQUIRES A 4000 psi, 28 DAY COMPRESSIVE STRENGTH FOR CAST-IN-PLACE SLAB CONCRETE.

BEAM NOTES:

MINIMUM CONCRETE f'c (AT 28 DAYS) AND MINIMUM f'ci AT RELEASE ARE LOCATED IN THE BTD BEAM DATA TABLE ABOVE. FOUR 0.60 IN. DIAMETER STRANDS STRESSED TO NOT MORE THAN 5000 LBS. EACH MAY BE USED IN LIEU OF BARS 5d1 AND 5d2 IN THE TOP FLANGE. THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 LBS 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 0.09 L MAXIMUM AT PRODUCERS' OPTION. ALL PRESTRESSING STRANDS EXCEPT LIFTING LOOP STRANDS SHALL BE 0.60 IN. NOMINAL DIAMETER (NOMINAL STEEL AREA = 0.217 in²) AND CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. MINIMUM STRAND BREAKING STRENGTH SHALL BE 58.6 KIPS. TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND INTENTIONALLY ROUGHENED TRANSVERSELY TO A FULL AMPLITUDE OF APPROXIMATELY 1/4" EXCEPT A 2 INCH WIDE FINISH SHALL BE PROVIDED ON THE TOP EDGE ON ONE SIDE ONLY OF THE BEAM. 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 PRESTRESSED 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. THE EXTERIOR SURFACES OF THE EXTERIOR (FASCIA) BEAM ENDS OVER THE PIER SHALL NOT BE ROUGHENED. UNLESS OTHERWISE NOTED ALL BEAMS ARE TO BE INCREASED IN LENGTH BY .0005L TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE. FOR TRANSPORTING, THE ALLOWABLE OVERHANG IS SHOWN IN THE LIFTING LOOP TABLE. THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE BEAMS DURING HANDLING, TRANSPORTING AND ERECTION BY PROVIDING TEMPORARY BRACING AS NEEDED. HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON BT30-SD2-04. IF THE PRECAST PANEL OPTION IS ALLOWED AND USED FOR BRIDGE DECK FORMATION, THE BEAM STIRRUPS WILL NEED TO BE EXTENDED AND TOP FLANGE BEAM FINISH SHALL BE MODIFIED AS PER DETAILS ON THE PRECAST DECK PANEL SHEET.

BENT BAR DETAILS



REINFORCING BAR LIST

BEAM	BTDI10		BTDI15		BTDI20		BTDI25		BTDI30		
	BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	
5d1	5d1	12	37'-9"	12	21'-4"	12	23'-10"	12	26'-4"	12	28'-10"
	5d2	6	40'-0"	12	40'-0"	12	40'-0"	12	40'-0"	12	40'-0"
	5b1	85	9'-4"	91	9'-4"	91	9'-4"	103	9'-4"	107	9'-4"
ΔΔ	5b2	85	5'-6"	91	5'-6"	91	5'-6"	103	5'-6"	107	5'-6"
	6b3	36	5'-9"	36	5'-9"	36	5'-9"	36	5'-9"	36	5'-9"
	6b4	20	5'-1"	20	5'-1"	20	5'-1"	24	5'-1"	24	5'-1"
4e1	4e1	139	2'-7"	145	2'-7"	151	2'-7"	163	2'-7"	169	2'-7"
	4d1	105	6'-5"	111	6'-5"	117	6'-5"	123	6'-5"	127	6'-5"
	4e1	26	3'-2"	26	3'-2"	26	3'-2"	26	3'-2"	26	3'-2"
4h1	4h1	6	8'-0"	6	8'-0"	6	8'-0"	6	8'-0"	6	8'-0"

ΔΔ 5b2 AND 6b3 BARS TO BE EPOXY COATED
* 6b3 AND 6b4 BARS TO BE USED IN PAIRS

LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER	
		STANDARD DESIGN - 30' ROADWAY, 2 SPAN BRIDGES PRETENSIONED PRESTRESSED BULB TEE CONCRETE BEAM BRIDGES
		ALL SPANS JULY, 2004
BTD BEAM DETAILS		BT30-DB1-04