STD42.DGN

DESIGN CRITERIA

3 1. DESIGN SPECIFICATIONS: AASHTO CURRENT EDITION WITH ADDENDA.

2. CONCRETE: 28 DAY COMPRESSION STRENGTH OF 5000 psi AND A MINIMUM RELEASE STRENGTH OF 4000 psi.

3. REINFORCING STEEL (FOR PANELS): ASTM A615, GRADE 40 OR 60.

4. PRESTRESSING STEEL: ASTM GRADE, HIGH STRENGTH, 7 WIRE UNCOATED, STRESS RELIEVED STRANDS WITH A MINIMUM INITIAL TENSION AS SHOWN BELOW. MAXIMUM STRAND SIZE SHALL BE ½" NOMINAL DIAMETER.

3 Ⓐ WHERE LOW RELAXATION STRANDS ARE USED, THE MAXIMUM ALLOWABLE INITIAL TENSION SHALL BE THAT FOR STRESS-RELIEVED STRANDS. HOWEVER THE LOWER STRESS LOSSES MAY BE ACCOUNTED FOR IN THE DESIGN.

STRAND SIZE	INITIAL TENSION (LB.)		MINIMUM PANEL THICKNESS
	Ⓐ GRADE 250K	Ⓐ GRADE 270K	
3/8" ø	13,982	16,141	3½"
7/16" ø	19,057	22,056	3½"
½" ø	25,165	28,936	4"

5. THE RATIO OF PANEL THICKNESS TO STRAND DIAMETER SHALL BE 8 OR GREATER.

4 6. THE DESIGN CHARTS ON THIS SHEET ARE APPLICABLE FOR BRIDGE DECKS WITH GIRDER SPACINGS WITHIN THE RANGE SHOWN. ALTERNATE DESIGNS FOR BRIDGE DECK SLABS MAY BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEERING DIRECTOR OF STRUCTURES FOR APPROVAL. EACH ALTERNATE DESIGN SHALL BE ACCOMPANIED BY A SET OF DESIGN CALCULATIONS AND DETAILS STAMPED BY AN ENGINEER REGISTERED IN TENNESSEE.

7. PANELS SHALL BE DESIGNED TO SUPPORT THE DEAD LOAD OF PANEL, REINFORCEMENT, PLASTIC CONCRETE AND A 100 LB. PER SQUARE FOOT CONSTRUCTION LOAD. THE PANEL AND SLAB SHALL BE DESIGNED TO SUPPORT THE DEAD LOAD OF THE PANEL, REINFORCEMENT, AND PLASTIC CONCRETE ACTING ON THE NON-COMPOSITE SECTION AND THE DESIGN LIVE LOADS AND DEAD LOAD ACTING ON THE COMPOSITE SECTION.

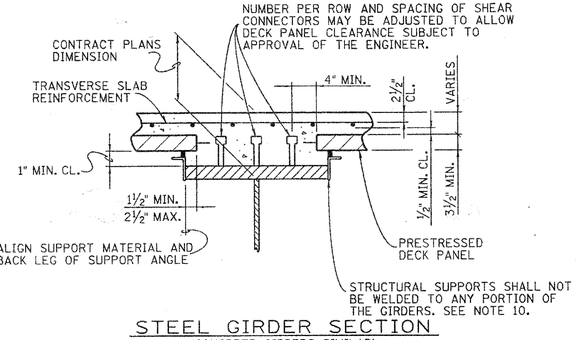
8. THE NON-COMPOSITE AND COMPOSITE DESIGN SPANS OF THE PRESTRESSED PANEL SHALL BE AS DEFINED BY THE 'DESIGN SPAN CONDITIONS' ON THIS DRAWING. THE CLEAR SPAN 'S' IS THE CLEAR DISTANCE BETWEEN BEAMS.

5 9. THE MAXIMUM INCREASE IN SLAB THICKNESS DUE TO THE USE OF PRESTRESSED PANELS SHALL BE 1½ INCHES. WHEN PRESTRESSED DECK PANELS ARE USED, THE CONTRACTOR SHALL PROVIDE SUPPLEMENTAL REINFORCING, ADDITIONAL REINFORCING TIES AND TEMPORARY OR PERMANENT ERECTION DIAPHRAGMS AS REQUIRED BY SPECIFICATIONS AND STANDARD DWG. STD-4-4. IT IS THE CONTRACTORS RESPONSIBILITY TO INSURE THAT THE PRESTRESSED PANELS WILL FIT BETWEEN THE ERECTED GIRDERS SUCH THAT THE PANEL OVERHANG LIMITS GIVEN ON STANDARD DWG. STD-4-1 AND THIS SHEET ARE MAINTAINED. PANELS WHICH DO NOT FIT MUST BE REPLACED AT THE CONTRACTORS EXPENSE.

4 1 10. FOR BRIDGES:
PANELS SHALL BE TEMPORARILY SUPPORTED ON 1 INCH WIDE BY ½ INCH THICK BITUMINOUS FIBER OR ELASTOMERIC MATERIAL. THE PERMANENT SUPPORT OF THE PANELS SHALL BE PROVIDED BY THE BRIDGE DECK CONCRETE POURED UNDER THE PANEL END OVERHANGING THE BITUMINOUS STRIP. THE PROPER DECK PROFILE SHALL BE PROVIDED BY UTILIZING A SUPPORT SYSTEM AS SHOWN ON THIS SHEET. STRIPS SHALL BE GLUED TO THE SUPPORT BRACKETS. PANELS SHALL BE FULLY SUPPORTED AT EACH END WHERE THE PRESTRESSING STRANDS PROJECT FROM THE PANELS. WELDING TO THE BRIDGE GIRDERS WILL NOT BE PERMITTED.

2 11. BITUMINOUS FIBER MATERIAL SHALL BE PREFORMED EXPANSION JOINT FILLER OF NON EXTRUDING AND RESILIANT BITUMINOUS TYPES CONFORMING TO AASHTO M123 OR ASTM D1751.

12. ELASTOMERIC MATERIAL SHALL BE 50 DUROMETER ELASTOMERIC CONFORMING TO AASHTO M 251 AND SECTION 18.2 DIVISION II OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.



STEEL GIRDER SECTION
(CONCRETE GIRDERS SIMILAR)

4 1 NOTE: DECK PANELS MUST CLEAR SHEAR CONNECTORS, SPLICE PLATES AND HIGH STRENGTH BOLTS. NOTCHES IN PANELS WILL NOT BE PERMITTED. A MINIMUM OF 3½ INCHES CLEAR DISTANCE BETWEEN PANEL ENDS MUST BE MAINTAINED.

7

6 MAXIMUM AND MINIMUM CLEAR SPAN "S"

APPLICABLE TO CONCRETE GIRDERS EXCEPT BULB-TEE BEAMS

SLAB THICKNESS (INCHES)	STRAND SPACING (INCHES)	PANEL THICKNESS (INCHES)	STRAND SIZE AND TYPE											
			3/8" ø				7/16" ø				½" ø			
			250K		270K		250K		270K		250K		270K	
			MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'
8¼"	3"	3½"	3'-4"	8'-9"	3'-2"	8'-9"	3'-1"	8'-9"	3'-2"	8'-0"	NA	NA	NA	NA
	6"	3½"	5'-2"	6'-7"	5'-0"	7'-2"	4'-8"	7'-10"	4'-6"	8'-7"	NA	NA	NA	NA
	9"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	5'-11"	6'-3"	5'-8"	6'-10"	NA	NA	NA	NA
	12"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	NA	NA	NA	NA
8½"	3"	3½"	3'-5"	9'-6"	3'-4"	9'-6"	3'-3"	9'-1"	3'-4"	7'-11"	NA	NA	NA	NA
		4"	3'-1"	9'-6"	2'-11"	9'-6"	2'-9"	9'-6"	2'-8"	9'-6"	2'-7"	9'-4"	2'-9"	7'-7"
	6"	3½"	5'-3"	6'-8"	5'-1"	7'-4"	4'-10"	7'-11"	4'-8"	8'-8"	NA	NA	NA	NA
		4"	5'-5"	6'-9"	5'-2"	7'-5"	4'-9"	8'-0"	4'-6"	8'-10"	4'-2"	9'-4"	4'-0"	9'-6"
	9"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-0"	6'-4"	5'-9"	6'-11"	NA	NA	NA	NA
		4"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-3"	6'-5"	5'-11"	7'-0"	5'-8"	7'-5"	5'-4"	8'-2"
	12"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	NA	NA	NA	NA
		4"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-5"	7'-0"
8¾"	3"	3½"	3'-7"	9'-8"	3'-6"	9'-10"	3'-5"	9'-1"	3'-6"	7'-11"	NA	NA	NA	NA
		4"	3'-3"	10'-0"	3'-1"	10'-3"	2'-11"	10'-3"	2'-10"	10'-1"	2'-10"	9'-3"	3'-0"	7'-7"
	6"	3½"	5'-5"	6'-10"	5'-2"	7'-5"	4'-11"	8'-0"	4'-9"	8'-10"	NA	NA	NA	NA
		4"	5'-7"	6'-11"	5'-3"	7'-6"	4'-11"	8'-2"	4'-8"	9'-0"	4'-5"	9'-6"	4'-2"	10'-5"
	9"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-0"	6'-6"	5'-10"	7'-1"	NA	NA	NA	NA
		4"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-4"	6'-7"	6'-1"	7'-2"	5'-9"	7'-7"	5'-6"	8'-4"
	12"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	NA	NA	NA	NA
		4"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-6"	7'-2"
9"	3"	3½"	3'-9"	9'-7"	3'-8"	9'-9"	3'-7"	9'-0"	3'-8"	7'-10"	NA	NA	NA	NA
		4"	3'-5"	10'-2"	3'-3"	10'-9"	3'-1"	10'-9"	3'-0"	10'-0"	3'-0"	9'-2"	3'-2"	7'-6"
	6"	3½"	5'-6"	6'-11"	5'-3"	7'-6"	5'-1"	8'-1"	4'-11"	8'-10"	NA	NA	NA	NA
		4"	5'-8"	7'-0"	5'-4"	7'-8"	5'-1"	8'-3"	4'-9"	9'-1"	4'-6"	9'-7"	4'-4"	10'-6"
	9"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-1"	6'-7"	5'-11"	7'-2"	NA	NA	NA	NA
		4"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-5"	6'-8"	6'-2"	7'-4"	5'-11"	7'-9"	5'-7"	8'-5"
	12"	3½"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	NA	NA	NA	NA
		4"	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	Ⓐ	6'-7"	7'-3"

Ⓐ DENOTES INSUFFICIENT ULTIMATE MOMENT OR CRACKING MOMENT CAPACITY.
NA-DENOTES "NOT ALLOWED". SEE DESIGN CRITERIA NOTE 4 THIS SHEET.

PROJECT NO.	YEAR	SHEET NO.
	1992	

REVISIONS

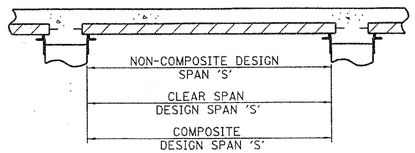
	NO.	DATE	BY	BRIEF DESCRIPTION
M/R	1	10-26-92	MAH	REARRANGED DETAILS AND NOTES ON STD-4-SERIES. REVISED NOTE 10 AND DETAIL W.
M/R	2	2-15-93	MAH	REVISED NOTE 11
M/R	3	10-25-93	MAH	REVISED DIMENSION ℄ GENERAL REVISION
M/R	4	11-7-94	MAH	REVISED MINIMUM CLEAR DIMENSION
M/R	5	5-1-95	MAH	ADDED ALT. ANGLE SUPPORT DETAIL
M/R	6	6-10-96	MAH	DELETED SUPPORT MATERIAL DESIGN CHART AND ADDED MAXIMUM ℄ MINIMUM CLEAR SPAN TABLE; REV. NOTE 9 ℄ 10
M/R	7	4-8-05	JHW	DELETED USE ON CULVERTS

TABLE OF DESIGN CRITERIA

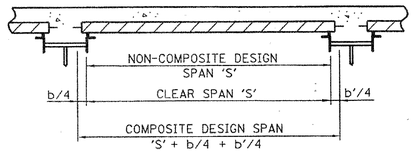
LOADING STAGES	APPLIED LOADS (SEE NOTE 6)	STRAND LOSSES (psi)	ALLOW. COMP. (psi)	ALLOW. TENSION (psi)	SECTION	PANEL DESIGN SPAN
AT RELEASE	PRESTRESS PLUS DEAD LOAD PANEL	20,000	0.60 f'ci 2,400	3.35 √f'ci 212	NON-COMPOSITE	SEE DETAILS THIS SHEET
INTERMEDIATE	ADD PLASTIC CONC. ℄ 100 LB. CONST. LOAD	45,000	0.48 f'c 2,400	3 √f'c 212	NON-COMPOSITE	
FINAL	REMOVE CONST. LOAD, ADD WEARING SURFACE, DEAD LOAD AND/OR LIVE LOAD	45,000	0.40 f'c 2,000	3 √f'c 212	COMPOSITE	

THE STRESS LIMIT IN THE PRESTRESSING STEEL AS SHOWN IN AASHTO ARTICLE 9.17.4.2 SHALL BE MODIFIED IN ACCORDANCE WITH THE FHWA'S OCTOBER 1988 MEMORANDUM AS FOLLOWS:

6 $\frac{*}{fsu} = \frac{fx}{1.6D} + \frac{2}{3} fse$

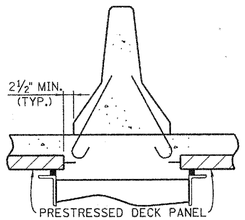


3 CONCRETE GIRDERS

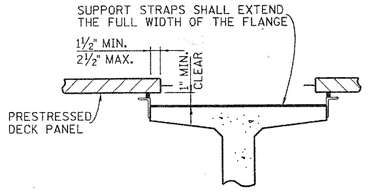


STEEL GIRDERS
(AND BULB-TEE BEAMS)

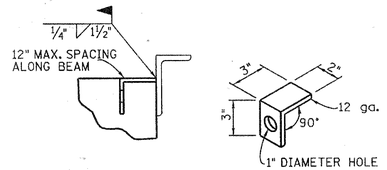
DESIGN SPAN CONDITIONS
DESIGN SPANS FOR PANELS



3 DECK PANEL AT MEDIAN BARRIER
NOTE: DECK PANELS ARE NOT PERMITTED UNDERNEATH THE MEDIAN BARRIER.



3 ANGLE SUPPORT DETAIL



5 ALTERNATE ANGLE SUPPORT DETAIL
SHOWING SUGGESTED DIMENSIONS FOR CONCRETE INSERTS

THE CONTRACTOR MAY SUBMIT AN ALTERNATE ANGLE SUPPORT DETAIL FOR APPROVAL. THE DESIGN OF THE PRESTRESSED PANEL SUPPORT SYSTEM IS THE RESPONSIBILITY OF THE CONTRACTOR.

M/R MINOR REVISION - FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD PRECAST PRESTRESSED BRIDGE DECK PANELS DESIGN CRITERIA 1992

DESIGNED BY M.A.H. DATE
DRAWN BY K.D.F. DATE
SUPERVISED BY M.A.H. DATE
CHECKED BY DATE

CORRECT Edward P. Wasserman
ENGINEER OF STRUCTURES

SHEET 2 OF 4
STD-4-2