

PROJECT NO.	YEAR	SHEET NO.	
	1996		
REVISIONS			
NO.	DATE	BY	BRIEF DESCRIPTION
1	6-10-96	BRB	NEW METRIC STANDARD
2	4-8-05	JHW	DELETED USE ON CULVERTS

MAXIMUM AND MINIMUM CLEAR SPAN "S"
 APPLICABLE TO CONCRETE GIRDERS EXCEPT BULB-TEE BEAMS

SLAB THICKNESS (mm)	STRAND SPACING (mm)	PANEL THICKNESS (mm)	STRAND SIZE AND TYPE											
			10 mm ϕ				11 mm ϕ				13 mm ϕ			
			1724 MPa	1862 MPa	1724 MPa	1862 MPa	1724 MPa	1862 MPa	1724 MPa	1862 MPa	1724 MPa	1862 MPa	1724 MPa	1862 MPa
MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	MIN. 'S'	MAX. 'S'	
210	75	90	1016	2667	965	2667	940	2667	965	2438	NA	NA	NA	NA
	150	90	1575	2007	1524	2185	1422	2388	1372	2616	NA	NA	NA	NA
	225	90	(A)	(A)	(A)	(A)	1803	1905	1727	2083	NA	NA	NA	NA
	300	90	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	NA	NA	NA	NA
215	75	90	1041	2896	1016	2896	991	2769	1016	2413	NA	NA	NA	NA
	150	90	1600	2032	1549	2235	1473	2413	1422	2642	NA	NA	NA	NA
	225	90	(A)	(A)	(A)	(A)	1829	1930	1753	2108	NA	NA	NA	NA
	300	90	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	NA	NA	NA	NA
225	75	90	1092	2946	1067	2997	1041	2769	1067	2413	NA	NA	NA	NA
	150	90	1651	2083	1575	2261	1499	2438	1448	2692	NA	NA	NA	NA
	225	90	(A)	(A)	(A)	(A)	1829	1981	1778	2159	NA	NA	NA	NA
	300	90	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	NA	NA	NA	NA
230	75	90	1143	2921	1118	2972	1092	2743	1118	2388	NA	NA	NA	NA
	150	90	1676	2108	1600	2286	1549	2464	1499	2692	NA	NA	NA	NA
	225	90	(A)	(A)	(A)	(A)	1854	2007	1803	2184	NA	NA	NA	NA
	300	90	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	NA	NA	NA	NA

DESIGN CRITERIA

- DESIGN SPECIFICATIONS: AASHTO CURRENT EDITION WITH ADDENDA.
- CONCRETE: 28 DAY COMPRESSION STRENGTH OF 35 MPa (f'c) AND A MINIMUM RELEASE STRENGTH OF 28 MPa (f'ci).
- REINFORCING STEEL (FOR PANELS): AASHTO M31M, GRADE 300 OR 400.
- 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 13 mm NOMINAL DIAMETER.

(A) 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 (N)		MINIMUM PANEL THICKNESS
	(A) GRADE 1724 MPa	(A) GRADE 1862 MPa	
10 mm ϕ	66100	71500	90
11 mm ϕ	89500	96700	90
13 mm ϕ	119100	128700	100

- THE RATIO OF PANEL THICKNESS TO STRAND DIAMETER SHALL BE 8 OR GREATER.
- 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.
- PANELS SHALL BE DESIGNED TO SUPPORT THE DEAD LOAD OF PANEL, REINFORCEMENT, PLASTIC CONCRETE AND A 4.788 kPa 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.
- 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.
- THE MAXIMUM INCREASE IN SLAB THICKNESS DUE TO THE USE OF PRESTRESSED PANELS SHALL BE 40 mm. 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 CONTRACTOR'S 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 CONTRACTOR'S EXPENSE.
- FOR BRIDGES: PANELS SHALL BE TEMPORARILY SUPPORTED ON 25 mm WIDE BY 13 mm 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.

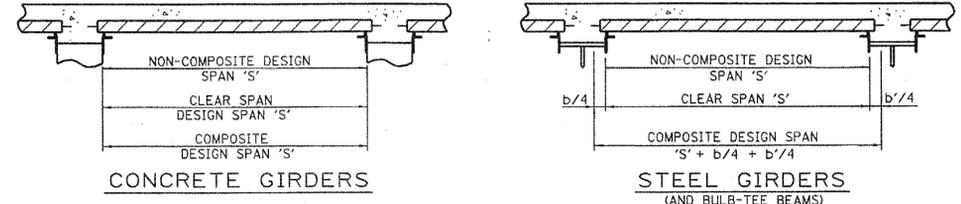
TABLE OF DESIGN CRITERIA

LOADING STAGES	APPLIED LOADS (SEE NOTE 6)	STRAND LOSSES (kPa)	ALLOW. COMP (kPa)	ALLOW. TENSION (kPa)	SECTION	PANEL DESIGN SPAN
AT RELEASE	PRESTRESS PLUS DEAD LOAD PANEL	137900	0.60 f'ci 16800	8.80 $\sqrt{f'ci}$ 1470	NON-COMPOSITE	SEE DETAILS THIS SHEET
INTERMEDIATE	ADD PLASTIC CONC. & 4.788 kPa CONST. LOAD	310300	0.48 f'c 16800	7.88 $\sqrt{f'c}$ 1470	NON-COMPOSITE	
FINAL	REMOVE CONST. LOAD, ADD WEARING SURFACE, DEAD LOAD AND/OR LIVE LOAD	310300	0.40 f'c 14000	7.88 $\sqrt{f'c}$ 1470	COMPOSITE	

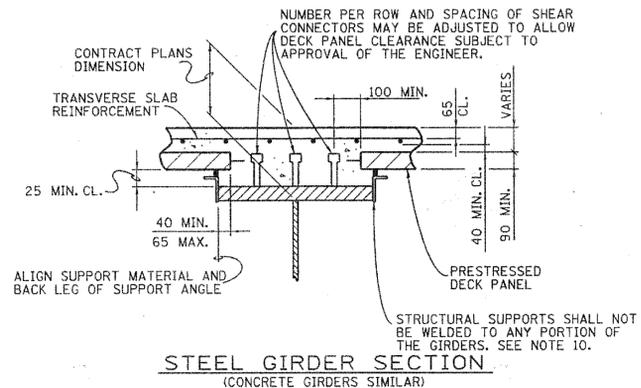
THE STRESS LIMIT IN THE PRESTRESSING STEEL AS SHOWN IN AASHTO ARTICLE 9.17.4.2 SHALL BE MODIFIED IN ACCORDANCE WITH THE FHWA'S OCTOBER 1988 MEMORANDUM AS FOLLOWS:
 $f_{su} = \frac{4.3f_y + 2}{3} f_{se}$

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

- BITUMINOUS FIBER MATERIAL SHALL BE PREFORMED EXPANSION JOINT FILLER OF NON EXTRUDING AND RESILIENT BITUMINOUS TYPES CONFORMING TO AASHTO M123 OR ASTM D1751.
- ELASTOMERIC MATERIAL SHALL BE 50 DUROMETER ELASTOMERIC CONFORMING TO AASHTO M251 AND SECTION 18.2 DIVISION II OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.

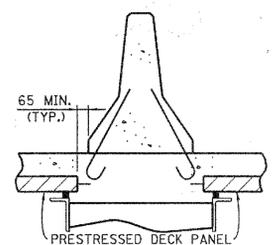


DESIGN SPAN CONDITIONS
 DESIGN SPANS FOR PANELS

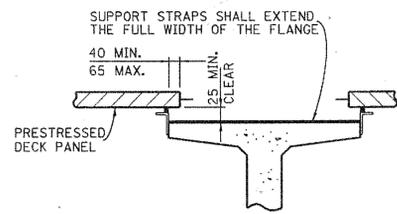


STEEL GIRDER SECTION
 (CONCRETE GIRDERS SIMILAR)

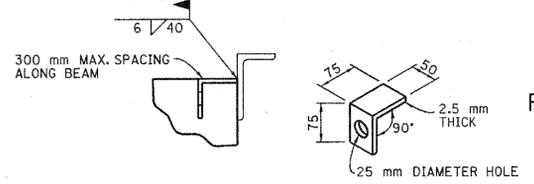
NOTE: DECK PANELS MUST CLEAR SHEAR CONNECTORS, SPLICE PLATES AND HIGH STRENGTH BOLTS. NOTCHES IN PANELS WILL NOT BE PERMITTED. A MINIMUM OF 90 mm CLEAR DISTANCE BETWEEN PANEL ENDS MUST BE MAINTAINED.



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



ANGLE SUPPORT DETAIL



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.

ALL UNITS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

MINOR REVISION - FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
STANDARD PRECAST PRESTRESSED BRIDGE DECK PANELS DESIGN CRITERIA 1996

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