



# PennDOT District 5-0 Bridge Load Rating and Analysis

BMS No.: 48 7208 0684 9041

Type: Two Span Simply Supported Encased I-Beam

Description: Little Creek Road over Little Martins Creek

Pennoni Associates Inc. December 14, 2015



By: JMF
Checked: MDR
Sheet: 1

Date: 11/24/15
Date: 12/8/15
of: 1

# PennDOT District 5-0 Bridge Load Rating and Analysis

BMS No.: 48 7208 0684 9041

Type: Two Span Simply Supported Encased I-Beam
Description: Little Creek Road over Little Martins Creek

# **Rating Summary**

Method of Analysis: LRFR

Program(s) Used: STLRFD, Version 2.3.0.0

Doom	Tuno	Rating Factor		To	ons	Controlling	Limit Ctata
Beam	Туре	Inv	Ор	Inv	Ор	Location	Limit State
	H20	1.07	1.39	21.4	27.8	21'	Str I/II
Exterior	HS20	0.81	1.05	29.2	37.9	18.9'	Str I/II
Exte	ML80	0.63	0.82	23.2	30.1	21'	Str I/II
	TK527	0.68	0.88	27.2	35.3	21'	Str I/II
	H20	1.26	1.63	25.2	32.7	21'	Str I/II
Interior	HS20	0.95	1.24	34.3	44.5	18.9'	Str I/II
Inte	ML80	0.75	0.97	27.3	35.4	21'	Str I/II
	TK527	0.80	1.04	32.0	41.5	21'	Str I/II
<i>p</i> 0	H20	1.07	1.39	21.4	27.8	Ext 21'	Str I/II
iii iii	HS20	0.81	1.05	29.2	37.9	Ext 18.9'	Str I/II
Controlling	ML80	0.63	0.82	23.2	30.1	Ext 21'	Str I/II
ŭ	TK527	0.68	0.88	27.2	35.3	Ext 21'	Str I/II

# **Rating Summary**

Notes: No plans or field measurements were available for this load rating analysis;

therefore, the previous LFD Load Rating Analysis by STV (attached for

reference) was used in lieu of plans.

Warnings in the STLRFD output files are due to changing design standards and

do not affect the ratings. Input files accurately reflect the existing condition of

the structure.

Rating Assumptions: ADTT is not available and assumed to be 100.

References: AASHTO LRFD Bridge Design Specifications

**AASHTO Manual for Bridge Evaluation** 

**AASHTO Standard Specifications for Highway Bridges** 

PennDOT Design Manual Part 4

PennDOT Bridge Safety Inspection Manual (Pub 238) Previous LFD Load Rating Analysis (9/23/2013) Program Title LRFD Steel Girder Design and Rating

Program Name Version 2.3.0.0 Last Updated 07/24/2014 Documentation 07/2014 License No. 333529

9041 EXTERIOR BEAM BMS NO.: 48 7208 0684 9041

FEATURE CARRIED: LITTLE CREEK ROAD

FEATURE INTERSECTED: LITTLE MARTINS CREEK

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12/14/2015 08:36:14

## 9041 EXTERIOR BEAM

INPUT

%WARNING - <Input Post Processor>: The specified yield strength of the web should be greater than the maximum of 36 ksi or 70 percent of the specified yield strength of the higher strength flange. (LRFD 6.10.1.3)

For Material ID No. 1:
Web yield of 33. ksi is less than 36. ksi

1 warning was issued.

- Please verify that the input is correct. - The program will continue running.

#### CONTROL PARAMETERS

Design/ Type of Beam Exterior/ No. No. Deck Pour Interior Beams Spans Symmetry Symmetry Analysis ANALYSIS ROLLED BEAM EXTERIOR NO

Single Multiple Fatigue Presence Live Load Dynamic Load Dynamic Load Traffic Neg. Lane ADTT Adj. Factor Code Allowance Allowance Factor Moments 1.330 1.150 100 1.000 Α 1.200 NO

Constant Impor. Duct. Redun. Redundant Analysis P-82 Dynamic Skew Angle Lateral Factor Factor Factor Load Path Points Load Allowance Designation Bending Stress 1.000 1.000 1.000 R 2 1.200 0.00

\*NOTE: Since this input file uses the COMPUTED DISTRIBUTION FACTOR command, the skew angle designation is set via the CDF command.

#### BEAM GEOMETRY

#### Number of Deflection Ream/ Stringer Deck Staggered Design Distribution Spacing Overhang Diaphragms Lanes (ft) (ft) 0.775 3.350 NO 0.250

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9041 EXTERIOR BEAM

INPUT (cont.)

COMPUTED DISTRIBUTION FACTORS

Skew Design Ang. Brace Lane Girder Distance Distance Spacing (ft) Desn. Type Width (ft) 12.000 6.000 4.000

> Centerline Distance to Girder Outermost to Curb Wheel (ft) -0.475 (ft) -2.475

> > SKEW ANGLES

Support Angle (deg) 30.000 30.000 Apply skew

SPAN LENGTHS

Span No. 1 Length (ft) 42.000

MATERIAL PROPERTIES

Matl.				Cover	Plate
ID	Noncomposite/	Rolled	Beam	Top	Bottom
No.	Composite	Fy	Fu	Fy	Fy
		(ksi)	(ksi)	(ksi)	(ksi)
1	NONCOMPOSITE	33.0	60.0	36.0	36.0

ROLLED BEAM DIMENSIONS, PART 1 of 2

Nominal Nominal Moment of Designation Depth Weight Inertia (in) (lbm/ft) (in^4) (in^2) W27X90 27 90 2958. 26.34

ROLLED BEAM DIMENSIONS, PART 2 of 2

	Flange	Flange	Beam	Web	Distance
Designation	Width	Thickness	Depth	Thickness	"k"
_	(in)	(in)	(in)	(in)	(in)
W27X90	9.000	0.7075	27.000	0.5240	1.3600

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9041 EXTERIOR BEAM

INPUT (cont.)

ROLLED BEAM PROPERTIES, PART 1 of 2

LH

End Matl. 0 0 Top Cover Span Span ID S L Beam Plate
No. Dist.\* No. S E Designat. Width Thick. Plate Width Thick. Span (in) (ft) (in) (in) (in) (ft) (in) (in) 1 42.000 1 W 27x 90 0.0000 0.0000 0.0000 0.0000

\* The properties given on each line of this table are for the range of the beam to the LEFT of the span and the distance given.

ROLLED BEAM PROPERTIES, PART 2 of 2

End End Deck Span Span No. Dist.\* Haunch Reinf C.G. Depth Area (in^2/ft) (ft) (in) 42.000 0.000 0.000 0.000

\* The properties given on each line of this table are for the range of the beam to the LEFT of the span and the distance given.

SLAB PROPERTIES, PART 1 OF 2

Deck Slab Thickness Concrete Density Reinforcement Concrete Actual Effective Strength Loads Ec (lbf/ft^3) (lbf/ft^3) Strength (in) 11.500 (in) (ksi) 12.000 2.500 150.00 145.00 33.

SLAB PROPERTIES, PART 2 OF 2

Transverse Development Reinforcement Length Factor Modular Ratio E (ksi) Size for Slabs 10.000 1.000

DISTRIBUTED LOADS (DC2)

Start Span End Span Start No. Dist. No. Dist. Magnitude Magnitude (ft) (ft) 0.000 1 42.000 (kips/ft) (kips/ft) 0.103 0.103

DISTRIBUTED LOADS (DC1S)

Start Span End Span Start No. Dist. No. Dist. Magnitude Magnitude (kips/ft) (kips/ft) 0.000 1 42.000 0.518

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9041 EXTERIOR BEAM

INPUT (cont.)

WIND USER DEFINED

Additional	Cons	truction	Permanent		
Wind Cross	Load	Wind	Load	Wind	
Section	Path	Pressure	Path	Pressure	
(in)		(ksf)		(ksf)	
0.000	L	0.000	L	0.000	

#### BRACE POINTS

		DIGHCH I	OINID	
Start	Start	End	End	
Span	Span	Span	Span	Brace
No.	Dist.	No.	Dist.	Spacing
	(ft)		(ft)	(ft)
1	0.000	1	42.000	21.000

CONTINUOUS BRACE

Continuously Braced Span Numbers 1

SYSTEM SETTINGS

Steel Construction Weight Modular Ratio (lbf/ft^3) 490.00 14.000 LRFD Steel Girder Design and Rating, Version 2.3.0.0 PAGE 6
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9041	EXTERIOR	BEAM	

ANALYSIS

LOAD F	ACTORS	AND	COMBINATIONS
--------	--------	-----	--------------

Limit								
State	DC1	DC2	FWS	LL	PL	WND	MC1	MC2
STR-I	1.25	1.25	1.50	1.75	0.00	0.00	1.25	1.25
STR-IA	1.25	1.25	1.50	1.35	0.00	0.00	1.25	1.25
STR-II	1.25	1.25	1.50	1.35	0.00	0.00	1.25	1.25
STR-III	1.25	1.25	1.50	0.00	0.00	1.40	1.25	1.25
STR-IV	1.50	1.50	1.50	0.00	0.00	0.00	1.50	1.50
STR-V	1.25	1.25	1.50	1.35	0.00	0.40	1.25	1.25
SERV-I	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
SERV-II	1.00	1.00	1.00	1.30	0.00	0.00	1.00	1.00
SERV-IIA	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
SERV-IIB	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
FATG-I	1.00	1.00	1.00	1.80	0.00	0.00	1.00	1.00
FATG-II	1.00	1.00	1.00	0.90	0.00	0.00	1.00	1.00
DEFL	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
CONSTR	1.25	1.25	1.50	1.50	0.00	1.25	1.25	1.25

### LIVE LOADING SUMMARY

Limit State	Design/Analysis Loading	Rating Loading	Rating Loading	Rating Loading	Rating Loading
STR-I	PHL-93	ML-80	HS20	H20	TK527
STR-IA	PHL-93				
STR-II	P-82	ML-80	HS20	H20	TK527
STR-III					
STR-IV					
STR-V	PHL-93				
SERV-I	PHL-93				
SERV-II	PHL-93	ML-80	HS20	H20	TK527
SERV-IIA	PHL-93	ML-80	HS20	H20	TK527
SERV-IIB	P-82				
FATG-I	FATIGUE				
FATG-II	FATIGUE				
DEFL	DEFLECT				

## LOAD MODIFIER

Importance	Ductility	Redundancy		Load	Load
Factor Ni	Factor Nd	Factor Nr	Calculated Ni*Nd*Nr	Modifier Used	Modifier Used
1.00	1.00	1.00	1.000	1.000	1.000

#### RESISTANCE FACTORS

					Shear	
		Axial	Bearing	Shear	on Fillet	Web
Flexure	Shear	Compression	on Pins	Connector	Weld Throat	Crippling
1.00	1.00	0.90	1.00	0.85	0.80	0.80

LRFD Steel Girder Design and Rating, Version 2.3.0.0 12/14/2015 08:36:14 Input File: 041 Ext.dat 12/14/2015 08:36:14 9041 EXTERIOR BEAM ANALYSIS (cont.) DISTRIBUTION FACTORS FOR DESIGN LIVE LOADING (LANE FRACTION, INCL. SKEW) \*\* - Cross-frame action controls NOTE: The value in parentheses is the number of lanes loaded to produce the controlling live load distribution factor.
The shear distribution factor reported include the Shear Skew Correction factors. DISTRIBUTION FACTORS FOR FATIGUE VEHICLE (LANE FRACTION, INCL. SKEW) 
 Moment
 Shear
 Code

 DF1
 DF2
 DF1
 DF2
 Deflection
 Check\*

 0.280
 0.000
 0.429
 0.280
 1.000
 A
 Span No. NOTE: The shear distribution factors reported include the Shear Skew Correction factors. \* Legend of code checks: A. Beam spacing is outside the range of applicability
B. Slab thickness is outside the range of applicability
C. Span length is outside the range of applicability D. Number of beams is less than the lower bound of applicability E. Longitudinal stiffness parameter is outside range of applicability F. Skew angle is outside the range of applicability G. Distance from exterior web to curb (de) is outside the range of applicability %WARNING: \*\*THIS MUST BE APPROVED BY CHIEF BRIDGE ENGINEER\*\* SHEAR SKEW CORRECTION FACTORS Span No. LEFT RIGHT 1 1.531 DISTRIBUTION FACTORS FOR DESIGN LIVE LOAD REACTIONS

	Rea	ction	Rotation
Support	Distr	ibution	Distribution
No.	Factor	Comment*	Factor
1	0.515	A	0.337
2	0.337		0.337

DISTRIBUTION FACTORS FOR FATIGUE LIVE LOAD REACTIONS

	Rea	ction	Rotation
Support	Distr	ibution	Distributio
No.	Factor	Comment*	Factor
1	0.429	A	0.280
2	0.280		0.280

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9041 EXTERIOR BEAM ANALYSIS (cont.)

# DISTRIBUTION FACTORS FOR FATIGUE LIVE LOAD REACTIONS (cont.)

- \* Legend of Comments:
  - A. The distribution factor reported includes the Shear Skew Correction factor.
  - B. Shear Skew Correction factor applied to abutments at both ends. Not compatible with DM-4. Refer to DM-4 Article 4.6.2.2.3C.

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9041 EXTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

												factored		
										Flexu	ıral 1	Flex+Lat		
Span			Limit		Inte			lculat:		Resist		Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Aq*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)			. 5	(kip-ft)	(ksi)	(ksi)		
1	0.000	TOP	STR-I	POS.	2.2		1.000	1 000	N/A	602.6	-33.0	0.0	D	
-	0.000	101	STR-IA		2.2			1.000		602.6	-33.0	0.0	D	
			STR-II	POS.			1.000		N/A	602.6	-33.0	0.0	D	
			STR-III		2.2		1.000		N/A	602.6	-33.0	0.0	D	
			STR-IV	POS.	2.2		1.000		N/A	602.6	-33.0	0.0	D	
			STR-V	POS.	2.2		1.000		N/A	602.6	-33.0	0.0	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	0.0	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-IV		2.2		1.000		N/A	602.6	33.0	0.0	J	
			STR-V	POS.	2.2		1.000		N/A	602.6	33.0	0.0	J	
			SIK-V	PUS.	2.2	12.0	1.000	IV / PA	N/A	602.6	33.0	0.0	U	
1	2.100	TOP	STR-I	POS.	2.2		1.000		N/A	602.6	-33.0	-9.0	D	
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-7.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-8.7	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-3.1	D	
			STR-IV				1.000		N/A	602.6	-33.0	-3.7	D	
			STR-V	POS.	2.2		1.000		N/A	602.6	-33.0	-7.7	D	
		DOT	STR-I	POS.	2.2			N/A	N/A	602.6	33.0	9.0	J	
		DOI		POS.	2.2		1.000	N/A		602.6	33.0	7.7	J	
									N/A					
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0	8.7	J	
			STR-III		2.2		1.000		N/A	602.6	33.0	3.1	J	
			STR-IV	POS.	2.2		1.000	N/A	N/A	602.6	33.0	3.7	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	7.7	J	
1	4.200	TOP	STR-I	POS.	2.2	12 8	1.000	1 000	N/A	602.6	-33.0	-17.1	D	
-	4.200	101	STR-IA	POS.	2.2		1.000		N/A	602.6	-33.0	-14.5	D	
			STR-IA	POS.			1.000		N/A	602.6	-33.0	-14.3	D	
			STR-III				1.000		N/A	602.6	-33.0	-5.9	D	
			STR-IV				1.000		N/A	602.6	-33.0	-7.0	D	
			STR-V	POS.	2.2		1.000		N/A	602.6	-33.0	-14.5	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	17.1	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.3	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	5.9	J	
			STR-IV	POS.	2.2		1.000	N/A	N/A	602.6	33.0	7.0	J	
			STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0	14.5	J	
									/-				_	
1	6.300	TOP	STR-I	POS.	2.2		1.000		N/A	602.6	-33.0	-24.2	D	
			STR-IA	POS.	2.2		1.000		N/A	602.6	-33.0	-20.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-22.7	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-8.3	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-10.0	D	
			STR-V	POS.	2.2			1.000	N/A	602.6	-33.0	-20.5	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	24.2	J	
		201	01111	200.	2.2	12.0	1.500	1.771	11/11	002.0	55.0	21.2	-	

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

Span			Limit		Inte	rmedi	ate Cai	lculat:	ions	Flex	ıral	Factored Flex+Lat Stress		Code
No.	Dist.	T/B	State	Flex.	rt.*	Dc*	Rh*	Rb*	An/Aa*	Mr(e)*	Fr	F+* (ksi) 0 20.5 0 22.7	Calc.**	Chk**
1	6.300	BOT	STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 20.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 22.7	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.	0 8.3	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 10.0	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 20.5	J	
1	8.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -30.3	D	
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -25.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6 602.6 602.6	-33.	0 -28.2	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -10.4	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -12.5	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -25.7	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 30.3	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6 602.6	33.	0 25.7	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 28.2	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.	0 10.4	J	
			STR-IV STR-V	POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6	33.	0 12.5 0 25.7	J J	
1	10.500	TOP	STR-T	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -35.4	D	A
_			STR-TA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -30.1	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -30.1 0 -32.8 0 -12.2 0 -14.7	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -12.2	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -14.7	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -30.1	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.	0 35.4	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.	0 30.1	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 32.8	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.	0 12.2	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 14.7	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 30.1	J	
1	12.600	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -39.5 0 -33.6	D	A
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -33.6	D	A
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -37.0	D	A
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -13.7	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -16.4	D	
		DOE	STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.	0 -33.6	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 39.5	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 33.6 0 37.0	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 37.0 0 13.7	J	A
			STK-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.	0 13.7	J J	
			PIK-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.	0 16.4	J	70
			91K-A	PUS.	2.2	1∠.8	1.000	N/A	N/A	602.6	33.	0 33.6	J	A

1 14.700 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A 602.6 -33.0 -42.7 D A

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												actored		
Span			Limit		Into	rmodi:	ato Ca	lculati	ona	Resist		Flex+Lat	Resist.	Codo
	Dist.	T/B	State	Flex.	rt.*		Rh*			Mr(e)*		F+*	Calc. **	
110.	(ft)	-,-	Deace	1 10111	(in)	(in)	1111	100		(kip-ft)		(ksi)	caro.	CILL
1	14.700	TOP	STR-IA	POS.	2.2	12.8	1.000	1.000		602.6	-33.0	-36.3	D	A
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-40.1	D	A
			STR-III				1.000		N/A	602.6	-33.0	-14.8	D	
			STR-IV	POS.			1.000		N/A	602.6	-33.0	-17.8	D	
			STR-V	POS.			1.000		N/A	602.6		-36.3	D	A
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0	42.7	J	A
			STR-IA STR-II	POS.	2.2		1.000		N/A N/A	602.6 602.6	33.0	36.3 40.1	J J	A A
			STR-II		2.2		1.000		N/A	602.6	33.0	14.8	J	A
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	17.8	J	
			STR-V	POS.	2.2		1.000		N/A	602.6	33.0	36.3	J	A
								,	,					
1	16.800	TOP	STR-I	POS.	2.2		1.000		N/A	602.6	-33.0	-44.9	D	A
			STR-IA	POS.	2.2		1.000		N/A	602.6	-33.0	-38.2	D	A
			STR-II	POS.	2.2		1.000		N/A	602.6	-33.0	-42.3	D	A
			STR-III		2.2		1.000		N/A	602.6	-33.0	-15.6	D	
			STR-IV STR-V	POS.	2.2		1.000		N/A N/A	602.6 602.6	-33.0 -33.0	-18.8 -38.2	D D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	44.9	J	A
		201	STR-TA				1.000		N/A	602.6	33.0	38.2	J	A
			STR-II	POS.			1.000		N/A	602.6	33.0	42.3	J	A
			STR-III			12.8	1.000	N/A	N/A	602.6	33.0	15.6	J	
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	18.8	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	38.2	J	A
1	18.900	TOP	STR-I	POS.	2.2		1.000		N/A	602.6	-33.0	-46.1	D	A
			STR-IA	POS.	2.2		1.000		N/A	602.6	-33.0	-39.2	D	A
			STR-II	POS.	2.2		1.000		N/A	602.6	-33.0	-43.5	D	A
			STR-III STR-IV				1.000		N/A	602.6 602.6	-33.0 -33.0	-16.1 -19.3	D D	
			STR-IV STR-V	POS.	2.2		1.000		N/A N/A	602.6		-19.3	D D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	46.1	J	A
		DOI	STR-IA	POS.	2.2		1.000		N/A	602.6	33.0	39.2	J	A
			STR-II	POS.			1.000		N/A	602.6	33.0	43.5	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.1	J	
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	19.3	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	39.2	J	A
1	21.000L	TOP		POS.	2.2		1.000		N/A	602.6	-33.0	-46.3	D	A
			STR-IA	POS.	2.2		1.000		N/A	602.6	-33.0	-39.4	D	A
			STR-II	POS.	2.2		1.000		N/A	602.6	-33.0	-43.7	D	A
			STR-III STR-IV	POS.	2.2		1.000		N/A N/A	602.6	-33.0 -33.0	-16.3 -19.5	D D	
			STR-IV STR-V	POS.	2.2		1.000		N/A N/A	602.6 602.6	-33.0	-19.5	D	A
		BOT	STR-V	POS.	2.2		1.000		N/A	602.6	33.0	46.3	J	A
		201	STR-IA		2.2		1.000		N/A	602.6	33.0	39.4	J	A
								,	,					

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1 27.300 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A STR-IA POS. 2.2 12.8 1.000 1.000 N/A

9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

Span No.	Dist.	T/B	Limit State	Flex.	Inter		ate Cal Rh*	lculat Rb*		Flexu Resist Mr(e)* (kip-ft)	ance Fr	F+*		
1	21.000L	BOT	STR-III	POS. POS. POS.	2.2	12.8	1.000 1.000 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	43.7 16.3	J J J	A
			STR-IV STR-V	POS.	2.2		1.000	N/A N/A	N/A N/A	602.6 602.6	33.0		J	A
1	21.000R	TOP		POS.	2.2		1.000			602.6	-33.0		D	A
			STR-IA		2.2		1.000			602.6	-33.0		D	A
			STR-II	POS.	2.2		1.000				-33.0		D	A
			STR-III		2.2		1.000			602.6	-33.0		D	
			STR-IV STR-V	POS.	2.2		1.000			602.6 602.6	-33.0 -33.0		D D	A
		DOT	STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0		J	A
		вот	STR-IA		2.2		1.000		N/A	602.6	33.0		J	A
				POS.	2.2		1.000		N/A	602.6	33.0		J	A
			STR-III		2.2		1.000	N/A	N/A	602.6	33.0		J	n
			STR-IV		2.2		1.000	N/A	N/A	602.6	33.0		J	
			STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0		J	A
1	23.100	TOP	STR-I	POS.	2.2		1.000			602.6	-33.0		D	A
			STR-IA		2.2		1.000				-33.0		D	A
				POS.	2.2		1.000			602.6	-33.0		D	A
			STR-III		2.2		1.000				-33.0		D	
			STR-IV		2.2		1.000		N/A	602.6	-33.0		D	_
			STR-V	POS.	2.2		1.000				-33.0		D	A
		BOT	STR-I	POS.	2.2		1.000	N/A	N/A	602.6	33.0		J J	A
			STR-IA		2.2		1.000	N/A	N/A	602.6	33.0		J	A
			STR-II STR-III	POS.	2.2		1.000	N/A N/A	N/A N/A	602.6 602.6	33.0		J	A
			STR-III		2.2		1.000	N/A N/A	N/A N/A	602.6	33.0		J	
			STR-IV STR-V	POS.	2.2		1.000	N/A N/A	N/A N/A	602.6	33.0		J	A
1	25.200	mon.	STR-I	POS.	2.2	10 0	1.000	1 000	N/A	602.6	-33.0	-44.9	D	A
Τ.	25.200	IOP	STR-IA		2.2		1.000				-33.0		D	A
			STR-IA	POS.	2.2		1.000			602.6	-33.0		D	A
			STR-III		2.2		1.000				-33.0		D	n
				POS.	2.2		1.000			602.6	-33.0		D	
			STR-V	POS.	2.2		1.000			602.6	-33.0		D	A
		вот	STR-I	POS.	2.2		1.000		N/A	602.6	33.0		J	A
			STR-IA		2.2		1.000		N/A	602.6	33.0		J	A
				POS.	2.2		1.000	N/A	N/A	602.6	33.0		J	A
			STR-III		2.2		1.000	N/A	N/A	602.6	33.0		J	
					2.2		1.000	N/A	N/A	602.6	33.0		Ĵ	

602.6 -33.0 -42.7 D 602.6 -33.0 -36.3 D

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

										Flexu		actored		
Span			Limit		Inte	rmedia	ate Cal	lculat	ions	Resist			Resist.	Code
	Dist.	T/B	State	Flex.	rt*		Rh*			Mr(e)*		F+*	Calc.**	
	(ft)	-,-			(in)	(in)				(kip-ft)		(ksi)		
1	27.300	TOP	STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0		D	A
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-14.8	D	
			STR-IV		2.2		1.000			602.6	-33.0	-17.8	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-36.3	D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	42.7	J	A
			STR-IA		2.2		1.000	N/A	N/A	602.6	33.0	36.3	J	A
				POS.	2.2		1.000	N/A	N/A	602.6	33.0	40.1	J	A
			STR-III		2.2		1.000	N/A	N/A	602.6	33.0	14.8	J	
			STR-IV STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0	17.8 36.3	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.3	J	A
1	29.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-39.5	D	A
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-33.6	D	A
			STR-II	POS.	2.2		1.000			602.6	-33.0	-37.0	D	A
			STR-III		2.2		1.000			602.6	-33.0	-13.7	D	
			STR-IV		2.2		1.000			602.6	-33.0	-16.4	D	
			STR-V	POS.	2.2		1.000				-33.0	-33.6	D	A
		BOJ	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	39.5	J	A
			STR-IA STR-II		2.2		1.000	N/A N/A	N/A N/A	602.6 602.6	33.0	33.6 37.0	J J	A A
			STR-II		2.2		1.000		N/A	602.6	33.0	13.7	J	A
			STR-IV		2.2		1.000		N/A	602.6	33.0	16.4	J	
			STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0	33.6	J	A
1	31.500	TOP	STR-I	POS.	2.2		1.000			602.6	-33.0	-35.4	D	A
			STR-IA	POS.	2.2		1.000			602.6 602.6	-33.0 -33.0	-30.1 -32.8	D D	
			STR-II STR-III		2.2		1.000			602.6	-33.0	-32.8	D D	
			STR-III		2.2		1.000				-33.0		D	
			STR-IV	POS.	2.2		1.000			602.6	-33.0	-30.1	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	35.4	J	A
			STR-IA		2.2		1.000		N/A	602.6	33.0	30.1	J	
			STR-II	POS.	2.2			N/A	N/A	602.6	33.0	32.8	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.2	J	
			STR-IV		2.2		1.000	N/A	N/A	602.6	33.0	14.7	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	30.1	J	
1	33.600	TOD	STR-I	POS.	2.2	12 8	1.000	1 000	NI / D	602.6	-33.0	-30.3	D	
-	33.000	101	STR-IA		2.2		1.000			602.6	-33.0	-25.7	D	
			STR-II	POS.	2.2		1.000			602.6	-33.0	-28.2	D	
			STR-III		2.2		1.000			602.6	-33.0	-10.4	D	
			STR-IV		2.2		1.000			602.6	-33.0	-12.5	D	
			STR-V	POS.	2.2		1.000			602.6	-33.0	-25.7	D	
		BOT	STR-I	POS.	2.2		1.000	N/A	N/A	602.6	33.0	30.3	J	
			STR-IA		2.2		1.000	N/A	N/A	602.6	33.0	25.7	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	28.2	J	

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

			T 2 2 /		T		~ :	7 - :		Flext Resist Mr(e)* (kip-ft) 602.6 602.6 602.6	ıral	Factored Flex+Lat	Desider	G - 3
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Code Chk*
1	33.600	BOT	STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.0	10.4	J .T	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	25.7	J	
1	35.700	TOP	STR-I STR-IA	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-24.2	D D	
			STR-II STR-III	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6	-33.0 -33.0	-22.7	D D	
			STR-IV STR-V	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0	-10.0 -20.5	D D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	24.2	J J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	22.7	J	
			STR-III STR-IV	POS.	2.2	12.8	1.000	N/A	N/A N/A	602.6	33.0	10.0	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	20.5	J	
1	37.800	TOP	STR-I STR-IA	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-17.1	D D	
			STR-II STR-III	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-16.3	D D	
			STR-IV STR-V	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-7.0 -14.5	D D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A N/A	602.6	33.0	17.1	J J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.3	J J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6	33.0	7.0	J	
4	20.000	mon	STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.5	D	
1	39.900	101	STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-7.7	D	
			STR-II STR-III	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-8.7 -3.1	D D	
			STR-IV STR-V	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-3.7	D D	
		BOT	STR-I STR-IA	POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6 602.6	33.0	9.0	J J	
			STR-II	POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6	33.0	8.7	J J	
			STR-IV STR-V	POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6	33.0	3.7	J J	
1	42.000	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-IA STR-II	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6	-33.0 -33.0	0.0	D D	

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# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												ractored		
										Flexu	ıral	Flex+Lat		
Span			Limit		Inte	rmedia	ate Cal	lculat:	ions	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	42.000	TOP	STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	

#### \* Legend of General Notes:

- = Effective radius of gyration for lateral torsional buckling
- = Total depth of the web in compression, per Appendix D6.3.1
- = Hybrid factor
- = Load shedding factor (only applies to compression flange)
- An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1 Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr
- From the Siless items items after, it is a factored flexural + lateral stress due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects

- \*\* Legend of Resistance Calculation:

  A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2

  C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1

  D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-1

  E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

  F. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.3-2

  G. Noncompos or neg. flexure, compression flange, Fr calculated using ITB, A6.10.8.2.3-2

  H. Noncompos or neg. flexure, compression flange, Fr calculated using ITB, A6.10.8.2.3-2

  J. Noncompos or neg. flexure, compression flange, Fr calculated using ITB, A6.10.8.2.3-3
  - I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1
  - J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1 K. Tension flange, Fr calculated using net section fracture, A6.10.1.8-1

  - X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

### \*\*\* Legend of Code Check:

- A. Insufficient flexural resistance
- B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (F+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

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# 9041 EXTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

## FLANGE LATERAL CAPACITY

Span No.	Dist. (ft)	T/B	Limit State	Flex.	Lateral Resistance 0.6*Fyf* (ksi)	Factored Lateral Stress fl (ksi)	Code Check**
1	0.000	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	2.100	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	4.200	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	6.300	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	8.400	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	10.500	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	12.600	BOT	STR-I STR-IA STR-II STR-III	POS. POS. POS.	19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00	

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

# FLANGE LATERAL CAPACITY (cont.)

1 14.700 BOT STR-I POS. 19.80 0.00 STR-IN POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-V POS. 19.80 0.00 STR-II POS.		Dist. (ft) 2.600			Limit State STR-IV STR-V	lex.	Res	6*I (ks	tance Fyf* si)	La S	ter tre fl (ks 0.	i) 00	(	Co Che	*	
STR-IA POS. 19.80	L·	4.700		BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.		19 19 19	.80 .80 .80		0.	00 00 00				
STR-IA   POS.   19.80   0.00	L	6.800		BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.		19 19 19	.80 .80 .80		0. 0. 0.	00 00 00				
STR-IA   POS.   19.80   0.00	L	8.900		BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.		19 19 19	.80 .80 .80		0. 0. 0.	00 00 00				
STR-IA POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-III POS. 19.80 0.00 STR-IV POS. 19.80 0.00 STR-V POS. 19.80 0.00  1 23.100 BOT STR-I POS. 19.80 0.00 STR-IA POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-II POS. 19.80 0.00 STR-IV POS. 19.80 0.00 STR-IV POS. 19.80 0.00 STR-V POS. 19.80 0.00	2:	1.0001	ь	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.		19 19 19	.80 .80 .80		0.	00 00 00				
STR-IA     POS.     19.80     0.00       STR-II     POS.     19.80     0.00       STR-III     POS.     19.80     0.00       STR-IV     POS.     19.80     0.00       STR-V     POS.     19.80     0.00	2:	1.000	R	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.		19 19 19	.80 .80 .80		0.	00 00 00				
1 25.200 BOT STR-I POS. 19.80 0.00	2:	3.100		BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.		19 19 19	.80 .80 .80		0.	00 00 00				
	2!	5.200		BOT	STR-I	POS.		19	. 80		0.	00				

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# 9041 EXTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# FLANGE LATERAL CAPACITY (cont.)

pan No.	Dist.	T/B	Limit State STR-IA STR-II STR-III	Flex. POS. POS. POS.	Lateral Resistance 0.6*Fyf* (ksi) 19.80 19.80 19.80 19.80	Factored Lateral Stress fl (ksi) 0.00 0.00 0.00 0.00	Code Check**
1	27.300	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.	19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	29.400	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.	19.80 19.80 19.80 19.80 19.80	0.00	
1	31.500	BOT	STR-I STR-IA STR-II STR-III STR-IV STR-V	POS. POS. POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	33.600	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.	19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	35.700	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.	19.80 19.80 19.80 19.80 19.80	0.00 0.00 0.00 0.00 0.00	
1	37.800	BOT	STR-IA STR-II	POS.	19 80	0.00 0.00 0.00 0.00 0.00	

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

## FLANGE LATERAL CAPACITY (cont.)

Pagtored

Span No.	(ft)		State				Code Check**
1	39.900	BOT	STR-IA STR-II STR-III STR-IV	POS. POS. POS.	19.80 19.80 19.80 19.80 19.80 19.80	0.00	
1	42.000	BOT		POS. POS. POS.	19.80 19.80 19.80 19.80 19.80	0.00	

\* Legend of General Notes:
 Fyf = Yield stress of flange
 NOTE: Lateral stress check is not applicable to the top flange
 because the deck is assumed to provide the horizontal
 diaphragm action for wind loads, whether the girder is
 composite or noncomposite in the final state.

NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Span			Limit		Intermediate Calculation	Flexu Resist	ance	Factored Flexural Stress	Resist.	
No.	Dist. (ft)	T/B	State	Flex.	Rh*	Mr(e)* (kip-ft)	Fr (ksi)	Fu* (ksi)	Calc.**	Check***
1	0.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIB	POS.	1.000	482.1	26.4	0.0	C	
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-6.9	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-5.9	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	-6.6	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	6.9	C	
			SERV-IIA	POS.	1.000	482.1	26.4	5.9	C	

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

								T		
					Intermediate	Flexu		Factored Flexural		
Span			Limit		Calculation			Stress	Resist.	Codo
No.	Dist.	m/p	State	Flex.		Mr(e)*				Check***
NO.	(ft)	T/B	State	riex.	KII^	(kip-ft)			CalC. **	CHeck
-		рош	OPDII TTD	DOG	1 000				~	
1	2.100	BOT	SERV-IIB	POS.	1.000	482.1	26.4	6.6	C	
1	4.200	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1			C	
			SERV-IIB	POS.	1.000	482.1			C	
		BOT		POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	12.4	C	
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-18.4	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-15.7	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	-17.3	C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1			C	
			SERV-IIB	POS.	1.000	482.1			C	
1	8.400	TOP	SERV-II	POS.	1.000	482.1	-26 4	-23.1	С	
_			SERV-IIA	POS.	1.000	482.1			č	
			SERV-IIB	POS.	1.000	482.1			Č	
		BOT	SERV-II	POS.	1.000	482.1			Č	
		201	SERV-IIA	POS.	1.000	482.1			Č	
			SERV-IIB	POS.	1.000	482.1			č	
			DERV 11D	105.	1.000	402.1	20.4			
1	10.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.0	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-23.0	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	-25.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	27.0	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	23.0	C	
			SERV-IIB	POS.	1.000	482.1	26.4	25.0	C	
1	12.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-30.2	С	A
			SERV-IIA	POS.	1.000	482.1	-26.4		Ċ	
			SERV-IIB	POS.	1.000	482.1			Č	A
		BOT		POS.	1.000	482.1			č	A
		201	SERV-IIA	POS.	1.000	482.1			Č	**
			SERV-IIB	POS.	1.000	482.1			Č	A
1	14.700	TOP		POS.	1.000	482.1			C	A
			SERV-IIA	POS.	1.000	482.1			C	A
			SERV-IIB	POS.	1.000	482.1			C	A
		BOT		POS.	1.000	482.1			C	A
			SERV-IIA	POS.	1.000	482.1			C	A
			SERV-IIB	POS.	1.000	482.1	26.4	30.6	C	A
1	16.800	TOP	SERV-II	POS.	1.000	482.1	-26 4	-34.2	С	A
	10.000	101	SERV-IIA	POS.	1.000	482.1			Č	A
			DHK V - IIM	100.	1.000	402.1	20.4	23.2	_	n

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

								Factored		
					Intermediate	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc **	Check***
140.	(ft)	1/1	Deace	IICA.	1011	(kip-ft)	(ksi)	(ksi)	carc.	CHCCK
									_	_
1	16.800	TOP	SERV-IIB	POS.	1.000	482.1	-26.4	-32.3	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	34.2	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	29.2	C	A
			SERV-IIB	POS.	1.000	482.1	26.4	32.3	C	A
			DDICT TID	100.	1.000	102.1	20.1	32.3	Ü	**
1	18.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-35.2	C	A
_	10.500	IOF								
			SERV-IIA	POS.	1.000	482.1	-26.4	-30.0	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-33.2	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	35.2	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	30.0	C	A
			SERV-IIB	POS.	1.000	482.1	26.4	33.2	C	A
			DERVIID	100.	1.000	402.1	20.4	33.2	C	-
-	01 0007	mor.	OPDII TT	DOG	1 000	100 1	06.4	25.2	~	
1	21.000L	TOP	SERV-II	POS.	1.000	482.1	-26.4		C	A
			SERV-IIA	POS.	1.000	482.1	-26.4		C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-33.3	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	35.3	C	A
			SERV-TTA	POS.	1.000	482.1	26.4	30.2	C	A
			SERV-IIB	POS.	1.000	482.1	26.4	33.3	č	A
			SEKA-TIP	FOB.	1.000	402.1	20.4	33.3	C	n
_		mon		200					~	
1	21.000R	TOP	SERV-II	POS.	1.000	482.1	-26.4		C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-30.2	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-33.3	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	35.3	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	30.2	Č	A
			SERV-IIB	POS.	1.000	482.1	26.4	33.3	Č	
			SERV-IIB	POS.	1.000	482.1	26.4	33.3	C	A
									_	_
1	23.100	TOP	SERV-II	POS.	1.000	482.1	-26.4		C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-30.0	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-33.2	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	35.2	C	A
		201	SERV-IIA	POS.	1.000	482.1	26.4	30.0	Ċ	A
						482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	33.2	C	A
1	25.200	TOP	SERV-II	POS.	1.000	482.1	-26.4		C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-29.2	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-32.3	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	34.2	Ċ	A
		DOI	SERV-IIA	POS.	1.000	482.1	26.4	29.2	č	A
			SERV-IIB	POS.	1.000	482.1	26.4	32.3	C	A
1	27.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-32.6	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-27.8	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-30.6	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	32.6	C	A
		201	SERV-IIA	POS.	1.000	482.1	26.4	27.8	Č	A
			ODK V-IIA	rus.	1.000	402.1	20.4	21.0	_	rs.

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# 9041 EXTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)


								Factored		
					Intermediate	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	27.300	BOT	SERV-IIB	POS.	1.000	482.1	26.4	30.6	C	A
1	29.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-30.2	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-25.7	C	
			SERV-IIB	POS.		482.1	-26.4	-28.2	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	30.2	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	25.7	C	
			SERV-IIB	POS.	1.000	482.1	26.4	28.2	C	A
1	31.500	TOP		POS.			-26.4		C	A
			SERV-IIA	POS.			-26.4	-23.0	C	
			SERV-IIB	POS.		482.1		-25.0	C	
		BOT		POS.		482.1	26.4	27.0	C	A
			SERV-IIA			482.1		23.0	C	
			SERV-IIB	POS.	1.000	482.1	26.4	25.0	C	
1	33.600	TOP		POS.			-26.4		C	
			SERV-IIA				-26.4		C	
			SERV-IIB	POS.			-26.4	-21.5	C	
		BOT		POS.		482.1	26.4		C	
			SERV-IIA	POS.		482.1	26.4	19.7	C	
			SERV-IIB	POS.	1.000	482.1	26.4	21.5	C	
1	35.700	TOP	ODDII TT	POS.	1 000	400 1	-26.4	10.4	~	
1	35.700	TOP							C	
			SERV-IIA	POS.			-26.4		C C	
		n.o.m	SERV-IIB				-26.4			
		BOT		POS.			26.4		C	
			SERV-IIA			482.1	26.4		C	
			SERV-IIB	POS.	1.000	482.1	26.4	17.3	C	
1	37.800	TOP	SERV-II	POS.	1.000	482.1	-26.4	-13.0	С	
Τ.	37.000	101	SERV-IIA	POS.			-26.4		C	
			SERV-IIA SERV-IIB	POS.		482.1		-11.1	C	
		BOT		POS.		482.1		13.0	c	
		ВОІ	SERV-IIA	POS.		482.1	26.4	11.1	C	
			SERV-IIA	POS.		482.1	26.4		C	
			SEKA-IIB	FOS.	1.000	402.1	20.4	12.4	C	
1	39.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-6.9	C	
_	33.300	101	SERV-IIA	POS.			-26.4		Č	
			SERV-IIB	POS.			-26.4		Ċ	
		BOT	SERV-II	POS.			26.4		Ċ	
		201	SERV-IIA	POS.		482.1	26.4	5.9	č	
			SERV-IIB	POS.		482.1	26.4	6.6	Č	
			DELIC TID	100.	1.000	102.1	20.1	3.0	_	
1	42.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
-	-2.000	101	SERV-IIA	POS.			-26.4	0.0	Č	
				- 00.		-52.1		5.0	-	

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span			Limit		Intermediate Calculation	Flexu Resist		Factored Flexural Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	42.000	TOP	SERV-IIB	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIB	POS.	1.000	482.1	26.4	0.0	C	

- \* Legend of General Notes:
  Rh = Hybrid factor
  Mr(e) = Flexural resistance in terms of moment, back-calculated

  - from the stress flexural resistance, Fr
    Fu = For bottom flanges of composite sections or both flanges
    of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)
- \*\* Legend of Resistance Calculation:

  - A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3
- \*\*\* Legend of Code Check:
  - A. Insufficient flexural resistance

#### SERVICE LIMIT STATE - WEB BEND-BUCKLING

									Factored	
					Interme	diate	Flexu	ral	Flexural	
Span			Limit		Calcula	tions	Resist	ance	Stress	Code
No.	Dist.	T/B	State	Flex.	Dc*	Rh*	Mr(e)*	Fcrw*	fc*	Check**
	(ft)				(in)		(kip-ft)	(ksi)	(ksi)	
1	0.000	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	0.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	0.0	
1	2.100	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-6.9	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-5.9	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-6.6	
1	4.200	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-13.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-11.1	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-12.4	
1	6.300	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-18.4	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-15.7	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-17.3	
1	8.400	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-23.1	

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

Span			Limit		Interme Calcula	tions	Flexu Resist	ance	Factored Flexural Stress	Code
No.	Dist. (ft)	T/B	State	Flex.	Dc*	Rh*	Mr(e)* (kip-ft)	Fcrw* (ksi)	fc* (ksi)	Check**
1	8.400	TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-19.7	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-21.5	
1	10.500	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-27.0	
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-23.0 -25.0	
1	12.600	TOP	SERV-II	POS.	12.79	1.000	602.6 602.6	-33.0 -33.0	-30.2	
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6	-33.0	-25.7 -28.2	
1	14.700	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-32.6 -27.8	
		TOP	SERV-IIA SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-30.6	
1	16.800	TOP	SERV-II	POS.	12.79	1.000				A
1	16.800	TOP	SERV-II SERV-IIA	POS.	12.79	1.000	602.6 602.6	-33.0 -33.0	-34.2 -29.2	A
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-32.3	
1	18.900	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-35.2	A
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-30.0	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-33.2	A
1	21.000L	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-35.3	A
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-30.2	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-33.3	A
1	21.000R	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-35.3	A
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-30.2 -33.3	A
		101	SEKV-IIB	ros.	12.73	1.000		-33.0	-33.3	A
1	23.100	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-35.2	A
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-30.0 -33.2	A
1	25.200	TOP	SERV-II	POS.	12.79	1.000	602.6 602.6	-33.0 -33.0	-34.2	A
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6	-33.0	-29.2 -32.3	
1	27.300	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-32.6 -27.8	
		TOP	SERV-IIA SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-27.8	
1	29.400	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-30.2 -25.7	
		101	DERV-IIA	FUS.	12.79	1.000	002.6	-33.0	-25.7	

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

									ractored	
Span			Limit		Interme Calcula		Flexu Resist		Flexural Stress	Code
No.	Dist. (ft)	T/B	State	Flex.	Dc* (in)	Rh*	Mr(e)* (kip-ft)			Check**
1	29.400	TOP	SERV-IIB	POS.	12.79	1.000	602.6			
1	31.500	TOP	SERV-II	POS.	12.79	1.000	602.6			
		TOP TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6 602.6			
1	33.600	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-23.1	
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6 602.6		-19.7 -21.5	
		101	DDICT IID	100.	12.75	1.000	002.0	55.0	21.5	
1	35.700	TOP	SERV-II	POS.	12.79	1.000	602.6		-18.4	
		TOP	SERV-IIA SERV-IIB	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-15.7 -17.3	
-	27 000	mon	CEDII TT	DOG	10 70	1 000		22.0	12.0	
1	37.800	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-13.0 -11.1	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-12.4	
1	39.900	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-6.9	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6			
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	-6.6	
1	42.000	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	0.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6		0.0	
		TOP	SERV-IIB	POS.	12.79	1.000	602.6	-33.0	0.0	

<sup>\*</sup> Legend of Intermediate Calculations:

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# 9041 EXTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY

			Factored	Maximum		
Span No.	Dist.	Limit State	Resistance Vr	Shear Vu	Stiffened/ Unstiffened	Code Check*
		STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	30.58 86.08	n n	
1	4.200	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	79.50	U	
1	6.300		256.60 256.60 256.60 256.60 256.60	72.96	Ü	
1	8.400	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60			
			256.60 256.60 256.60 256.60 256.60	60.02	U	
1	12.600	STR-I STR-IA STR-II STR-III	256.60 256.60 256.60 256.60	66.15 53.62 61.54 11.32	и и и	

Dc = Depth of web in compression
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from

Forw = Nominal bend-buckling resistance, Exp Specifications 6.10.4.2.2-4 fc = Compression-flange stress calculated without flange lateral bending N/A = This check is not required for composite sections in positive

flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

<sup>\*\*</sup> Legend of Code Check:
A. Insufficient bend-buckling resistance

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

SHEAR CAPACITY (cont.)

The state of the s										
			Factored							
			Shear	Factored						
Span		Limit	Resistance	Shear	Stiffened/	Code				
No.	Dist.	State	Vr	Vu	Unstiffened	Check*				
	(ft)		(king)	(king)	Stiffened/ Unstiffened U					
1	12 (00	STR-IV	250 00	12 50	TT					
1	12.600	SIK-IV	256.60 256.60	13.59	U					
		STR-V	256.60	53.62	U					
1	14.700	STR-I	256.60							
		STR-IA	256.60	47.27	U					
		STR-II	256.60	54.20	U					
		STR-III	256.60	8.49	U					
		STR-IV	256.60	8.49 10.19	Ū					
		STR-V		47.27						
		SIK-V	230.00	47.27	0					
1	16 000	STR-I	256 60	51.42	U					
1	16.600				0					
		STR-IA	256.60	40.96						
		STR-II	256.60 256.60	46.87	U					
		STR-III	256.60	5.66 6.79	U					
		STR-IV	256.60	6.79	U					
		STR-V	256.60	40.96	U					
1	18.900	STR-I	256.60	44.14	U					
		STR-IA	256.60	34.70	U					
		STR-II		39 53	TT					
		STR-III	256.60 256.60	2.83	Ū					
		STR-IV	256.60	3.40	Ū					
					Ū					
		STR-V	256.60	34.70	U					
4	01 0001	OMP T	056.60	26.02	TJ					
Τ.	21.000L	STR-I STR-IA	256.60	36.93 28.49	n n					
			256.60	28.49						
		STR-II	256.60 256.60	32.19	U					
		STR-III			U					
		STR-IV	256.60	0.00	U					
		STR-V	256.60	28.49	U					
1	21.000R	STR-I	256.60	36.93 28.49	U					
		STR-IA	256.60	28.49	U					
		STR-II	256 60	32.19	Ū					
		STR-III	256.60 256.60	0.00						
		STR-IV	256.60	0.00	Ū					
				28.49	IJ					
		STR-V	256.60	28.49	U					
1	22 100	CERD T	256.60	-29.82	U					
1	23.100	STR-I	250.60	-29.82	U					
		STR-IA	256.60	-23.65						
		STR-II	256.60	-26.81						
		STR-III	256.60	-2.83	U					
		STR-IV	256.60	-3.40	U					
		STR-V	256.60	-23.65	U					
1	25.200	STR-I	256.60	-35.56	U					

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# 9041 EXTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

			SHEAR CAPACIT	Y (cont.)		
Span No.	Dist.	Limit State	Factored Shear Resistance Vr	Maximum Factored Shear Vu	Stiffened/ Unstiffened	Code Check*
1	(ft) 25.200	STR-IA STR-II STR-III STR-IV STR-V	(kips) 256.60 256.60 256.60 256.60 256.60	(kips) -28.72 -32.58 -5.66 -6.79 -28.72	ս ս ս	
1	27.300	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-41.33 -33.82 -38.36 -8.49 -10.19 -33.82	ט ט ט ט	
1	29.400	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-47.14 -38.96 -44.13 -11.32 -13.59 -38.96	ט ט ט ט	
1	31.500	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-53.00 -44.12 -49.91 -14.16 -16.99 -44.12	ט ט ט ט	
1	33.600	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-58.89 -49.31 -55.68 -16.99 -20.38 -49.31	ט ט ט ט ט	
1	35.700	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60	-64.82 -54.53 -61.46 -19.82 -23.78 -54.53	ט ט ט ט	
1	37.800	STR-I STR-IA STR-II STR-III STR-IV	256.60 256.60 256.60 256.60 256.60	-70.79 -59.79 -67.86 -22.65 -27.18	u u u	

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9041 EXTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

SHEAR CAPACITY (cont.)

Span No.	Dist. (ft) 37.800	Limit State STR-V	Factored Shear Resistance Vr (kips) 256.60	Vu	Stiffened/ Unstiffened U	Code Check*
1	39.900	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-74.38 -25.48	ט ט ט ט	
1	42.000	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60		ט ט ט ט	

UNCURED SLAB NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

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# 9041 EXTERIOR BEAM ML-80 - SPECIFICATION CHECKING

### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Flexu Resist Mr(e)* (kip-ft) 602.6 602.6 602.6 602.6	ral ance Fr	F+*	Resist. Calc.**	Code Chk***
1										602.6 602.6 602.6 602.6				
1	4.200	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0	-16.0 -13.7 16.0 13.7	D D J	
1	6.300	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6	-33.0 -33.0 33.0	-22.5 -19.2 22.5 19.2	D D J J	
1	8.400	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6	-33.0 -33.0 33.0	-27.9 -23.9 27.9 23.9	D D J	
1	10.500	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6	-33.0 -33.0 33.0	-32.4 -27.8 32.4 27.8	D D J	
1	12.600	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0	-36.2 -31.1 36.2 31.1	D D J	A A
1	14.700	TOP	STR-I STR-II STR-I	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6	-33.0 -33.0 33.0	-39.3 -33.7 39.3 33.7	D D J	A A A
1	16.800	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0	-41.4 -35.5 41.4 35.5	D D J	A A A
1	18.900	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-42.5	D	A

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9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
										Flexu		Flex+Lat		
Span			Limit					lculati			ance		Resist.	
No.	Dist.	T/B	State				Rh*	Rb*		Mr(e)*		F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)			_	_
1	18.900			POS.				1.000				-36.5	D	A
		BOJ	STR-I	POS.			1.000		N/A	602.6		42.5	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.5	J	A
1	21.000L	TOD	стр. т	POS.	2.2	12 0	1 000	1.000	N/A	602 6	-33.0	-42.6	D	A
_	21.0001	IOF	STR-II					1.000		602.6		-36.6	D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	42.6	J	A
		201		POS.	2.2		1.000		N/A	602.6	33.0	36.6	J	A
								,	,				-	
1	21.000R	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-42.6	D	A
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-36.6	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	42.6	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.6	J	A
1	23.100	TOP	STR-I	POS.	2.2			1.000		602.6			D	A
			STR-II					1.000			-33.0		D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	42.5	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.5	J	A
4	05 000	mon	OMP T	POS.	2.2	10 0	1 000	1 000	3T / 3		22.0	41 4	D	
1	25.200	TOP	STR-I STR-II					1.000		602.6 602.6			D	A A
		DOT	STR-II	POS.			1.000		N/A N/A	602.6	33.0	41.4	J	A
		БОІ	STR-II		2.2		1.000		N/A	602.6	33.0	35.5	J	A
			31K-11	ros.	2.2	12.0	1.000	IN / PI	IN / Pi	002.0	33.0	33.3	U	A
1	27.300	TOP	STR-I	POS.	2.2	12 8	1 000	1.000	N/A	602 6	-33.0	-39.3	D	A
-	27.300	101	STR-II					1.000			-33.0		D	A
		BOT	STR-I	POS.	2.2			N/A		602.6		39.3	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	33.7	J	A
1	29.400	TOP	STR-I	POS.		12.8	1.000	1.000	N/A	602.6	-33.0	-36.2	D	A
			STR-II			12.8	1.000	1.000	N/A	602.6	-33.0	-31.1	D	
		BOT	STR-I	POS.				N/A		602.6	33.0	36.2	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	31.1	J	
1	31.500	TOP	STR-I	POS.	2.2			1.000		602.6		-32.4	D	
			STR-II					1.000				-27.8	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	32.4	J J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.8	J	
1	33.600	TOD	STR-I	POS.	2.2	12 0	1 000	1.000	N/A	602.6	-33.0	-27.9	D	
1	33.000	101	STR-II					1.000		602.6		-27.9	D	
		BOT	STR-II	POS.	2.2			N/A		602.6	33.0	27.9	J	
		201		POS.	2.2			N/A		602.6	33.0	23.9	J	
				- 00.		_2.0		,	/	002.0	33.0	23.5	-	
1	35.700	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-22.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-19.2	D	

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9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												actored		
										Flexi		lex+Lat		~ 3
Span			Limit	_			ate Cal			Resist		Stress	Resist.	
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*		Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	35.700	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	22.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	19.2	J	
1	37.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-16.0	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-13.7	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.0	J	
			STR-II	POS.	2.2		1.000	N/A	N/A	602.6	33.0	13.7	J	
			0111 11	100.	2.2	12.0	1.000	/	11/11	002.0	55.0	23.7	Ü	
1	39.900	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-8.5	D	
			STR-II	POS.	2.2		1.000		N/A	602.6	-33.0	-7.3	D	
		BOT	STR-I	POS.	2.2		1.000	N/A	N/A	602.6	33.0	8.5	J	
		DOI	STR-II	POS.	2.2		1.000	N/A	N/A	602.6	33.0	7.3	J	
			SIK-II	PUS.	2.2	12.0	1.000	IV / A	IN/A	602.6	33.0	7.3	U	
1	42.000	TOD	STR-I	POS.	2.2	12 0	1.000	1 000	N/A	602.6	-33.0	0.0	D	
	42.000	IOF	STR-II	POS.			1.000				-33.0	0.0	D	
					2.2					602.6				
		BOT	STR-I	POS.	2.2		1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	

\* Legend of General Notes:

rt = Effective radius of gyration for lateral torsional buckling
Dc = Total depth of the web in compression, per Appendix D6.3.1

= Hybrid factor

Rb = Load shedding factor (only applies to compression flange)
An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1

Mr(e) = Flexural resistance in terms of moment, back-calculated from

from the stress flexural resistance, Fr F+ = fbu + (1/3)\*fl, total factored flexural + lateral stress due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects

\*\* Legend of Resistance Calculation:

Legend of Resistance Calculation:

A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2

C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1

D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

F. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1

G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-2

H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3

I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1

N. Tomosmos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1

K. Tension flange, Fr calculated using hab. 10.8.3-1

K. SKW has not been entered. App. A provisions have been skipped but may be applicable.

X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

#### \*\*\* Legend of Code Check:

Legend of Code Check:
A. Insufficient flexural resistance
B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (F+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

### FLANGE LATERAL CAPACITY

This output report is not applicable because wind loads do not apply to this vehicle.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Factored

								ractorca			
					Intermediate	Flexu	ral	Flexural			
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code	
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***	
	(ft)					(kip-ft)	(ksi)	(ksi)			
1	0.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C		
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0			
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C		
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C		
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-6.5	C		
			SERV-IIA	POS.	1.000	482.1	-26.4	-5.6	C		
		BOT	SERV-II	POS.	1.000	482.1	26.4	6.5	C		
			SERV-IIA	POS.	1.000	482.1	26.4	5.6	C		
1	4.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-12.2	C		
			SERV-IIA	POS.	1.000	482.1	-26.4	-10.5	C		
		BOT	SERV-II	POS.	1.000	482.1	26.4	12.2			
			SERV-IIA	POS.	1.000	482.1	26.4	10.5	C		
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-17.2	C		
			SERV-IIA	POS.	1.000	482.1	-26.4	-14.7	C		
		BOT	SERV-II	POS.	1.000	482.1	26.4	17.2			
			SERV-IIA	POS.	1.000	482.1	26.4	14.7	C		
1	8.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-21.4	С		
			SERV-IIA	POS.	1.000	482.1	-26.4	-18.3			
		BOT	SERV-II	POS.	1.000	482.1	26.4	21.4			
			SERV-IIA	POS.	1.000	482.1	26.4	18.3	C		
1	10.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-24.8	С		
			SERV-IIA	POS.	1.000	482.1	-26.4	-21.3	C		

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### 9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span No.	Dist.	T/B	Limit State	Flex.	Intermediate Calculation Rh*	Flexu Resist Mr(e)*	ance Fr	Factored Flexural Stress Fu*	Resist. Calc.**	Code Check***
1	(ft) 10.500	BOT	SERV-II SERV-IIA	POS. POS.	1.000	(kip-ft) 482.1 482.1	(ksi) 26.4 26.4	(ksi) 24.8 21.3	C C	
1	12.600	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-27.7 -23.8 27.7 23.8	0 0 0	A A
1	14.700	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-30.1 -25.9 30.1 25.9	0 0 0	A A
1	16.800	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1		-31.7 -27.3 31.7 27.3	C C C	A A A
1	18.900	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-32.5 -28.0 32.5 28.0	0 0 0	A A A
1	21.000L	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-32.6 -28.1 32.6 28.1	0 0 0	A A A
1	21.000R	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4	-32.6 -28.1 32.6 28.1	0 0 0	A A A
1	23.100	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-32.5 -28.0 32.5 28.0	C C C	A A A
1	25.200	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-31.7 -27.3 31.7 27.3	0 0 0	A A A
1	27.300	TOP	SERV-II SERV-IIA SERV-II	POS. POS. POS.	1.000 1.000 1.000	482.1 482.1 482.1	-26.4 -26.4 26.4	-30.1 -25.9 30.1	с с	A A

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#### 9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

								Factored		
					Intermediate	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)				
1	27.300	BOT	SERV-IIA	POS.	1.000	482.1			C	
-	27.300	201	DDICT TITL	100.	1.000	102.1	20.1	23.5	- C	
1	29.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.7	C	A
			SERV-IIA	POS.	1.000	482 1	-26.4	-23.8	C	
		BOT	SERV-II	POS.		482.1			Ċ	A
		DOI	SERV-IIA	POS.		482.1		23.8	Č	-
			DERCY IIA	100.	1.000	402.1	20.4	23.0	C	
1	31.500	TOP	SERV-II	POS.	1.000	482 1	-26.4	-24.8	C	
-	31.300	101	SERV-IIA	POS.			-26.4		Ċ	
		BOT		POS.		482.1		24.8	Č	
		DOI	SERV-IIA	POS.		482.1		21.3	Ċ	
			SERV-IIA	PUS.	1.000	402.1	20.4	21.3	C	
1	33.600	TOP	SERV-II	POS.	1.000	482 1	-26.4	-21.4	С	
_	33.000	101	SERV-IIA	POS.			-26.4		Č	
		BOT	SERV-II	POS.		482.1		21.4	Ċ	
		BUI	SERV-IIA	POS.		482.1		18.3	C	
			SERV-IIA	POS.	1.000	482.1	26.4	18.3	C	
1	35.700	TOP	SERV-II	POS.	1.000	482 1	-26.4	-17.2	C	
_	33.700	101	SERV-IIA	POS.			-26.4		Ċ	
		BOT	SERV-IIA	POS.		482.1		17.2	C	
		BUI							C	
			SERV-IIA	POS.	1.000	482.1	26.4	14.7	C	
1	37.800	TOP	SERV-II	POS.	1.000	482 1	-26.4	-12.2	C	
_	37.000	101	SERV-IIA	POS.			-26.4		Ċ	
		BOT		POS.		482.1		12.2	C	
		BUI	SERV-IIA	POS.		482.1			c	
			SERV-IIA	POS.	1.000	482.1	26.4	10.5	C	
1	39.900	TOP	SERV-II	POS.	1.000	102 1	-26.4	-6.5	C	
1	33.300	101	SERV-IIA	POS.			-26.4		C	
		BOT	SERV-IIA SERV-II	POS.		482.1		6.5		
		BUI							C	
			SERV-IIA	POS.	1.000	482.1	26.4	5.6	C	
1	42.000	TOP	SERV-II	POS.	1.000	102 1	-26.4	0.0	C	
_	-2.000	102	SERV-IIA	POS.			-26.4	0.0	C	
		BOT	SERV-IIA SERV-II	POS.		482.1		0.0	C	
		DOT							C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	

<sup>\*</sup> Legend of General Notes:

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#### 9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

- \*\* Legend of Resistance Calculation:
  - A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3
- \*\*\* Legend of Code Check:
  A. Insufficient flexural resistance

### SERVICE LIMIT STATE - WEB BEND-BUCKLING

Span No.	Dist.	T/B	Limit State	Flex.	Interme Calcula Dc* (in)	tions	Flexu Resist Mr(e)* (kip-ft)	ance Fcrw*	Factored Flexural Stress fc*	Code Check**
1	0.000	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79	1.000	602.6 602.6	-33.0	0.0	
1	2.100	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000		-33.0 -33.0		
1	4.200	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000		-33.0 -33.0		
1	6.300	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000		-33.0 -33.0	-17.2 -14.7	
1	8.400	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-21.4 -18.3	
1	10.500	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000	602.6 602.6			
1	12.600	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000	602.6 602.6	-33.0 -33.0		
1	14.700	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000		-33.0 -33.0	-30.1 -25.9	
1	16.800	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-31.7 -27.3	
1	18.900	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-32.5 -28.0	
1	21.000L	TOP	SERV-II SERV-IIA	POS. POS.		1.000		-33.0 -33.0	-32.6 -28.1	
1	21.000R	TOP TOP	SERV-II SERV-IIA	POS.		1.000	602.6 602.6		-32.6 -28.1	

Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

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#### 9041 EXTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

Span	<b>.</b>	- / -	Limit		Interme Calcula	tions	Flexu Resist	ance	Factored Flexural Stress	Code
No.	Dist.	T/B	State	Flex.	Dc* (in)	Rh*	Mr(e)* (kip-ft)			Check**
1	23.100	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000		-33.0	-32.5	
1	25.200	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0		
1	27.300	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	29.400	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	31.500	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0		
1	33.600	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	35.700	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	37.800	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	39.900	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0		
1	42.000	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	0.0	

<sup>\*</sup> Legend of Intermediate Calculations:

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#### 9041 EXTERIOR BEAM ML-80 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY

Span No.	Dist.	Limit State	Factored Shear Resistance Vr	Maximum Factored Shear Vu	Stiffened/ Unstiffened U	Code Check*
1	0.000	STR-I STR-II	256.60 256.60	104.73 87.26	n	
1	2.100	STR-I STR-II	256.60 256.60	97.37 80.94	n	
1	4.200	STR-I STR-II	256.60 256.60	90.01 74.62	n n	
		STR-II	256.60 256.60	68.29	U	
			256.60 256.60			
			256.60 256.60			
		STR-II	256.60 256.60	49.33	U	
		STR-II	256.60 256.60	43.01	U	
			256.60 256.60			
		STR-II	256.60 256.60	30.36	U	
			256.60 256.60			
			256.60 256.60			
			256.60 256.60			
		STR-II	256.60 256.60	-25.93	U	
1	27.300	STR-I STR-II	256.60 256.60	-37.72 -31.04	n	
1	29.400	STR-I	256.60	-43.51	U	

Dc = Depth of web in compression Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from

Mr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Fcrw
Forw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4 fc = Compression-flange stress calculated without flange lateral bending
N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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# 9041 EXTERIOR BEAM ML-80 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY (cont.)

Span No.	(ft)	Limit State STR-II	Resistance	Vu		
1	31.500	STR-I STR-II		-49.30 -41.27	n	
1	33.600	STR-I STR-II	256.60 256.60	-55.09 -46.38	n	
1	35.700	STR-I STR-II		-60.87 -51.49	U	
1	37.800	STR-I STR-II	256.60 256.60	-66.66 -56.60	n n	
1	39.900	STR-I STR-II	256.60 256.60	-72.45 -61.71	n	
1	42.000	STR-I STR-II	256.60 256.60	-78.24 -66.82	U	

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# 9041 EXTERIOR BEAM HS20 - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

Span No.	Dist.	T/B	Limit State	Flex.	Inte	rmedia	ate Cai Rh*	lculat: Rb*	ions An/Ag*	Flexu Resist Mr(e)* (kip-ft)	ıral ance	Factored Flex+Lat Stress F+*	Resist. Calc.**	Code Chk***
1	(ft) 0.000	TOP	STR-I STR-II	POS.	(in) 2.2 2.2	(in) 12.8 12.8	1.000	1.000	N/A N/A	(kip-ft) 602.6 602.6	(ksi) -33.0	(ksi) 0.0	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 12.8	1.000	N/A N/A	N/A N/A	602.6 602.6 602.6 602.6	33.0	0.0	J J	
1	2.100	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-7.8 -6.7	D D	
		BOT	STR-I STR-II	POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6 602.6 602.6	33.0	7.8	J J	
1	4.200	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A N/A	602.6	-33.0	-14.7	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6 602.6 602.6 602.6	33.0	14.7 12.6	J J	
1	6.300	TOP	STR-I STR-II	POS. POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6	-33.0 -33.0	-20.5 -17.7	D D	
1	8.400	TOP	STR-I STR-II	POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0	-25.4 -22.0	D D	
1	10.500	TOP	STR-I STR-II	POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6	-33.0 -33.0	-29.3 -25.4	D D	
													J J	
1	12.600	TOP	STR-I STR-II	POS. POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6	-33.0 -33.0	-32.3 -28.0	D D	
													J J	
1	14.700	TOP	STR-I STR-II	POS. POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6	-33.0 -33.0	-34.5 -30.0	D D	A
														A
1	16.800	TOP	STR-I STR-II	POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0	-36.2 -31.5	D D	A
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 12.8	1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	36.2 31.5	J J	A

1 18.900 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A 602.6 -33.0 -36.9 D A

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9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
										Flexu		Flex+Lat		
Span			Limit					lculati		Resist			Resist.	
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)			_	(kip-ft)	(ksi)	(ksi)		
1	18.900	TOP	STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-32.2	D	
		BOT	STR-I	POS.			1.000		N/A	602.6			J	A
		201	STR-II				1.000		N/A	602.6	33.0	32.2	J	
			DIK II	100.	2.2	12.0	1.000	14/11	14/21	002.0	33.0	32.2	U	
1	21.000L	TOD	CEED T	POS.	2.2	10 0	1.000	1 000	N/A	602.6	-33.0	-36.7	D	A
Τ.	21.0001	IOP		POS.			1.000		N/A	602.6			D	A
		DOM											J	А
		BOL	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	36.7		A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	32.0	J	
-1	21.000R	mon.	CMD T	POS.	2.2	10 0	1.000	1 000	N/A	602.6	22 0	-36.7	D	A
1	21.000K	IOP												A
			STR-II				1.000		N/A	602.6			D	_
		BOT	STR-I	POS.			1.000		N/A	602.6		36.7	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	32.0	J	
4	00 100	mon	OMP T	DOG	0 0	10 0	1 000	1 000	3T / 3	600 6	22.0	26.0	D	А
1	23.100	TOP	STR-I	POS.			1.000		N/A	602.6		-36.9		A
			STR-II				1.000		N/A			-32.2	D	
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0		J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	32.2	J	
		mon	amp =	200					/-				_	
1	25.200	TOP	STR-I	POS.			1.000		N/A	602.6		-36.2	D	A
			STR-II					1.000			-33.0		D	
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0	36.2	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	31.5	J	
		mon							/-				_	
1	27.300	TOP	STR-I	POS.			1.000		N/A	602.6		-34.5	D	A
			STR-II					1.000		602.6		-30.0	D	
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0		J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	30.0	J	
		mon	amp =	200					/-				_	
1	29.400	TOP	STR-I	POS.			1.000		N/A	602.6		-32.3	D	
			STR-II				1.000		N/A	602.6			D	
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0	32.3	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	28.0	J	
									/-				_	
1	31.500	TOP	STR-I	POS.			1.000		N/A	602.6			D	
			STR-II					1.000			-33.0		D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	29.3	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	25.4	J	
									/-				_	
1	33.600	TOP	STR-I	POS.			1.000		N/A	602.6		-25.4	D	
			STR-II					1.000	N/A	602.6			D	
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0	25.4	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	22.0	J	
1	35.700	TOP	STR-I	POS.	2.2		1.000		N/A	602.6		-20.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-17.7	D	

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9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
										Flexu	ıral	Flex+Lat		
Span			Limit		Inte	rmedia	ate Cal	Lculat:	ions	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Aq*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	35.700	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	20.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.7	J	
1	37.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-14.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-12.6	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.7	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.6	J	
1	39.900	TOP		POS.			1.000		N/A	602.6	-33.0		D	
			STR-II	POS.	2.2		1.000		N/A	602.6	-33.0		D	
		BOT	STR-I	POS.	2.2		1.000	N/A	N/A	602.6	33.0	7.8	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	6.7	J	
1	42.000	TOD	STR-I	POS.	2.2	12 0	1.000	1 000	N/A	602.6	-33.0	0.0	D	
_	42.000	IOF	STR-II	POS.	2.2		1.000		N/A	602.6	-33.0		D	
		рош												
		ROI	STR-I	POS.	2.2		1.000		N/A	602.6	33.0		J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	

\* Legend of General Notes:

rt = Effective radius of gyration for lateral torsional buckling
Dc = Total depth of the web in compression, per Appendix D6.3.1

= Hybrid factor

Rb = Load shedding factor (only applies to compression flange)
An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1

Mr(e) = Flexural resistance in terms of moment, back-calculated from

from the stress flexural resistance, Fr F+ = fbu + (1/3)\*fl, total factored flexural + lateral stress due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects

## \*\* Legend of Resistance Calculation:

- A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1
  B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2
  C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1
  D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-1

- D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-1 E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.3-2 F. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1 H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3 I. Noncompos or neg. flexure, tension flange, Fr calculated using M6.10.8.1.3-1 J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1 K. Tension flange, Fr calculated using A6.10.8.3-1

- X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

#### \*\*\* Legend of Code Check:

Legend of Code Check:
A. Insufficient flexural resistance
B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (F+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

### FLANGE LATERAL CAPACITY

This output report is not applicable because wind loads do not apply to this vehicle.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Factored

Span No.	Dist. (ft)	T/B	Limit State	Flex.		Resist Mr(e)* (kip-ft)	Fr (ksi)			Code Check***
1	0.000	TOP	SERV-II SERV-IIA SERV-II		1.000	482.1	-26.4 -26.4 26.4	0.0	C C	
		201	SERV-IIA	POS.	1.000	482.1		0.0	Č	
1	2.100	TOP	SERV-II SERV-IIA			482.1	-26.4 -26.4	-5.2		
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4	6.0 5.2	C	
1	4.200	TOP	SERV-II SERV-IIA	POS.			-26.4 -26.4		С С С	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4		C	
1	6.300	TOP	SERV-II SERV-IIA		1.000	482.1	-26.4 -26.4	-13.6	C C	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4		C	
1	8.400	TOP	SERV-II SERV-IIA		1.000	482.1	-26.4 -26.4	-16.9		
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1			C	
1	10.500	TOP	SERV-II SERV-IIA	POS.	1.000		-26.4 -26.4		C	

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### 9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span			Limit		Intermediate Calculation	Resist	ance	Factored Flexural Stress	Resist.	
No.	Dist. (ft)	T/B	State	Flex.	Rh*	Mr(e)* (kip-ft)	Fr (ksi)	Fu* (ksi)	Calc.**	Check***
1	10.500	BOT	SERV-II	POS.	1.000	482.1	26.4	22.5	C	
			SERV-IIA	POS.	1.000	482.1	26.4	19.5	C	
1	12.600	TOP	SERV-II	POS.	1.000	482.1			C	
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1 482.1	-26.4 26.4	-21.6 24.8	C C	
		ВОТ	SERV-IIA	POS.	1.000	482.1	26.4	21.6	C	
1	14.700	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	-26.4 -26.4	-26.5 -23.1	C C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1	26.4	26.5	C	A
		DOI	SERV-IIA	POS.	1.000	482.1	26.4	23.1	Ċ	
1	16.800	TOP	SERV-II	POS.	1.000	482.1		-27.8	C	A
		D.O.M.	SERV-IIA	POS.	1.000		-26.4	-24.3	C	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4	27.8 24.3	C C	A
1	18.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-28.4	C	A
		вот	SERV-IIA SERV-II	POS.	1.000		-26.4	-24.8	C	A
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4	28.4 24.8	c	A
1	21.000L	TOP	SERV-II	POS.	1.000	482.1			C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1 482.1	-26.4 26.4	-24.7 28.2	C C	A
		БОІ	SERV-IIA	POS.	1.000	482.1	26.4	24.7	C	A
1	21.000R	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1		-28.2 -24.7	C C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1	26.4	28.2	C	A
		201	SERV-IIA	POS.	1.000	482.1	26.4	24.7	Ċ	**
1	23.100	TOP	SERV-II	POS.	1.000	482.1		-28.4	C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1 482.1	-26.4 26.4	-24.8 28.4	C	A
		ВОТ	SERV-IIA	POS.	1.000	482.1	26.4	24.8	C	A
1	25.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.8	C	A
		рош	SERV-IIA	POS.	1.000		-26.4	-24.3	C	
		BOT	SERV-II SERV-IIA	POS. POS.	1.000	482.1 482.1	26.4 26.4	27.8 24.3	C	A
1	27.300	TOP	SERV-II	POS.	1.000	482.1		-26.5	C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1 482.1	-26.4 26.4	-23.1 26.5	C C	A

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#### 9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span No.	Dist.	T/B	Limit State		Intermediate Calculation Rh*	Resist	ance	Stress	Resist. Calc.**	Code Check***
1	(ft) 27.300	BOT	SERV-IIA	POS.	Rh*	(Kip-It) 482.1	(KS1) 26.4	(KS1) 23.1	C	
1	29.400		SERV-II SERV-IIA	POS.	1.000	482.1 482.1	-26.4 -26.4	-24.8 -21.6	C C	
		BOT	SERV-II SERV-IIA	POS.	1.000 1.000 1.000	482.1 482.1	26.4 26.4	24.8 21.6	C	
1	31.500	TOP	SERV-II SERV-IIA	POS.	1.000 1.000 1.000	482.1 482.1	-26.4 -26.4	-22.5 -19.5	C	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4	22.5 19.5	C	
1	33.600	TOP	SERV-II SERV-IIA	POS.	1.000 1.000 1.000	482.1 482.1	-26.4 -26.4	-19.5 -16.9	C	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4 26.4	19.5 16.9	C	
1	35.700	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	-26.4 -26.4	-15.7 -13.6	C	
		BOT	SERV-II SERV-IIA	POS. POS.	1.000 1.000 1.000	482.1 482.1	26.4 26.4	15.7 13.6	C	
1	37.800	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	-26.4	-11.2	C C	
		BOT	SERV-II SERV-IIA	POS. POS.	1.000 1.000 1.000	482.1 482.1	26.4 26.4	11.2 9.7	C	
1	39.900	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	-26.4 -26.4	-6.0 -5.2	C C	
		BOT	SERV-II SERV-IIA	POS.	1.000 1.000 1.000	482.1 482.1	26.4 26.4	6.0 5.2	C C	
1	42.000	TOP	SERV-II SERV-IIA	POS.	1.000 1.000 1.000	482.1 482.1	-26.4 -26.4	0.0	C C	
		BOT			1.000					

<sup>\*</sup> Legend of General Notes:

BOT SERV-II POS. SERV-IIA POS.

482.1 26.4 482.1 26.4

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#### 9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

#### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

#### \*\* Legend of Resistance Calculation:

- A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3

\*\*\* Legend of Code Check:
A. Insufficient flexural resistance

### SERVICE LIMIT STATE - WEB BEND-BUCKLING

		-							Factored	
Span			Limit		Calcula	tions	Flexu Resist	ance	Stress	Code
No.	Dist.	T/B	State	Flex.	Dc*	Rh*	Mr(e)* (kip-ft)	Fcrw*	fc*	Check**
1			SERV-II SERV-IIA		12.79	1.000	602.6	-33.0	0.0	
1	2.100	TOP TOP	SERV-II SERV-IIA				602.6 602.6			
1	4.200		SERV-II SERV-IIA		12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-11.2 -9.7	
1	6.300		SERV-II SERV-IIA							
1	8.400		SERV-II SERV-IIA				602.6 602.6			
1	10.500		SERV-II SERV-IIA				602.6 602.6			
1	12.600	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-24.8 -21.6	
1	14.700		SERV-II SERV-IIA				602.6 602.6			
1	16.800		SERV-II SERV-IIA		12.79 12.79		602.6 602.6			
1	18.900		SERV-II SERV-IIA				602.6 602.6		-28.4 -24.8	
1	21.000L		SERV-II SERV-IIA							
1	21.000R	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-28.2 -24.7	

Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated
from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges
of noncomposite sections, this value includes lateral
stresses when input by the user (A6.10.4.2.2)

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#### 9041 EXTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

									Factored	
Span			Limit		Interme Calcula	tions	Flexu Resist		Flexural Stress	Code
No.	Dist.	T/B	State	Flex.	Dc*	Rh*	Mr(e)*			Check**
	(ft)				(in)		(kip-ft)			
1	23.100	TOP	SERV-II	POS.	12.79				-28.4	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-24.8	
1	25.200	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-24.3	
1	27.300	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-26.5	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-23.1	
1	29.400	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-24.8	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-21.6	
1	31.500	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-22.5	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-19.5	
1	33.600	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-19.5	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-16.9	
1	35.700	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-15.7	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-13.6	
1	37.800	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-11.2	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-9.7	
1	39.900	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-6.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-5.2	
1	42.000	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	0.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	

<sup>\*</sup> Legend of Intermediate Calculations:

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9041 EXTERIOR BEAM HS20 - SPECIFICATION CHECKING (cont.)

### SHEAR CAPACITY Dankara Maraka

Span		Limit	Factored Shear Resistance	Factored	Stiffened/	Code
	Dist. (ft)	State	Vr	Vu (kips)	Unstiffened	
1	0.000	STR-I STR-II	256.60 256.60		n	
1	2.100	STR-I STR-II	256.60 256.60	88.31 73.95	n	
1	4.200	STR-I STR-II	256.60 256.60	81.16 67.79		
1	6.300	STR-I STR-II	256.60 256.60	74.01 61.63	n	
1	8.400	STR-I STR-II	256.60 256.60	66.87 55.46	n	
1	10.500		256.60 256.60	59.72 49.30		
1	12.600	STR-I STR-II	256.60 256.60	52.57 43.14	n	
1	14.700	STR-I STR-II	256.60 256.60	45.58 37.11		
1	16.800	STR-I STR-II	256.60 256.60		n	
1	18.900	STR-I STR-II	256.60 256.60	32.25 25.52	n	
1	21.000L	STR-I STR-II	256.60 256.60		n	
1	21.000R	STR-I STR-II	256.60 256.60	25.58 19.73		
1	23.100	STR-I STR-II	256.60 256.60	-22.05 -17.66	n	
1	25.200	STR-I STR-II	256.60 256.60	-27.39 -22.42	n n	
1	27.300	STR-I STR-II	256.60 256.60	-32.73 -27.19		
1	29.400	STR-I	256.60	-38.27	U	

Dc = Depth of web in compression Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from

Mr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Fcrw
Forw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4 fc = Compression-flange stress calculated without flange lateral bending
N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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9041 EXTERIOR BEAM HS20 - SPECIFICATION CHECKING (cont.)

S	H	Ε	A	R		C	Α	P	Α	C	Ι	Т	Y		(	C	0	n	t	•	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

	Dist. (ft)		Resistance Vr (kips)	Factored Shear Vu	Unstiffened	
1	31.500	STR-I STR-II	256.60 256.60			
1	33.600	STR-I STR-II		-49.57 -42.13		
1	35.700	STR-I STR-II	256.60 256.60	-55.23 -47.13	n	
1	37.800	STR-I STR-II			n	
1	39.900	STR-I STR-II	256.60 256.60		n	
1	42.000	STR-I STR-II	256.60 256.60		n	

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# 9041 EXTERIOR BEAM H20 - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

pan No.	Dist.	T/B	Limit State	Flex.	Inte	rmediate C	alculat Rb*	ions An/Ag*	Flexu Resist	ral ance Fr	Factored Flex+Lat Stress F+*	Resist. Calc.**	Code Chk**
1	(ft) 0.000	TOP	STR-I STR-II	POS. POS.	(in) 2.2 2.2	(in) 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 1.000	N/A N/A	(kip-ft) 602.6 602.6	-33.0 -33.0	(ksi) 0.0 0.0	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0 33.0	0.0	J J	
1	2.100	TOP	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-6.3 -5.5	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0 33.0	6.3 5.5	J J	
1	4.200	TOP	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00	0 1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-11.9 -10.5	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0 33.0	11.9 10.5	J J	
1	6.300	TOP	STR-I	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-16.8	D D	
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0	16.8	J J	
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0	21.0	J J	
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0	24.5	J J	
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0	27.4 24.2	J J	
1	14.700	TOP	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00	0 1.000	N/A N/A	602.6 602.6	-33.0	-29.5	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6 602.6	33.0	29.5	J J	
1	16.800	TOP	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00	0 1.000	N/A N/A	602.6 602.6	-33.0	-31.0 -27.5	D D	
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A 0 N/A	N/A N/A	602.6	33.0	31.0	J J	
						12.8 1.00							

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H20 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
												Flex+Lat		
Span										Resist			Resist.	
No.		T/B	State				Rh*	Rb*		Mr(e)*			Calc.**	Chk***
	(ft)				(in)					(kip-ft)				
1	18.900	TOP	STR-II	POS.	2.2	12.8	1.000	1.000		602.6	-33.0	-28.2	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	31.8	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	28.2	J	
1	21.000L	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-31.9	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-28.3	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	31.9	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	28.3	J	
1	21.000R	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-31.9	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-28.3	D	
		BOT	STR-I	POS.				N/A				31.9	J	
			STR-II					N/A		602.6			J	
								,	,				-	
1	23.100	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-31.8	D	
			STR-II					1.000				-28.2	D	
		BOT	STR-I	POS.				N/A			33.0		J	
		201	STR-II					N/A		602.6			J	
			0111 11	100.	2.2	12.0	1.000	/	/	002.0	55.0	20.2	Ü	
1	25.200	TOP	STR-T	POS.	2 2	12 8	1 000	1.000	N/A	602 6	-33 0	-31.0	D	
-	23.200	101	STR-II					1.000				-27.5	D	
		BOT	STR-I					N/A			33.0		J	
			STR-II					N/A	N/A	602.6			J	
			0111 11	100.	2.2	12.0	1.000	/	/	002.0	55.0	27.5	Ü	
1	27.300	TOP	STR-T	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-29.5	D	
			STR-II					1.000				-26.2	D	
		BOT	STR-I	POS.				N/A				29.5	J	
			STR-II					N/A		602.6			J	
								,	,				-	
1	29.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-27.4	D	
			STR-II					1.000				-24.2	D	
		BOT	STR-I	POS.				N/A			33.0		J	
			STR-II					N/A		602.6			J	
			0111 11	100.	2.2	12.0	1.000	/	/	002.0	55.0	21.2	Ü	
1	31.500	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-24.5	D	
			STR-II					1.000				-21.7	D	
		BOT	STR-I	POS.				N/A	N/A	602.6			J	
			STR-II					N/A		602.6			J	
								,	,					
1	33.600	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-21.0	D	
_			STR-II					1.000				-18.6	D	
		BOT	STR-I					N/A				21.0	J	
			STR-II					N/A		602.6			J	
									,					
1	35.700	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-16.8	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-14.8	D	

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#### 9041 EXTERIOR BEAM H20 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

											Factored		
									Flexu	ıral	Flex+Lat		
1		Limit		Inte	rmedia	ate Cal	Lculat:	ions	Resist	ance	Stress	Resist.	Code
Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Chk***
(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
35.700	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.8	J	
		STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.8	J	
37.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-11.9	D	
		STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-10.5	D	
	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	11.9	J	
		STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	10.5	J	
39.900	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-6.3	D	
		STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-5.5	D	
	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	6.3	J	
		STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	5.5	J	
42.000	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
		STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
		STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
	35.700 37.800 39.900	Dist. T/B (ft) 35.700 BOT 37.800 TOP BOT 39.900 TOP BOT 42.000 TOP	Dist.   T/B   State (ft)   35.700   BOT   STR-I   STR-II   BOT   STR-II   BOT   STR-II   STR-II   BOT   STR-II   BOT   STR-II   BOT   STR-II   STR-II   STR-II   STR-II   BOT   STR-II	Dist.   T/B State   Flex.	Dist.   T/B State   Flex.   rt* (ft)   35.700   BOT STR-I   POS.   2.2   STR-II   POS.   2.2   STR-II   POS.   2.2   EVENTION   POS.   E	Dist.   T/B   State   Flex.   rt*   Dc*	Dist.   T/B   State   Flex.   rt*   Dc*   Rh* (ft)   35.700   BOT   STR-I   POS.   2.2   12.8   1.000   STR-II   POS.	Dist.   T/B   State   Flex.   rt*   Dc*   Rh*   Rb* (ft)   35.700   BOT   STR-I   POS.   2.2   12.8   1.000   N/A   STR-II   POS.   2.2   12.8   1.000   N/A   STR-II   POS.   2.2   12.8   1.000   N/A   STR-II   POS.   2.2   12.8   1.000   1.000   BOT   STR-II   POS.   2.2   12.8   1.000   N/A   STR-II   POS.   2.2   12.8   1.000   1.000   1.000   STR-II   POS.   2.2   12.8   1.000   1.000   STR-II   POS.   2.2   12.8   1.000   1.000   TOTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	Dist.   T/B   State   Flex.   rt*   Dc*   Rh*   Rh*   An/Ag*	Limit   Dist.   T/B   State   Flex.   Trt=rmediate Calculations   Resist	Dist.   T/B   State   Flex.   Intermediate Calculations   Resistance   Resistance   T/B   State   Flex.   Intermediate Calculations   Resistance   Resistance   T/B   State   Flex.   T/B   De* Rh* Rb* Rb* An/Ag*   Mr(e)* Fr   (kip-ft)   (ksi)   35.700   BOT STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   37.800   TOP STR-II   POS.   2.2   12.8   1.000   1.000   N/A   602.6   -33.0   BOT STR-II   POS.   2.2   12.8   1.000   1.000   N/A   602.6   -33.0   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   39.900   TOP STR-II   POS.   2.2   12.8   1.000   1.000   N/A   602.6   -33.0   STR-II   POS.   2.2   12.8   1.000   1.000   N/A   602.6   -33.0   BOT STR-II   POS.   2.2   12.8   1.000   1.000   N/A   602.6   -33.0   BOT STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/A   602.6   33.0   Garage   STR-II   POS.   2.2   12.8   1.000   N/A   N/	Dist.   The State   Flex.   The Tree   The State   Flex.   The State   Flex.   The State   The State	Dist.   Limit   Limit   Dist.   T/B   State   Flex.   Intermediate Calculations   Flex.   Tr*   De* Rh*   Rb*   An/Ag*   Mr(e)*   Fr   Fr   Fr   Fr   Fr   Fr   Fr   F

#### \* Legend of General Notes:

- rt = Effective radius of gyration for lateral torsional buckling
  Dc = Total depth of the web in compression, per Appendix D6.3.1
- = Hybrid factor
- Rb = Load shedding factor (only applies to compression flange)
  An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1
- Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr F+ = fbu + (1/3)\*fl, total factored flexural + lateral stress due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects

### \*\* Legend of Resistance Calculation:

- Legend of Resistance Calculation:

  A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2

  C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1

  D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

  F. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

  G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1

  G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-2

  H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3

  I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1

  N. Tomosmos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1

  K. Tension flange, Fr calculated using hab. 10.8.3-1

  K. SKW has not been entered. App. A provisions have been skipped but may be applicable.

- X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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9041 EXTERIOR BEAM

H20 - SPECIFICATION CHECKING (cont.)

# FLANGE LATERAL CAPACITY

This output report is not applicable because wind loads do not apply to this vehicle.

### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

### SERVICE LIMIT STATE - FLEXURAL RESISTANCE

								Factored		
					Intermediate			Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	0.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	Ċ	
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-4.8	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-4.3	C	
		BOT	SERV-II	POS.		482.1			č	
			SERV-IIA	POS.	1.000	482.1	26.4	4.3	C	
									-	
1	4.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-9.1	C	
_			SERV-IIA	POS.			-26.4		č	
		BOT	SERV-II	POS.		482.1			Č	
		201	SERV-IIA	POS.		482.1			Ċ	
			DDICT TITL	100.	1.000	102.1	20.1	0.1	-	
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-12.9	C	
_			SERV-IIA	POS.			-26.4		Č	
		BOT		POS.		482.1			Ċ	
		DOI	SERV-TTA	POS.		482.1			C	
			DERCY IIA	100.	1.000	402.1	20.4	11.5	C	
1	8.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-16.2	C	
-	0.100	101	SERV-IIA	POS.			-26.4		Ċ	
		BOT	SERV-II	POS.		482.1			Ċ	
		DOI	SERV-IIA	POS.		482.1			Č	
			DERCY IIA	100.	1.000	402.1	20.4	11.1	C	
1	10.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-18.9	C	
_	10.500	101	SERV-IIA				-26.4		Ċ	
		BOT		POS.		482.1			Č	
		DOI	SERV-IIA	POS.		482.1			C	
			DERCY IIA	100.	1.000	402.1	20.4	10.0	C	
1	12.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-21.1	С	
1	12.000	101	SERV-II	POS.			-26.4		C	
		BOT	SERV-II	POS.		482.1			Ċ	
		DOI	SERV-IIA	POS.		482.1			C	
			SEKV-IIA	FUS.	1.000	402.1	20.4	10.0	_	
1	14.700	TOP	SERV-II	POS.	1.000	482.1	-26.4	-22.8	С	
1	14.700	101	SERV-IIA	POS.		482.1			C	
			SERV-IIA	FUS.	1.000	402.1	-20.4	-20.3	_	

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# 9041 EXTERIOR BEAM

H20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

	-									
Span No.	Dist.	T/B	Limit State	Flex.	Intermediate Calculation Rh* 1.000 1.000	Flexu Resist Mr(e)*	ral ance Fr	Factored Flexural Stress Fu*	Resist. Calc.**	Code Check***
1	14.700	BOT	SERV-II SERV-IIA	POS. POS.	1.000	482.1 482.1	26.4 26.4	22.8 20.3	C C	
1	16.800	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-23.9 -21.3 23.9 21.3	0 0 0	
					1.000 1.000 1.000 1.000					
1	21.000L	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-24.6 -21.9 24.6 21.9	0 0 0	
1	21.000R	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-24.6 -21.9 24.6 21.9	C C C	
1	23.100	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-24.5 -21.8 24.5 21.8	0 0 0	
1	25.200	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-23.9 -21.3 23.9 21.3	0 0 0	
1	27.300	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-22.8 -20.3 22.8 20.3	C C C	
1	29.400	TOP	SERV-II SERV-IIA SERV-II SERV-IIA	POS. POS. POS.	1.000 1.000 1.000 1.000	482.1 482.1 482.1 482.1	-26.4 -26.4 26.4 26.4	-21.1 -18.8 21.1 18.8	C C C	
					1.000 1.000 1.000					

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# 9041 EXTERIOR BEAM

# H20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

# Factored

Span No.	Dist. (ft)	T/B	Limit State	Flex.	Intermediate Calculation Rh*	Flexu Resist Mr(e)* (kip-ft)	ance Fr		Resist. Calc.**	
1	31.500	BOT	SERV-IIA	POS.	1.000	482.1	26.4	16.8	C	
1	33.600	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1			C C	
		BOT	SERV-II SERV-IIA	POS.	1.000		26.4	16.2		
1	35.700	TOP	SERV-II	POS.		482.1			C	
		BOT	SERV-IIA SERV-II SERV-IIA	POS. POS. POS.		482.1 482.1 482.1	26.4	12.9		
1	37.800	TOP	SERV-II SERV-IIA	POS.		482.1 482.1			C	
		BOT	SERV-II SERV-IIA	POS.		482.1 482.1		9.1 8.1	C C	
1	39.900	TOP	SERV-II SERV-IIA	POS.		482.1 482.1				
		BOT	SERV-II SERV-IIA	POS.		482.1 482.1			C	
1	42.000	TOP	SERV-II SERV-IIA	POS.		482.1 482.1			C C	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4		C	

- \* Legend of General Notes:

- Rh = Hybrid factor
  Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
  Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)
- \*\* Legend of Resistance Calculation:
  A. Composite, top flange, Fr calculated using A6.10.4.2.2-1
  B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2
  C. Noncomposite, Fr calculated using A6.10.4.2.2-3

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# 9041 EXTERIOR BEAM

H20 - SPECIFICATION CHECKING (cont.) DECEMBER OF STREET

# SERVICE LIMIT STATE - WEB BEND-BUCKLING

		-							Factored	
Span No.	Dist. (ft)	T/B	Limit State SERV-II	Flex.	Dc*	Rh*	Mr(e)*	ral ance Fcrw*	Flexural Stress fc*	Code Check**
1	0.000	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	0.0	
1	2.100	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-4.8 -4.3	
1	4.200	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-9.1 -8.1	
1	6.300		SERV-II SERV-IIA							
1	8.400	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-16.2 -14.4	
1	10.500	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-18.9 -16.8	
1	12.600	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-21.1 -18.8	
1	14.700		SERV-II SERV-IIA							
1	16.800	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-23.9 -21.3	
1	18.900	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-24.5 -21.8	
1	21.000L	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-24.6 -21.9	
1	21.000R	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-24.6 -21.9	
1	23.100	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-24.5 -21.8	
1	25.200	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	-23.9 -21.3	
1	27.300		SERV-II SERV-IIA							
1	29.400	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-21.1	

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# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

									Factorea	
					Interme	diate	Flexu	ral	Flexural	
Span			Limit		Calcula	tions	Resist	ance	Stress	Code
No.	Dist.	T/B	State	Flex.	Dc*	Rh*	Mr(e)*	Fcrw*	fc*	Check**
110.	(ft)	-/-	Deace	1 10111	(in)		(kip-ft)			CIICOIL
1	29.400	TOP	SERV-IIA	POS.	12.79		602.6			
1	29.400	IUP	SERV-IIA	PUS.	12.79	1.000	602.6	-33.0	-10.0	
1	31.500	TOP	SERV-II	POS.	12.79	1.000	602.6			
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-16.8	
1	33.600	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-16.2	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-14.4	
		101	DDICT TITL	100.	12.75	1.000	002.0	33.0		
1	35.700	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-12.9	
Τ.	35.700									
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-11.5	
1	37.800	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-9.1	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-8.1	
1	39.900	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-4.8	
-	33.300	TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0		
		IOF	DDK v - TIM	100.	12.75	1.000	002.0	55.0	4.3	
4	40 000	mor.	OPDII TT	DOG	10 70	1 000		22.0	0 0	
1	42.000	TOP	SERV-II	POS.	12.79	1.000		-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	

- \* Legend of Intermediate Calculations: Dc = Depth of web in compression Rh = Hybrid factor

Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Fcrw
Fcrw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4 fc = Compression-flange stress calculated without flange lateral bending N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

# SHEAR CAPACITY

Span		Limit	Factored Shear Resistance	Maximum Factored Shear	Stiffened/	Code
No.	Dist.	State	Vr	Vu	Unstiffened	Check*
	(ft)		(kips)	(kips)		
1	0.000	STR-I	256.60	75.60	U	
		STR-II	256.60	64.79	U	
1	2.100	STR-I STR-II	256.60 256.60	69.64 59.55	n	
1	4.200	STR-I	256.60	63.76	U	

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			SHEAR CAPACIT	Y (cont.)		
Span No.	Dist.	Limit State	Resistance	Factored Shear	Stiffened/ Unstiffened	
1	(ft) 4.200	STR-II	256.60	54.36	U	
1	6.300	STR-I STR-II	256.60 256.60	57.96 49.24		
1	8.400	STR-I STR-II	256.60 256.60	52.24 44.18	U	
1	10.500	STR-I STR-II				
1	12.600	STR-I STR-II	256.60 256.60	41.70 34.76		
1	14.700	STR-I STR-II		36.47 30.08		
1	16.800	STR-I STR-II		31.24 25.39		
1	18.900	STR-I STR-II	256.60 256.60	26.01 20.71	n n	
1	21.000L	STR-I STR-II	256.60 256.60	20.78 16.03		
1	21.000R	STR-I STR-II				
1	23.100	STR-I STR-II	256.60 256.60			
1	25.200	STR-I STR-II		-22.37 -18.55		
1	27.300	STR-I STR-II	256.60 256.60	-26.77 -22.59		
1	29.400	STR-I STR-II	256.60 256.60	-31.17 -26.63		
1	31.500	STR-I STR-II		-35.57 -30.67		

1 33.600 STR-I 256.60 -40.02

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# 9041 EXTERIOR BEAM H20 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY (cont.)

Span No.	Dist.	Limit State	Factored Shear Resistance Vr (kips)	Maximum Factored Shear Vu (kips)	Stiffened/ Unstiffened	Code Check*
1	33.600	STR-II	256.60	-34.75	U	
1	35.700	STR-I STR-II	256.60 256.60	-44.74 -39.04	n	
1	37.800	STR-I STR-II	256.60 256.60	-49.51 -43.37	n	
1	39.900	STR-I STR-II	256.60 256.60	-54.33 -47.74	n	
1	42.000	STR-I STR-II	256.60 256.60	-59.21 -52.14	U	

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9041 EXTERIOR BEAM TK527 - SPECIFICATION CHECKING

### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

											ıral	Factored Flex+Lat		
Span			Limit							Resist			Resist.	
No.	Dist.	T/B	State	Flex.			Rh*			Mr(e)*			Calc.**	Chk***
	(ft)				(in)	(in)			/-	(kip-ft)	(ksi)	(ksi)	_	
1	0.000	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6 602.6	-33.0	0.0	D D	
		пош	STR-II STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	J	
		БОІ	STR-II		2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
1	2.100	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-8.4	D	
			STR-II		2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-7.2	D	
		BOT	STR-I	POS.									J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	7.2	J	
1	4.200	TOP	STR-I	POS.						602.6			D	
			STR-II							602.6			D	
		BOT	STR-I	POS.			1.000			602.6			J	
			STR-II	POS.			1.000		N/A				J	
1	6.300	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-21.9	D	
			STR-II		2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-18.8	D	
		BOT	STR-I	POS.			1.000			602.6			J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	18.8	J	
1	8.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-27.1	D	
			STR-II						N/A	602.6	-33.0	-23.3	D	
		BOT	STR-I	POS.			1.000		N/A	602.6 602.6	33.0	27.1	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	23.3	J	
1	10.500	TOP	STR-I	POS.						602.6		-31.4	D	
			STR-II						N/A				D	
		BOT	STR-I	POS.			1.000			602.6			J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.0	J	
1	12.600	TOP	STR-I	POS.						602.6		-35.0	D	A
			STR-II						N/A	602.6	-33.0	-30.1	D	
		BOT	STR-I	POS.			1.000			602.6	33.0	35.0	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	30.1	J	
1	14.700	TOP	STR-I	POS.						602.6			D	A
			STR-II		2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-32.7	D	
		BOT	STR-I STR-II	POS.	2.2	12.8	1.000	N/A					J J	A
			STK-II	POS.					,				J	
1	16.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-39.9	D	A
			STR-II										D	A
		BOT	STR-I	POS.			1.000					39.9	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	34.4	J	A
1	18.900	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-40.9	D	A

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9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

										Flexu		Factored Flex+Lat		
Span			Limit		Inte	rmedia	ata Ca	lculati	one				Resist.	Code
	Dist.	T/B	State	Flev						Mr(e)*		F+*	Calc.**	
140.	(ft)	1/1	beace	IICA.	(in)	(in)	1011	100		(kip-ft)			carc.	CIIIC
1		TOD	STR-II	POS.			1 000	1.000				-35.2	D	A
_	10.500		STR-I	POS.			1.000		N/A	602.6		40.9	J	A
		201	STR-II	POS.				N/A		602.6	33.0	35.2	J	A
			0111 11	100.	2.2	12.0	1.000	24/22	/	002.0	33.0	33.2		**
1	21.000L	TOP	STR-T	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-40.8	D	A
_			STR-II	POS.				1.000		602.6		-35.2	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A		602.6	33.0	40.8	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	35.2	J	A
1	21.000R	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-40.8	D	A
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-35.2	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	40.8	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	35.2	J	A
1	23.100	TOP	STR-I	POS.				1.000		602.6			D	A
			STR-II					1.000		602.6	-33.0	-35.2	D	A
		BOT	STR-I	POS.				N/A		602.6	33.0		J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	35.2	J	A
1	25.200		STR-I	POS.				1.000		602.6			D	A
			STR-II					1.000		602.6			D	A
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0	39.9	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	34.4	J	A
_		mon	amp =	200					/-				_	
1	27.300	TOP	STR-I STR-II	POS.				1.000			-33.0 -33.0		D D	A
		D.O.E.	STR-II	POS.	2.2			N/A		602.6	33.0	38.0	J	A
		BOT	STR-II	POS.	2.2		1.000		N/A N/A	602.6	33.0	38.0	J	A
			SIK-II	PUS.	2.2	12.0	1.000	IN / PA	IN / PA	602.6	33.0	34.1	U	
1	29.400	TOD	STR-I	POS.	2.2	12 0	1 000	1.000	N/A	602 6	-33.0	-35.0	D	Α
1	29.400	IOF	STR-II					1.000		602.6		-30.1	D	A
		DOT	STR-II	POS.	2.2			N/A		602.6	33.0	35.0	J	Α
		БОІ	STR-II		2.2			N/A		602.6	33.0	30.1	J	A
			SIK-II	PUS.	2.2	12.0	1.000	IV / PA	IN / PA	602.6	33.0	30.1	U	
1	31.500	TOD	STR-I	POS.	2.2	12 8	1 000	1.000	N/A	602 6	-33.0	-31.4	D	
_	31.300	101	STR-II					1.000			-33.0		D	
		BOT	STR-I	POS.				N/A		602.6	33.0	31.4	J	
		DOI		POS.	2.2		1.000		N/A	602.6	33.0	27.0	J	
			0111 11	100.	2.2	12.0	1.000	24/22	/	002.0	33.0	27.0	Ü	
1	33.600	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-27.1	D	
-			STR-II					1.000			-33.0		D	
		BOT	STR-I	POS.	2.2			N/A		602.6	33.0	27.1	J	
			STR-II		2.2		1.000		N/A	602.6	33.0	23.3	J	
								, .	,					
1	35.700	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-21.9	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-18.8	D	

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## 9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
										Flexu	ıral	Flex+Lat		
Span			Limit		Inte	rmedia	ate Cal	lculat:	ions	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)			_	(kip-ft)	(ksi)	(ksi)		
1	35.700	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	21.9	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	18.8	J	
1	37.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-15.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-13.4	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	15.7	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	13.4	J	
1	39.900	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-8.4	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-7.2	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	8.4	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	7.2	J	
1	42.000	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	

## \* Legend of General Notes:

- rt = Effective radius of gyration for lateral torsional buckling
  Dc = Total depth of the web in compression, per Appendix D6.3.1
- = Hybrid factor
- Rb = Load shedding factor (only applies to compression flange)
  An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1
- Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr F+ = fbu + (1/3)\*fl, total factored flexural + lateral stress due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects

### \*\* Legend of Resistance Calculation:

- Legend of Resistance Calculation:

  A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2

  C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1

  D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

  F. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

  G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1

  G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-2

  H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3

  I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1

  N. Tomosmos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1

  K. Tension flange, Fr calculated using hab. 10.8.3-1

  K. SKW has not been entered. App. A provisions have been skipped but may be applicable.

- X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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### 9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

#### \*\*\* Legend of Code Check:

1 10.500 TOP SERV-II POS. SERV-IIA POS.

A. Insufficient flexural resistance

B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (F+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

Factored

482.1 -26.4 -24.0

482 1 -26 4 -20 8

#### FLANGE LATERAL CAPACITY

This output report is not applicable because wind loads do not apply to this vehicle.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Intermediate Flexural Flexural Calculation Limit Resistance Stress Resist. Code Mr(e)\* Fr (kip-ft) (ksi) 482.1 -26.4 482.1 -26.4 Calc.\*\* Check\*\*\* Dist. T/B State Flex. Rh\* No. F11\* (ksi) (ft) TOP SERV-II POS. 0.000 0.0 SERV-IIA POS. 1.000 0.0 BOT SERV-II POS. 1.000 482.1 26.4 0.0 C SERV-IIA POS. 1.000 482.1 26.4 0.0 1 2.100 TOP SERV-II POS. 1.000 482.1 -26.4 С -64 SERV-IIA POS. 1.000 482.1 -26.4 -5.5 BOT SERV-II SERV-IIA POS. 1.000 482.1 26.4 4.200 TOP SERV-II 482.1 -26.4 SERV-IIA POS. 1.000 482.1 -26.4 -10.3 BOT SERV-II POS 1 000 482.1 26.4 482.1 26.4 12 0 SERV-IIA POS. 1.000 10.3 6.300 TOP SERV-II POS 1 000 482 1 -26 4 SERV-IIA POS. 1.000 482.1 -26.4 482.1 26.4 -14.4 16.8 BOT SERV-II SERV-IIA 1.000 482.1 26.4 8.400 TOP SERV-II 1.000 482.1 -26.4 -20.7 SERV-IIA POS. 1.000 482.1 -26.4 -17.9 BOT SERV-II POS. 1.000 482.1 26.4 20.7 SERV-IIA POS. 1.000 482.1 26.4 17.9

1.000

1 000

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### 9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

## SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span	Di-t	m/p	Limit	77	Intermediate Calculation Rh*	Flexu Resist	ance	Factored Flexural Stress		Code Check***
No.	Dist. (ft)	T/B	State	Flex.	Kn*	Mr(e)* (kip-ft)	Fr	Fu* (ksi)	Caic.**	Cneck***
1	10.500	BOT	SERV-II	POS.	1.000	(Kip-It) 482.1	26.4	(KS1) 24.0	С	
1	10.500	BUI	SERV-IIA	POS.	1.000	482.1	26.4		Ċ	
			SEKV-IIA	FOS.	1.000	402.1	20.4	20.0	C	
1	12.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-26.8	С	A
-	12.000	101	SERV-IIA	POS.	1.000	482.1			Č	**
		BOT	SERV-II	POS.	1.000	482.1	26.4		č	A
			SERV-IIA	POS.	1.000	482.1	26.4	23.1	C	
1	14.700	TOP	SERV-II	POS.	1.000	482.1	-26.4	-29.0	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-25.1	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	29.0	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	25.1	C	
									_	
1	16.800	TOP	SERV-II	POS.	1.000		-26.4		C	A
			SERV-IIA	POS.	1.000		-26.4		C	
		BOT	SERV-II	POS.	1.000	482.1	26.4		C	A
			SERV-IIA	POS.	1.000	482.1	26.4	26.4	C	
1	18.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-31.3	С	A
_	10.500	101	SERV-IIA	POS.	1.000	482.1			Č	A
		BOT	SERV-II	POS.	1.000	482.1	26.4		Č	A
		DOI	SERV-IIA	POS.	1.000	482.1	26.4	27.0	ď	A
1	21.000L	TOP	SERV-II	POS.	1.000	482.1	-26.4	-31.3	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-27.1	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	31.3	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	27.1	C	A
1	21.000R	TOP	SERV-II	POS.	1.000	482.1 482.1			C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1		-27.1 31.3	C	A A
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1	26.4	27.1	C	A
			SERV-IIA	PUS.	1.000	402.1	20.4	27.1	C	A
1	23.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-31.3	С	A
_	25.100	101	SERV-IIA	POS.	1.000	482.1			Č	A
		BOT	SERV-II	POS.	1.000	482.1	26.4		Č	A
			SERV-IIA	POS.	1.000	482.1	26.4	27.0	C	A
1	25.200	TOP	SERV-II	POS.	1.000	482.1		-30.5	C	A
			SERV-IIA	POS.	1.000		-26.4		C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	30.5	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	26.4	C	
-	07 200	mo p	OPDII II	DOG	1 000	400 1	06.4	20.0	a	
1	27.300	TOP	SERV-II	POS.	1.000	482.1	-26.4 -26.4	-29.0 -25.1	C	A
		BOT	SERV-IIA SERV-II	POS.	1.000	482.1 482.1	-26.4 26.4	-25.1 29.0	C	A
		DUI	9PV A-11	FUS.	1.000	402.1	20.4	29.0	_	n

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#### 9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

								Factored		
					Intermediate			Flexural		
Span			Limit		Calculation			Stress	Resist.	
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*			Calc.**	Check***
	(ft)					(kip-ft)				
1	27.300	BOT	SERV-IIA	POS.	1.000	482.1	26.4	25.1	C	
1	29.400	TOP	SERV-II				-26.4			A
			SERV-IIA							
		BOT		POS.	1.000	482.1			C	A
			SERV-IIA	POS.	1.000	482.1	26.4	23.1	C	
1	31.500	TOP		POS.			-26.4		C	
			SERV-IIA	POS.	1.000	482.1			C	
		BOT						24.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	20.8	C	
1	33.600	TOP		POS.			-26.4			
			SERV-IIA				-26.4		C	
		BOT		POS.		482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	17.9	C	
1	35.700	TOP		POS.			-26.4		C	
			SERV-IIA	POS.		482.1	-26.4	-14.4	C	
		BOT						16.8	C	
			SERV-IIA	POS.	1.000	482.1	26.4	14.4	C	
1	37.800	TOP	SERV-II	POS.			-26.4		C	
			SERV-IIA			482.1	-26.4	-10.3	C	
		BOT	SERV-II	POS.		482.1		12.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	10.3	C	
1	39.900	TOP	SERV-II	POS.			-26.4			
			SERV-IIA				-26.4			
		BOT	SERV-II	POS.	1.000	482.1	26.4	6.4	C	
			SERV-IIA	POS.	1.000	482.1	26.4	5.5	C	
1	42.000	TOP	SERV-II	POS.			-26.4		C	
			SERV-IIA				-26.4		C	
		BOT	SERV-II	POS.		482.1		0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	

<sup>\*</sup> Legend of General Notes:

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## 9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

#### \*\* Legend of Resistance Calculation:

- A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3

\*\*\* Legend of Code Check:
A. Insufficient flexural resistance

### SERVICE LIMIT STATE - WEB BEND-BUCKLING

Factored										
							Flexu			
Span			Limit		Calcula	tions	Resist	ance	Stress	Code
No.	Dist.	T/B	State SERV-II	Flex.	Dc*	Rh*	Mr(e)*	FCrw*	ic*	Check**
1	(10)	TOD	CEDW_TT	DOS	12 79	1 000	(KID-IL)	-33 U	(KSI)	
_	0.000	TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	
1	2.100		SERV-II				602.6			
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-5.5	
-	4.200	mo p	SERV-II	DOG	10 70	1 000	600 6	22.0	10.0	
1	4.200		SERV-II SERV-IIA							
		101	DERV IIA	105.	12.75	1.000	002.0	33.0	10.5	
1	6.300	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-16.8	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-14.4	
1	8.400	TOP					602.6 602.6			
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-17.9	
1	10.500	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-24.0	
			SERV-IIA				602.6			
1	12.600		SERV-II							
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-23.1	
1	14.700	TOP	SERV-II	POS	12 79	1 000	602.6	-33 0	-29.0	
-	111700		SERV-IIA							
1	16.800		SERV-II				602.6			
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-26.4	
1	18.900	TOD	SERV-II	DOS	12 79	1 000	602.6	-33 N	-31.3	
_	10.500	TOP								
1	21.000L		SERV-II		12.79	1.000	602.6	-33.0	-31.3	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-27.1	
1	21.000R	TOP	SERV-II	DOG	10 70	1 000	602.6	22.0	21 2	
1	21.000K	TOP					602.6			
		101	CHICA TIM	100.	12.73	1.000	002.0	55.0	21.1	

Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

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9041 EXTERIOR BEAM TK527 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

					Interme	diate	Flexu	ral	Flexural	
Span			Limit		Calcula		Resist			Code
No.	Dist.	T/B	State	Flex.	Dc*	Rh*	Mr(e)*			Check**
	(ft)				(in)		(kip-ft)	(ksi)	(ksi)	
1	23.100	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-31.3	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-27.0	
1	25.200	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-30.5	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-26.4	
1	27.300	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-29.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-25.1	
1	29.400	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-26.8	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-23.1	
1	31.500	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-24.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-20.8	
1	33.600	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-20.7	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-17.9	
1	35.700	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-16.8	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-14.4	
1	37.800	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-12.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-10.3	
1	39.900	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-6.4	
-		TOP	SERV-IIA	POS.	12.79	1.000	602.6		-5.5	
1	42.000	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	0.0	
-		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	

<sup>\*</sup> Legend of Intermediate Calculations:

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9041 EXTERIOR BEAM TK527 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY

Span No.	Dist. (ft)	Limit State	Factored Shear Resistance Vr	Shear	Stiffened/ Unstiffened	Code Check*					
1	0.000	STR-I STR-II		103.59 86.38	n n						
1			256.60 256.60	95.82	U						
1		STR-I STR-II	256.60 256.60	88.04 73.10	n n						
1	6.300	STR-I STR-II	256.60 256.60	80.27 66.45	n n						
1	8.400	STR-I STR-II	256.60 256.60	72.60 59.89	n						
1			256.60 256.60								
1	12.600	STR-I STR-II	256.60 256.60	58.04 47.36	n n						
1	14.700	STR-I STR-II	256.60 256.60	50.77 41.10	n n						
1	16.800	STR-I STR-II	256.60 256.60	43.49 34.84	n n						
1			256.60 256.60								
1	21.000L	STR-I STR-II	256.60 256.60	28.93 22.32	n n						
1	21.000R	STR-I STR-II	256.60 256.60	28.93 22.32	n n						
1	23.100	STR-I STR-II									
1	25.200		256.60 256.60	-30.38 -24.73							
1	27.300	STR-I STR-II	256.60 256.60	-36.11 -29.80	n n						
1	29.400	STR-I	256.60	-41.85	U						

Dc = Depth of web in compression Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from

Mr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Fcrw
Forw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4 fc = Compression-flange stress calculated without flange lateral bending
N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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# 9041 EXTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

			SHEAR CAPACIT	Y (cont.)		
Span No.	Dist. (ft)	State	Resistance	Factored Shear Vu	Stiffened/ Unstiffened	
1		STR-II	256.60	-34.87	U	
1	31.500	STR-I STR-II		-47.58 -39.94		
1	33.600	STR-I STR-II		-53.32 -45.01	n	
1	35.700	STR-I STR-II		-59.32 -50.29		
1	37.800	STR-I STR-II	256.60 256.60		n	
1	39.900	STR-I STR-II	256.60 256.60	-71.43 -60.93	n	
1	42.000	STR-I STR-II		-77.49 -66.25	U	

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# 9041 EXTERIOR BEAM SUMMARY - OVERALL REACTIONS

# REACTIONS & ROTATIONS PER GIRDER (UNFACTORED, W/O IMPACT, W/ DISTRIBUTION) FOR ELASTOMERIC BEARING PAD DESIGN

Support No.		Minimum Reaction LC (kips)	Maximum Reaction LC (kips)	Live Load Rotation LC (radians)		
1	Total DC1 Total DC2	20.49	20.49	(IddIdib)		
	Total DL LL (PHL-93)	22.65 0.00	22.65 37.59 1	0.004597 5		
2	Total DC1 Total DC2	20.49 2.16	20.49 2.16			
	Total DL LL (PHL-93)	22.65	22.65 24.56 1	0.004597 5		

Note: Rotation is about an axis normal to the centerline of the beam. The rotation value given is the larger of the positive rotation and absolute value of the negative rotation due to live load.

- LC (PHL-93 Loading Codes):
  1 Tandem + Lane Governs
  2 Truck + Lane Governs
  3 Tandem Pair + Lane Governs
  4 Truck Pair + Lane Governs
  5 Truck Alone Governs
  6 25% Truck + Lane Governs
  7 90% (Truck Pair + Lane) Governs

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9041 EXTERIOR BEAM SUMMARY - OVERALL REACTIONS (cont.)

REACTIONS & ROTATIONS PER GIRDER (UNFACTORED, W/ IMPACT, W/ DISTRIBUTION) FOR POT, STEEL OR DISC BEARING DESIGN

Support		Minimum	Maximum		-
No.		Reaction LC (kips)	Reaction LC (kips)	Rotation LC (radians)	
1	Total DC1 Total DC2	20.49	20.49	-0.005042 -0.00532	
	Total DL LL (PHL-93)	22.65	22.65 47.71 1	-0.005574 -0.006113 5	-
2	Total DC1 Total DC2	20.49 2.16	20.49 2.16	0.005042 0.000532	
	Total DL LL (PHL-93)	22.65 0.00	22.65 31.17 1	0.005574 0.006113 5	

Note: Rotation is about an axis normal to the centerline of the beam.

LC (PHL-93 Loading Codes):

- 1 Tandem + Lane Governs
  2 Truck + Lane Governs
  3 Tandem Pair + Lane Governs
  4 Truck Pair + Lane Governs
- 5 Truck Alone Governs 6 25% Truck + Lane Governs
- 7 90% (Truck Pair + Lane) Governs

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9041 EXTERIOR BEAM SUMMARY - OVERALL REACTIONS (cont.)

# REACTIONS (UNFACTORED) FOR ABUTMENT DESIGN

DL REACTIONS (UNFACTORED) PER GIRDER

Support No.	Total DC1	Minimum Reaction (kips) 20.49	Maximum Reaction (kips) 20.49
_	Total DC2	2.16	2.16
	Total DL	22.65	22.65
2	Total DC1 Total DC2	20.49 2.16	20.49
	Total DL	22.65	22.65

#### LL REACTIONS PER LANE (UNFACTORED, W/O IMPACT)

Support		Minimu	Minimum			
No.		Reaction	LC	Reaction	LC	
		(kips)		(kips)		
1	PHL-93	0.00		72.96	1	
2	PHL-93	0.00		72.96	1	

Note: These values are to be used only if the end supports are abutments. Do not use these values for the pier design at a discontinuous superstructure.

LC (PHL-93 Loading Codes): 1 - Tandem + Lane Governs 2 - Truck + Lane Governs

3 - Tandem Pair + Lane Governs 4 - Truck Pair + Lane Governs 5 - Truck Alone Governs

6 - 25% Truck + Lane Governs 7 - 90% (Truck Pair + Lane) Governs

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9041 EXTERIOR BEAM SUMMARY - OVERALL REACTIONS (cont.)

# REACTIONS (UNFACTORED) FOR PIER DESIGN

#### DL REACTIONS (UNFACTORED) PER GIRDER

Support No.		Minimum Reaction	Maximum Reaction
1	Total DC1 Total DC2	(kips) 20.49 2.16	(kips) 20.49 2.16
	Total DL	22.65	22.65
2	Total DC1 Total DC2	20.49 2.16	20.49 2.16
	Total DL	22.65	22.65

# LL REACTIONS PER LANE (UNFACTORED, W/O IMPACT)

Support		Minimum Reaction			Maximum Reaction				
No.		Vehicle (kips)	LC	Lane (kips)	LC	Vehicle (kips)	LC	Lane (kips)	LC
1	PHL-93 P-82	0.00		0.00		59.52 97.71	1	13.44	1
2	PHL-93 P-82	0.00		0.00		59.52 97.71	1	13.44	1

Note: Impact must be added for pier cap design

- LC (PHL-93 Loading Codes):

  1 Tandem + Lane Governs

  2 Truck + Lane Governs

  3 Tandem Pair + Lane Governs

  4 Truck Pair + Lane Governs

  5 Truck Alone Governs

  6 25% Truck + Lane Governs

  7 90% (Truck Pair + Lane) Governs

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9041 EXTERIOR BEAM SUMMARY - RATING FACTORS W/O FWS

### RATING FACTORS - OVERALL SUMMARY W/O FWS

Governs	T/B					Limit State
Flexure Flexure	T	0.557 0.722		1	21.000L 21.000L	
Flexure	T	0.610	62.2	1	21.000L	STR-II
Flexure Flexure	T	0.634	23.2 30.1	1	21.000L 21.000L	
Flexure	T	0.811	29.2	1	18.900	STR-I
Flexure	T	1.051	37.9	1	18.900	STR-II
Flexure Flexure	T	1.071	21.4 27.8	1	21.000L 21.000L	
Flexure Flexure	T	0.681	27.2 35.3	1	21.000L 21.000L	STR-I STR-II
	Flexure Flexure Flexure Flexure Flexure Flexure Flexure Flexure	Flexure T	Governs         T/B         Factor           Flexure         T         0.557           Flexure         T         0.722           Flexure         T         0.610           Flexure         T         0.634           Flexure         T         0.822           Flexure         T         0.811           Flexure         T         1.051           Flexure         T         1.388           Flexure         T         0.681	Governs         T/B         Factor         Tonnage (tons)           Flexure         T         0.557 Flexure         T           Flexure         T         0.610         62.2           Flexure         T         0.634 23.2 Flexure         23.2 Flexure           Flexure         T         0.822 30.1         30.1           Flexure         T         1.051 37.9         37.9           Flexure         T         1.071 21.4 Flexure         27.8           Flexure         T         0.681 27.8	Governs         T/B         Factor         Tonnage (tons)         No.           Flexure         T         0.557         1           Flexure         T         0.722         1           Flexure         T         0.610         62.2         1           Flexure         T         0.634         23.2         1           Flexure         T         0.822         30.1         1           Flexure         T         0.811         29.2         1           Flexure         T         1.051         37.9         1           Flexure         T         1.388         27.8         1           Flexure         T         0.681         27.2         1	Governs         T/B         Factor         Tonnage (tons)         No.         Dist. (ft)           Flexure         T         0.557 (tons)         1         21.000L           Flexure         T         0.722         1         21.000L           Flexure         T         0.610         62.2         1         21.000L           Flexure         T         0.634         23.2         1         21.000L           Flexure         T         0.822         30.1         1         21.000L           Flexure         T         0.811         29.2         1         18.900           Flexure         T         1.051         37.9         1         18.900           Flexure         T         1.388         27.8         1         21.000L           Flexure         T         0.681         27.2         1         21.000L

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9041 EXTERIOR BEAM

SUMMARY - SPECIFICATION CHECKS

# SPECIFICATION CHECK WARNINGS

For the live loadings input by the user, the program encountered for the live loadings input by the user, the program encountered one or more specification check warnings. Specification check warnings indicate conditions that do not fail a specification check, but may need to be reviewed by the user. The following is a list of output table headings, listed separately for each live loading for which warnings have occurred. It should be noted that the program does not perform specification checking corresponding to commands that have not been input by the user.

# PHL-93/P-82

 $\$  WARNING: \*\*THIS MUST BE APPROVED BY CHIEF BRIDGE ENGINEER\*\* on Page 7 USER-DEFINED WIND LOAD AND PRESSURE ECONOMIC FEASIBILITY CHECKS

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9041 EXTERIOR BEAM

SUMMARY - SPECIFICATION CHECKS (cont.)

## SPECIFICATION CHECK FAILURES

For the live loadings input by the user, the program encountered one or more specification check failures. The following is a

list of output table headings, listed separately for each live loading for which failures have occurred. It should be noted that the program does not perform specification checking corresponding to commands that have not been input by the user.

#### PHL-93/P-82

DISTRIBUTION FACTORS FOR DESIGN LIVE LOADING (LANE FRACTION, INCL. SKEW) DISTRIBUTION FACTORS FOR FATIGUE VEHICLE (LANE FRACTION, INCL. SKEW) STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) SERVICE LIMIT STATE - FLEXURAL RESISTANCE SERVICE LIMIT STATE - WEB BEND-BUCKLING

BEARING STIFFENER CHECK WEB CONCENTRATED LOAD CHECK

DEFLECTION LIMITS FOR LIVE LOAD RATING FACTORS - STRESS FLEXURAL CAPACITY

## ML-80

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) SERVICE LIMIT STATE - FLEXURAL RESISTANCE BEARING STIFFENER CHECK

WEB CONCENTRATED LOAD CHECK RATING FACTORS - STRESS FLEXURAL CAPACITY

#### HS20

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) SERVICE LIMIT STATE - FLEXURAL RESISTANCE BEARING STIFFENER CHECK

WEB CONCENTRATED LOAD CHECK

RATING FACTORS - STRESS FLEXURAL CAPACITY

## TK527

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) SERVICE LIMIT STATE - FLEXURAL RESISTANCE

BEARING STIFFENER CHECK

WEB CONCENTRATED LOAD CHECK RATING FACTORS - STRESS FLEXURAL CAPACITY

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Program Title LRFD Steel Girder Design and Rating

Program Name Version 2.3.0.0 Last Updated 07/24/2014 Documentation 07/2014 License No. 333529

9041 INTERIOR BEAM BMS NO.: 48 7208 0684 9041

FEATURE CARRIED: LITTLE CREEK ROAD

FEATURE INTERSECTED: LITTLE MARTINS CREEK

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# 9041 INTERIOR BEAM

INPUT

%WARNING - <Input Post Processor>: The specified yield strength of the web should be greater than the maximum of 36 ksi or 70 percent of the specified yield strength of the higher strength flange. (LRFD 6.10.1.3) For Material ID No. 1:
Web yield of 33. ksi is less than 36. ksi

1 warning was issued.

- Please verify that the input is correct. - The program will continue running.

#### CONTROL PARAMETERS

Design/ Type of Beam Exterior/ No. No. Deck Pour Interior Beams Spans Symmetry Symmetry Analysis ANALYSIS ROLLED BEAM INTERIOR 8 NO

Single Multiple Fatigue Presence Live Load Dynamic Load Dynamic Load Traffic Neg. Lane ADTT Adj. Factor Code Allowance Allowance Factor Moments 1.330 1.150 100 1.000 Α 1.200 NO

Constant Impor. Duct. Redun. Redundant Analysis P-82 Dynamic Skew Angle Lateral Factor Factor Load Path Points Load Allowance Designation Bending Stress 1.000 1.000 1.000 R 2 1.200 0.00

\*NOTE: Since this input file uses the COMPUTED DISTRIBUTION FACTOR command, the skew angle designation is set via the CDF command.

#### BEAM GEOMETRY

#### Number of Deflection Ream/ Stringer Deck Staggered Design Distribution Spacing Overhang Diaphragms Lanes (ft) (ft) NO 3.350 0.250

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9041 INTERIOR BEAM

INPUT (cont.)

COMPUTED DISTRIBUTION FACTORS

Centerline Distance to Girder Outermost to Curb Wheel (ft) (ft)

SKEW ANGLES

SPAN LENGTHS

Span No. 1 Length (ft) 42.000

MATERIAL PROPERTIES

| Matl. | Cover Plate | Top | Bottom | No. | Composite | Fy | Fu | Fy | Fy | Fy | (ksi) | (ksi) | (ksi) | (ksi) | 1 | NONCOMPOSITE | 33.0 | 60.0 | 36.0 | 36.0 |

ROLLED BEAM DIMENSIONS, PART 1 of 2

Nominal Nominal Moment of
Designation Depth Weight Inertia

Designation Depth Weight Inertia Area (in) (lbm/ft) (in^4) (in^2) W27X90 27 90 2958. 26.34

ROLLED BEAM DIMENSIONS, PART 2 of 2  $\,$ 

	Flange	Flange	Beam	Web	Distance
Designation	Width	Thickness	Depth	Thickness	"k"
_	(in)	(in)	(in)	(in)	(in)
W27X90	9.000	0.7075	27.000	0.5240	1.3600

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9041 INTERIOR BEAM

INPUT (cont.)

ROLLED BEAM PROPERTIES, PART 1 of 2  $\,$ 

L H

\* The properties given on each line of this table are for the range of the beam to the LEFT of the span and the distance given.

ROLLED BEAM PROPERTIES, PART 2 of 2

 End
 End
 Deck
 Reinf.

 Span
 Span
 Haunch
 Reinf.
 C.G.

 No.
 Dist.\*
 Depth
 Area
 Dist.

 (ft)
 (in)
 (in^2/ft)
 (in)

 1
 42.000
 0.000
 0.000
 0.000

\* The properties given on each line of this table are for the range of the beam to the LEFT of the span and the distance given.

SLAB PROPERTIES, PART 1 OF 2

SLAB PROPERTIES, PART 2 OF 2

| Modular | Steel | Reinforcement | Length Factor | Ratio | E (ksi) | 10.000 | 5 | 1.000 |

DISTRIBUTED LOADS (DC2)

 Start
 Span
 End
 Span
 Start
 End

 No.
 Dist.
 No.
 Dist.
 Magnitude
 Magnitude

 (ft)
 (ft)
 (kips/ft)
 (kips/ft)
 (kips/ft)

 1
 0.000
 1
 42.000
 0.103
 0.103

DISTRIBUTED LOADS (DC1S)

 Start
 Span
 End Span
 Start
 End Magnitude
 Magnitud

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9041 INTERIOR BEAM

INPUT (cont.)

BRACE POINTS

 Start
 Start
 End
 End

 Span
 Span
 Span
 Span

 No.
 Dist.
 No.
 Dist.
 Spacing

 (ft)
 (ft)
 (ft)
 (ft)

 1
 0.000
 1
 42.000
 21.000

CONTINUOUS BRACE

Continuously Braced Span Numbers 1

SYSTEM SETTINGS

Steel Construction
Weight Modular Ratio
(lbf/ft^3)
490.00 14.000

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9041	INTERIOR	BEAN

ANALYSIS

LOAD	FACTORS	AND	COMBINATIONS

Limit								
State	DC1	DC2	FWS	LL	PL	WND	MC1	MC2
STR-I	1.25	1.25	1.50	1.75	0.00	0.00	1.25	1.25
STR-IA	1.25	1.25	1.50	1.35	0.00	0.00	1.25	1.25
STR-II	1.25	1.25	1.50	1.35	0.00	0.00	1.25	1.25
STR-III	1.25	1.25	1.50	0.00	0.00	1.40	1.25	1.25
STR-IV	1.50	1.50	1.50	0.00	0.00	0.00	1.50	1.50
STR-V	1.25	1.25	1.50	1.35	0.00	0.40	1.25	1.25
SERV-I	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
SERV-II	1.00	1.00	1.00	1.30	0.00	0.00	1.00	1.00
SERV-IIA	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
SERV-IIB	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
FATG-I	1.00	1.00	1.00	1.80	0.00	0.00	1.00	1.00
FATG-II	1.00	1.00	1.00	0.90	0.00	0.00	1.00	1.00
DEFL	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
CONSTR	1.25	1.25	1.50	1.50	0.00	1.25	1.25	1.25

### LIVE LOADING SUMMARY

Limit State	Design/Analysis Loading	Rating Loading	Rating Loading	Rating Loading	Rating Loading
STR-I	PHL-93	ML-80	HS20	H20	TK527
STR-IA	PHL-93				
STR-II	P-82	ML-80	HS20	H20	TK527
STR-III					
STR-IV					
STR-V	PHL-93				
SERV-I	PHL-93				
SERV-II	PHL-93	ML-80	HS20	H20	TK527
SERV-IIA	PHL-93	ML-80	HS20	H20	TK527
SERV-IIB	P-82				
FATG-I	FATIGUE				
FATG-II	FATIGUE				
DEFL	DEFLECT				

# LOAD MODIFIER

Importance	Ductility	Redundancy		Load	Load
Factor	Factor	Factor	Calculated	Modifier	Modifier
Ni	Nd	Nr	Ni*Nd*Nr	Used	Used
1.00	1.00	1.00	1.000	1.000	1.000

### RESISTANCE FACTORS

					Shear	
		Axial	Bearing	Shear	on Fillet	Web
Flexure	Shear	Compression	on Pins	Connector	Weld Throat	Crippling
1.00	1.00	0.90	1.00	0.85	0.80	0.80

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9041 INTERIOR BEAM ANALYSIS (cont.)

DISTRIBUTION FACTORS FOR DESIGN LIVE LOADING (LANE FRACTION, INCL. SKEW)

DISTRIBUTION FACTORS FOR FATIGUE VEHICLE (LANE FRACTION, INCL. SKEW)

Span No. 1

- \* Legend of code checks:
  A. Beam spacing is outside the range of applicability

  - B. Slab thickness is outside the range of applicability
    C. Span length is outside the range of applicability
    D. Number of beams is less than the lower bound of applicability
    E. Longitudinal stiffness parameter is outside range of
  - applicability

    F. Skew angle is outside the range of applicability

    G. Distance from exterior web to curb (de) is outside

  - the range of applicability

%WARNING: \*\*THIS MUST BE APPROVED BY CHIEF BRIDGE ENGINEER\*\*

SHEAR SKEW CORRECTION FACTORS

Span No. LEFT

1 1.000

DISTRIBUTION FACTORS FOR DESIGN LIVE LOAD REACTIONS

Support		ction ibution	Rotation Distribution
No.	Factor	Comment*	Factor
1	0.494		0.291
2	0.494		0.291

# DISTRIBUTION FACTORS FOR FATIGUE LIVE LOAD REACTIONS

	Rea	ction .	Rotation
Support	Distr	ibution	Distribution
No.	Factor	Comment*	Factor
1	0.412		0.202
2	0.412		0.202

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9041 INTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING

## STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

pan No.	Dist.	T/B	Limit State	Flex.	Inte	rmediate C	alculat Rb*	ions An/Ag*	Flexu Resist	ral ance Fr	Factored Flex+Lat Stress F+*	Resist. Calc.**	Code Chk**
	(ft)				(in)	(in)			(kip-ft)	(ksi)	(ksi)		
1	0.000	TOP	STR-I	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	0.0	D	
			STR-IA	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	0.0	D	
			STR-II	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	0.0	D	
			STR-III	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	0.0	D	
			STR-IV	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	0.0	D	
			STR-V	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	0.0	D	
		BOT	STR-I	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	0.0	J	
			STR-IA	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	0.0	J	
			STR-III	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	0.0	J	
			STR-IV	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	0.0	J	
			STR-V	POS.	2.2	(in) 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 N/A	N/A	602.6	33.0	0.0	J	
1	2.100	TOP	STR-I	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-8.2	D	
			STR-IA	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-7.0	D	
			STR-II	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-7.9	D	
			STR-III	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-3.0	D	
			STR-IV	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-3.6	D	
			STR-V	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-7.0	D	
		BOT	STR-I	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	8.2	J	
			STR-IA	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	7.0	J	
			STR-II	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	7.9	J	
			STR-III	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	3.0	J	
			STR-IV	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	3.6	J	
			STR-V	POS.	2.2	12.8 1.00 12.8 1.00	0 N/A	N/A	602.6	33.0	7.0	J	
1	4.200	TOP	STR-I	POS.	2.2	12.8 1.00 12.8 1.00	0 1.000	N/A	602.6	-33.0	-15.5	D	
			STR-IA	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-13.3	D	
			STR-II	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-14.7	D	
			STR-III	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-5.8	D	
			STR-IV	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-6.9	D	
			STR-V	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-13.3	D	
		BOT	STR-I	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	15.5	J	
			STR-IA	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	13.3	J	
			STR-II	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	14.7	J	
			STR-III	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	5.8	J	
			STR-IV	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	6.9	J	
			STR-V	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	13.3	J	
1	6.300	TOP	STR-I	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	0 1.000	N/A	602.6	-33.0	-21.9	D	
			STR-IA	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-18.7	D	
			STR-II	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-20.6	D	
			STR-III	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-8.2	D	
			STR-IV	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-9.8	D	
			STR-V	POS.	2.2	12.8 1.00	0 1.000	N/A	602.6	-33.0	-18.7	D	
		BOT	STR-I	POS.	2.2	12.8 1.00	0 N/A	N/A	602.6	33.0	21.9	J	

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

## STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

The state of the s

												actored		
Q			Limit		T		ate Ca	1 7 4-		Flexu Resist		lex+Lat	Resist.	G - 3 -
Span	Dist.	m /n	State	77			Rh*	Rb*		Mr(e)*		F+*	Calc.**	
NO.	(ft)	1/B	State	riex.		(in)	Kn*	KD*					Caic.**	CIK***
1		D.O.M.	STR-IA	DOG	(in) 2.2		1 000	N/A	N/A	(kip-ft) 602.6			J	
1	6.300	BOIL					1.000				33.0	18.7	J	
			STR-II		2.2		1.000		N/A	602.6	33.0	20.6		
			STR-III		2.2		1.000	N/A	N/A	602.6	33.0	8.2	J	
			STR-IV		2.2		1.000	N/A		602.6	33.0	9.8	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	18.7	J	
1	8.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-27.4	D	
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-23.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-25.6	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-10.2	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-12.3	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-23.5	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	27.4	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	23.5	J	
			STR-II		2.2		1.000			602.6	33.0	25.6	J	
			STR-III		2.2		1.000			602.6		10.2	J	
			STR-IV		2.2		1.000			602.6	33.0	12.3	J	
			STR-V	POS.	2.2		1.000		N/A	602.6	33.0	23.5	J	
1	10.500	TOD	STR-I	POS.	2.2	12 0	1.000	1 000	NI / N	602.6	-33.0	-32.0	D	
_	10.500	IOF	STR-IA		2.2		1.000			602.6	-33.0	-27.5	D	
			STR-IA		2.2		1.000				-33.0		D	
			STR-III		2.2		1.000			602.6	-33.0	-12.0	D	
			STR-III		2.2		1.000				-33.0		D	
			STR-IV	POS.	2.2		1.000				-33.0	-27.5	D	
		DOT	STR-I	POS.	2.2		1.000			602.6	33.0	32.0	J	
		вот	STR-IA		2.2		1.000			602.6	33.0	27.5	J	
			STR-IA		2.2		1.000			602.6		29.8	J	
			STR-II		2.2		1.000			602.6		12.0	J	
			STR-III		2.2		1.000		N/A	602.6	33.0	14.4	J	
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	27.5	J	
			SIR-V	PUS.	2.2	12.0	1.000	IN / PA	IN / PA	602.6	33.0	27.5	U	
1	12.600	TOP	STR-I	POS.	2.2		1.000			602.6	-33.0	-35.8	D	A
			STR-IA	POS.	2.2		1.000			602.6	-33.0	-30.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-33.6	D	A
			STR-III	POS.	2.2		1.000			602.6	-33.0	-13.4	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-16.1	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-30.7	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	35.8	J	A
			STR-IA	POS.	2.2		1.000		N/A	602.6	33.0	30.7	J	
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0	33.6	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	13.4	J	
			STR-IV		2.2		1.000	N/A	N/A	602.6	33.0	16.1	J	
			STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0	30.7	J	

1 14.700 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A 602.6 -33.0 -38.7 D A

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

STRESS FLEXIBAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

										Z/NONCOMPA				
_										Flexi	ıral	Factored Flex+Lat		~ 1
Span	D1-4		State							Resist				
NO.	Dist. (ft)	T/B	State		(in)					(kip-ft)			Caic.**	CHK***
1	14 700	TOD	CTD TA	DOG	2 2	12 0	1 000	1 000	NT / 7A	602 6	22 0	- 22 2	D	А
_	14.700	IOF	STR-IA	POS.	2.2	12.0	1 000	1 000	N/A	602.6 602.6 602.6 602.6 602.6 602.6	-33.0	-35.2	D	A
			STR-III	POS.	2.2	12.0	1 000	1 000	N/A	602.6	-33.0	-14 6	D	
			STR-TV	POS.	2 2	12.8	1 000	1 000	N/A	602.6	-33.0	-17.5	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-33.2	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	38.7	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	33.2	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6	33.0	36.5	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.6	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.5	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	33.2	J	A
1	16.800	TOP	STR-T	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-40.6	D	A
_			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-34.9	D	A
			STR-II	POS	2.2	12 8	1 000	1 000	N/A	602 6	-33 0	-384	D	A
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6 602.6 602.6 602.6	-33.0	-15.4	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-18.4	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-34.9	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	40.6	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	34.9	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	38.4	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	15.4	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	18.4	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6 602.6	33.0	34.9	J	A
1	18.900	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-41.7	D	A
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-35.8	D	A
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-39.5	D	A
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-15.8	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-19.0	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-35.8	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.0	41.7	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6	33.0	35.8	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	39.5	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	15.8	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6	33.0	19.0	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	35.8	J	A
1	21.000L	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-41.9	D	A
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-36.0	D	A
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-39.7	D	A
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-16.0	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-19.2	D	_
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-36.0	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6	33.0	41.9	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.0	J	A

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

## STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

										Flexu		Factored		
Span			Limit		Inte:	rmedia		lculati	ions	Resist	ance	Stress	Resist.	Code
Ño.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	21.000L	BOT	STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	39.7	.T	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.0	J	
			STR-IV	POS.	2.2		1.000	N/A	N/A	602.6	33.0	19.2	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.0	J	A
1	21.000R	TOP		POS.	2.2		1.000		N/A	602.6	-33.0	-41.9	D	A
			STR-IA	POS.	2.2		1.000		N/A	602.6	-33.0	-36.0	D	A
			STR-II	POS.	2.2			1.000	N/A	602.6	-33.0	-39.7	D	A
			STR-III		2.2			1.000	N/A	602.6	-33.0	-16.0	D	
			STR-IV	POS.	2.2			1.000		602.6	-33.0	-19.2	D	
			STR-V	POS.	2.2		1.000		N/A	602.6	-33.0	-36.0	D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	41.9	J	A
			STR-IA		2.2		1.000		N/A	602.6	33.0	36.0	J	A
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0	39.7	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.0	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	19.2	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	36.0	J	A
1	23.100	TOD	STR-I	POS.	2.2	12 8	1 000	1.000	N/A	602.6	-33.0	-41.7	D	A
_	23.100	101	STR-IA		2.2			1.000		602.6	-33.0	-35.8	D	A
			STR-II	POS.	2.2			1.000		602.6	-33.0	-39.5	D	A
			STR-III		2.2			1.000	N/A	602.6	-33.0	-15.8	D	-
			STR-IV	POS.	2.2			1.000	N/A	602.6	-33.0	-19.0	D	
			STR-V	POS.	2.2			1.000	N/A	602.6	-33.0	-35.8	D	A
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	41.7	J	A
		DOI	STR-IA		2.2		1.000		N/A	602.6	33.0	35.8	J	Ā
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0	39.5	J	A
			STR-III		2.2		1.000		N/A	602.6	33.0	15.8	J	-
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	19.0	J	
			STR-V	POS.	2.2		1.000	N/A	N/A	602.6	33.0	35.8	J	A
								,	,				_	
1	25.200	TOP	STR-I	POS.	2.2			1.000	N/A	602.6	-33.0	-40.6	D	A
			STR-IA	POS.	2.2			1.000	N/A	602.6	-33.0	-34.9	D	A
			STR-II	POS.	2.2			1.000	N/A	602.6	-33.0	-38.4	D	A
			STR-III		2.2			1.000	N/A	602.6	-33.0	-15.4	D	
			STR-IV	POS.	2.2			1.000	N/A	602.6	-33.0	-18.4	D	
			STR-V	POS.	2.2			1.000	N/A	602.6	-33.0	-34.9	D	A
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	40.6	J	A
			STR-IA	POS.	2.2		1.000		N/A	602.6	33.0	34.9	J	A
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	38.4	J	A
			STR-III		2.2		1.000		N/A	602.6	33.0	15.4	J	
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	18.4	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	34.9	J	A
1	27.300	TOP	STR-I	POS.	2.2	12 9	1.000	1 000	N/A	602.6	-33.0	-38.7	D	A
_	27.300	IOF	STR-IA		2.2			1.000	N/A	602.6	-33.0	-33.2	D	A
			OIN IM	100.	2.2	12.0	1.000	1.000	14/21	002.0	22.0	55.2	D	**

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

										Flexi		Factored	l	
Span			Timit		Into	rmodi	ato Ca	laulati	iona	Flexi	ıraı .	Flex+Lat	Posist	Codo
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Aa*	Mr(e)*	Fr	F+*	Calc.**	Chk*
-1	(IL)	mon.	CED TT	DOG	(111)	12.0	1 000	1 000	NT / 70	(kip-ft) 602.6	(KSI)	(KSI)	D	A
Τ.	27.300	IUP	OTD TIT	DOG.	2.2	12.0	1 000	1 000	N/A	602.6	-33.0	-30.5	D	A
			CTD TV	DOG.	2.2	12.0	1 000	1 000	NT/A	602.6	-33.0	-14.6	D	
			CED V	DOC.	2.2	12.0	1 000	1 000	N / P1	602.6	-33.0	22.2	D	A
		DOT	SIR-V	POS.	2.2	12.0	1.000	1.000	N/A	602.6	-33.0	-33.2	<u>т</u>	A
		BUI	SIR-I	POS.	2.2	12.0	1.000	N/A	N/A	602.6	33.0	30.7	J.	A
			CED II	DOC.	2.2	12.0	1 000	N / Pl	N / P1	602.6	22.0	33.2	- J	A
			SIR-II	POS.	2.2	12.0	1.000	N/A	N/A	602.6	33.0	14.6	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.6	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.5	J	A
										602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6				A
1	29.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-35.8	D	A
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-30.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-33.6	D	A
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-13.4	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-16.1	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-30.7	D	_
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	35.8	J	A
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	30.7	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	33.6	J	A
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	13.4	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.1	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6	33.0	30.7	J	
1	31.500	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-32.0	D	
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-27.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-29.8	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-12.0	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-14.4	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-27.5	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	32.0	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	29.8	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.0	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.4	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6	33.0	27.5	J	
1	33.600	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6 602.6 602.6 602.6 602.6 602.6 602.6	-33.0	-27.4	D	
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-23.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-25.6	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-10.2	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-12.3	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-23.5	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.4	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	23.5	J	
			CED TT	DOG	2 2	12 0	1 000	NT / 7A	NT / 7A	602 6	22 0	25 6	т.	

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
										Flexu		Flex+Lat		
Span			Limit					lculat:			ance		Resist.	
No.	Dist.	T/B	State	Flex.			Rh*	Rb*	An/Ag*	Mr(e)*		F+*	Calc.**	Chk**
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	33.600	BOT	STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	10.2	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.3	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	23.5	J	
1	35.700	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-21.9	D	
			STR-IA	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-18.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-20.6	D	
			STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-8.2	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-9.8	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-18.7	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	21.9	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	18.7	J	
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0	20.6	J	
			STR-III	POS.	2.2	12.8	1.000		N/A	602.6	33.0	8.2	J	
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0	9.8	J	
			STR-V	POS.	2.2		1.000		N/A	602.6	33.0	18.7	J	
1	37.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-15.5	D	
			STR-IA					1.000			-33.0		D	
			STR-II	POS.				1.000			-33.0		D	
			STR-III	POS.				1.000		602.6	-33.0	-5.8	D	
			STR-IV					1.000			-33.0		D	
			STR-V	POS.				1.000				-13.3	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0		J	
			STR-IA		2.2		1.000		N/A	602.6	33.0		J	
			STR-II	POS.			1.000		N/A	602.6	33.0		Ĵ	
			STR-III				1.000		N/A	602.6			J	
			STR-IV	POS.	2.2		1.000		N/A	602.6	33.0		J	
			STR-V	POS.	2.2		1.000		N/A	602.6	33.0		J	
1	39.900	TOP	STR-I	POS.	2 2	12 8	1 000	1.000	N/A	602 6	-33.0	-8.2	D	
-	33.300	101	STR-IA					1.000		602.6	-33.0		D	
			STR-II	POS.				1.000			-33.0		D	
			STR-III					1.000		602.6	-33.0		D	
			STR-IV	POS.	2.2			1.000			-33.0		D	
			STR-V	POS.				1.000			-33.0		D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0		J	
		DOI	STR-IA				1.000		N/A	602.6	33.0		J	
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0		J	
			STR-III				1.000		N/A	602.6	33.0		J	
			STR-III	POS.	2.2		1.000		N/A	602.6	33.0		J	
			STR-V	POS.	2.2		1.000		N/A	602.6	33.0		J	
1	42.000	TOD	STR-I	POS.	2.2	12 0	1 000	1 000	N/A	602 6	-33.0	0.0	D	
	42.000	101	STR-IA	POS.	2.2			1.000			-33.0		D	
			STR-IA	POS.					N/A		-33.0		D	
			DIK-II	100.	2.2	12.0	1.000	1.000	14/21	002.0	55.0	0.0		

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												Factored		
										Flexu	ıral :	Flex+Lat		
Span			Limit		Inte:	rmedia	ate Cal	lculat	ions	Resist		Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	42.000	TOP	STR-III	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-IV	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-V	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-IA	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-III	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-IV	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-V	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	

#### \* Legend of General Notes:

- rt = Effective radius of gyration for lateral torsional buckling
- = Total depth of the web in compression, per Appendix D6.3.1
- = Hybrid factor
  - = Load shedding factor (only applies to compression flange)
- An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1 Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr
- F+ = fbu + (1/3)\*fl, total factored flexural + lateral stress due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or
- A6.10.8.1.2-1) and/or user input lateral effects

# \*\* Legend of Resistance Calculation:

- Legend of Resistance Calculation:

  A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2

  C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1

  D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-1

  E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2

  F. Noncompos or neg. flexure, compression flange, Fr calculated using ITB, A6.10.8.2.3-1

  G. Noncompos or neg. flexure, compression flange, Fr calculated using ITB, A6.10.8.2.3-3

  H. Noncompos or neg. flexure, compression flange, Fr calculated using ITB, A6.10.8.2.3-3
- I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1
- J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1 K. Tension flange, Fr calculated using net section fracture, A6.10.1.8-1
- X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

# \*\*\* Legend of Code Check:

- A. Insufficient flexural resistance
- B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (F+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

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PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

# FLANGE LATERAL CAPACITY

This output report is not applicable because no lateral loads (wind or user input lateral loads) have been entered.

## NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

### SERVICE LIMIT STATE - FLEXURAL RESISTANCE

								Factored		
					Intermediate	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
Ño.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	0.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.		482.1			č	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIB	POS.		482.1			Ċ	
			DIII III	100.	1.000	102.1	20.1	0.0	Ü	
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-6.2	C	
			SERV-IIA	POS.		482.1			č	
			SERV-IIB	POS.			-26.4		č	
		BOT	SERV-II	POS.		482.1			Č	
		DOI	SERV-IIA	POS.		482.1			č	
			SERV-IIB	POS.		482.1			Č	
			DERV IID	100.	1.000	402.1	20.4	0.0		
1	4.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-11.8	C	
-	4.200	101	SERV-IIA	POS.		482.1			č	
			SERV-IIB	POS.			-26.4		Č	
		BOT		POS.		482.1			C	
		БОІ	SERV-II	POS.		482.1			C	
			SERV-IIA SERV-IIB	POS.		482.1			C	
			SEKA-IIB	FUS.	1.000	402.1	20.4	11.3	C	
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-16.7	C	
_	0.300	IOF	SERV-IIA	POS.		482.1			C	
			SERV-IIA SERV-IIB	POS.			-26.4		C	
		BOT	SERV-II	POS.		482.1			C	
		BUI		POS.		482.1			C	
			SERV-IIA SERV-IIB	POS.		482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	15.7	C	
1	8.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-20.9	С	
1	0.400	IOP	SERV-II	POS.		482.1			C	
			SERV-IIA SERV-IIB	POS.		482.1				
		BOT	SERV-IIB SERV-II	POS.					C	
		BOT				482.1				
			SERV-IIA	POS.		482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	19.6	C	
1	10 500	mor.	OPPN TT	DOG	1 000	400 1	06.4	04 5	~	
1	10.500	TOP	SERV-II	POS.		482.1			C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-21.1	C.	

Engtowed

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# 9041 INTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

	-									
								Factored		
					Intermediate	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	10.500	TOP	SERV-IIB	POS.	1.000	482.1	-26.4	-22.8	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	24.5	Ċ	
			SERV-IIA	POS.	Rh* 1.000 1.000 1.000	482.1	26.4	21.1	C	
			SERV-IIB	POS.	1.000	482.1	26.4	22.8	C	
		mon	SERV-II						~	
1	12.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.4	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-23.5	C	
			SERV-IIB	POS.	1.000 1.000 1.000 1.000	482.1	-26.4	-25.7	C	_
		BOT	SERV-II	POS.	1.000	482.1	26.4	27.4	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	23.5	C	
			SEKV-IIB	POS.	1.000	482.1	26.4	25.7	C	
1	14.700	TOP	SERV-II	POS.	1.000 1.000 1.000 1.000 1.000 1.000	482.1	-26.4	-29.5	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-25.4	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	-27.9	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	29.5	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	25.4	C	
			SERV-IIB	POS.	1.000	482.1	26.4	27.9	C	A
1	16 000									
Τ.	10.000	101	CEDW TIN	DOC.	1.000	402.1	-26.4	-31.1	2	A
			SERV-IIA	DOG.	1.000	402.1	-26.4	-20.7	Č	A
		DOT	CEDV II	DOC.	1.000 1.000 1.000 1.000	402.1	-26.4	22.4	2	A
		BUI	CEDV III	POS.	1.000	402.1	20.4	31.1	2	A
			CEDY IIA	POS.	1.000	402.1	20.4	20.7	2	A
1	18.900	TOP	SERV-II	POS.	1.000 1.000 1.000 1.000 1.000 1.000	482.1	-26.4	-31.9	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-27.5	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-30.2	C	A
		BOT	SERV-II	POS.	1.000	482.1	26.4	31.9	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	27.5	C	A
			SERV-IIB	POS.	1.000	482.1	26.4	30.2	C	A
1	21.000L				1.000	482 1	-26 4	-32 1	C	
			SERV-TTA	POS.	1.000	482.1	-26.4	-27.6	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-27.6 -30.3 32.1 27.6	Ċ	A
		BOT	SERV-II	POS	1.000	482 1	26 4	32 1	č	A
		201	SERV-II SERV-IIA	POS.	1.000	482.1	26.4	27.6	č	A
			SERV-IIB	POS.	1.000	482.1	26.4	30.3	Ċ	
1	01 0000	mo p	SERV-II	DOG	1 000	400 1	06.4	20.1	~	A
Τ.	∠1.000R	TOP	SEKV-11	POS.	1.000 1.000 1.000	482.1	-26.4	-32.1	C	A A
			SERV-IIA	POS.	1.000	482.1	-26.4	-27.6	C	A
		рош	SEKV-11B	POS.	1.000	482.1	-26.4	-30.3	C	A
		RO.I.	SEKV-II	POS.	1.000	482.1	26.4	32.1	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	27.6	C	A

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

		Factored
Intermediate	Flexural	Flexural

					Intermediate	Flexu		Flexural		
Span			Limit		Calculation	Resist		Stress	Resist.	
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*		Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	21.000R	BOT	SERV-IIB	POS.	1.000	482.1	26.4	30.3	C	A
1	23.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-31.9	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-27.5	C	A
			SERV-IIB	POS.	1.000	482.1	-26.4	-30.2	C	A
		BOT	SERV-II	POS.	1.000	482.1			C	A
			SERV-IIA	POS.	1.000	482.1	26.4	27.5	C	A
			SERV-IIB	POS.	1.000	482.1	26.4	30.2	C	A
1	25.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-31.1	C	A
			SERV-IIA	POS.	1.000	482.1			C	A
			SERV-IIB	POS.	1.000	482.1		-29.4	C	A
		BOT		POS.	1.000		26.4		Ċ	A
			SERV-IIA	POS.	1.000		26.4		č	A
			SERV-IIB	POS.	1.000	482.1	26.4	29.4	C	A
1	27.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-29.5	C	A
-	27.300	101	SERV-IIA	POS.		482.1			č	**
			SERV-IIB	POS.	1.000	482.1				A
		BOT	SERV-II	POS.				29.5	Č	A
		201	SERV-IIA	POS.	1.000		26.4		Č	**
				POS.			26.4			A
1	29.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.4	C	A
			SERV-IIA	POS.	1.000	482.1			C	
			SERV-IIB	POS.	1.000		-26.4		Ċ	
		BOT	SERV-II	POS.	1.000	482.1			C	A
			SERV-IIA	POS.			26.4	23.5	C	
			SERV-IIB	POS.	1.000		26.4		C	
1	31.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-24.5	C	
			SERV-IIA		1.000	482.1			Ċ	
			SERV-IIB	POS.	1.000	482.1			Ċ	
		BOT	SERV-II	POS.	1.000		26.4		č	
			SERV-IIA	POS.	1.000	482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	22.8	C	
1	33.600	TOP		POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1			C	
			SERV-IIB	POS.	1.000	482.1			C	
		BOT	SERV-II	POS.	1.000		26.4		C	
			SERV-IIA	POS.	1.000		26.4		C	
			SERV-IIB	POS.	1.000	482.1	26.4	19.6	C	
1	35.700	TOP	SERV-II	POS.	1 000	482.1	-26.4	-16.7	C	
1	35.700	101	SERV-II SERV-IIA	POS.	1.000	482.1			C	
			OLKV-IIA	PUS.	1.000	402.I	-20.4	-14.4	C	

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span No.	Dist. (ft)	T/B	Limit State	Flex.	Intermediate Calculation Rh*	Flexu Resist Mr(e)* (kip-ft)	ance Fr		Resist. Calc.**	Code Check***
1	35.700	TOP	SERV-IIB	POS.		482.1	-26.4	-15.7	C C	
		BOT	SERV-II	POS.		482.1			C	
			SERV-IIA			482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	15.7	C	
1	37.800	TOP	SERV-II	POS.	1.000	482.1	-26.4	-11.8	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-10.2	C	
			SERV-IIB	POS.	1.000	482.1	-26.4	-11.3	C	
		BOT	SERV-II	POS.		482.1			C	
			SERV-IIA			482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	11.3	C	
1	39.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-6.2	C	
			SERV-IIA	POS.		482.1			C	
			SERV-IIB	POS.		482.1			C	
		BOT	SERV-II	POS.		482.1		6.2	C	
			SERV-IIA			482.1			C	
			SERV-IIB	POS.	1.000	482.1	26.4	6.0	C	
1	42.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C C	
			SERV-IIB	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIB	POS.	1.000	482.1	26.4	0.0	C	

Factored

Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

## \*\* Legend of Resistance Calculation:

\*\*\* Legend of Code Check:
A. Insufficient flexural resistance

<sup>\*</sup> Legend of General Notes:

A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.) 

Factored

# SERVICE LIMIT STATE - WEB BEND-BUCKLING

Span			Limit		Interme	diate	Flexu Resist	ral ance	Flexural	Code
No.	Dist. (ft)	T/B	State	Flex.	Dc* (in)	Rh*	Mr(e)* (kip-ft)	Fcrw* (ksi)	fc* (ksi)	Check**
1	0.000	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79	1.000	602.6 602.6 602.6	-33.0 -33.0	0.0	
1	2.100	TOP TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-6.2 -5.4 -6.0	
1	4.200	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79 12.79 12.79		602.6 602.6 602.6	-33.0 -33.0 -33.0	-10.2	
1	6.300	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79	1.000 1.000 1.000	602.6	-33.0 -33.0 -33.0	-14.4	
1	8.400	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79	1.000 1.000 1.000		-33.0 -33.0 -33.0	-18.0	
1	10.500	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79	1.000 1.000 1.000	602.6	-33.0 -33.0 -33.0	-21.1	
1	12.600	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79		602.6	-33.0 -33.0 -33.0	-23.5	
1	14.700	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-25.4	
1	16.800	TOP TOP	SERV-II SERV-IIA SERV-IIB		12.79	1.000 1.000 1.000	602.6	-33.0 -33.0 -33.0	-26.7	
1	18.900	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79	1.000 1.000 1.000	602.6	-33.0 -33.0 -33.0	-27.5	
1	21.000L	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS.	12.79	1.000 1.000 1.000	602.6	-33.0 -33.0 -33.0		
1	21.000R		SERV-II SERV-IIA	POS. POS.		1.000	602.6 602.6	-33.0 -33.0	-32.1 -27.6	

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9041 INTERIOR BEAM
PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

Span No.	Dist. (ft) 21.000R	T/B TOP	Limit State SERV-IIB	Flex.	Interme Calcula Dc* (in) 12.79	tions Rh*	Flexu Resist Mr(e)* (kip-ft) 602.6	ance		Code Check**
1	23.100	TOP TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-27.5	
1	25.200	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-26.7	
1	27.300	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-29.5 -25.4 -27.9	
1	29.400	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-27.4 -23.5 -25.7	
1	31.500	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0		
1	33.600	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-18.0	
1	35.700	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0		
1	37.800	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-11.8 -10.2 -11.3	
1	39.900	TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	-6.2 -5.4 -6.0	
1	42.000	TOP TOP TOP	SERV-II SERV-IIA SERV-IIB	POS. POS. POS.	12.79 12.79 12.79	1.000 1.000 1.000	602.6 602.6 602.6	-33.0 -33.0 -33.0	0.0 0.0 0.0	

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# 9041 INTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

\* Legend of Intermediate Calculations:

Dc = Depth of web in compression Rh = Hybrid factor

Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from
from the stress flexural resistance, Fcrw
Fcrw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4
fc = Compression-flange stress calculated without flange lateral bending
N/A = This check is not required for composite sections in positive

flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

SHEAR CAPACITY

			Factored			
	Dist. (ft)	Limit State		Factored Shear Vu (kips)	Stiffened/ Unstiffened U	Code Check*
1	0.000	STR-IA STR-II STR-III STR-IV	256.60 256.60 256.60	106.04 27.84 33.41	n n	
		STR-V	256.60	89.60	U	
1	2.100	STR-IA STR-II	256.60 256.60 256.60 256.60 256.60 256.60	83.17 96.82 25.05 30.07	n n	
1	4.200	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	76.78 88.64 22.27	Ū.	
1	6.300	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60	70.44 80.61 19.49	n n	
1	8.400			64.15 73.50	U	

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# 9041 INTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

2	SHEAR	CAPACITY	(cont.	

0.			* i i t		Maximum Factored	0+1551/	Code
	pan No.	Dist.	State	Resistance Vr (kips)	Vu (kips)	Unstiffened	
	1		STR-IV STR-V	256.60 256.60	20.04 64.15	n	
	1	10.500	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	70.93 57.90 66.39 13.92 16.70 57.90	U	
	1	12.600	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	63.71 51.69 59.29 11.14 13.36 51.69	U	
	1	14.700	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	56.55 45.53 52.18 8.35 10.02 45.53	U	
	1	16.800	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	49.45 39.42 45.08 5.57 6.68 39.42		
	1	18.900	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	42.40 33.35 37.97 2.78 3.34 33.35	ט ט ט ט	
	1	21.000L	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	35.41 27.32 30.87 0.00 0.00 27.32	ט ט ט ט	
	1	21.000R	STR-I	256.60	35.41	U	

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# 9041 INTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY (cont.)

		-				
Span No.	Dist. (ft) 21.000R	Limit State STR-IA	Factored Shear Resistance Vr (kips) 256.60		Stiffened/ Unstiffened U U U U U	Code Check*
		STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60	30.87 0.00 0.00 27.32	U U U	
1	23.100	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-42.40 -33.35 -37.97 -2.78 -3.34 -33.35	ט ט ט ט	
1	25.200	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-49.45 -39.42 -45.08 -5.57 -6.68 -39.42	ט ט ט ט	
1	27.300	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-56.55 -45.53 -52.18 -8.35 -10.02 -45.53	ט ט ט ט	
1	29.400	STR-I STR-IA STR-II STR-III STR-IV STR-V	256.60 256.60 256.60 256.60 256.60 256.60	-63.71 -51.69 -59.29 -11.14 -13.36 -51.69	ט ט ט ט	
			256.60 256.60 256.60 256.60 256.60 256.60			
1	33.600	STR-I STR-IA STR-II STR-III STR-IV	256.60 256.60 256.60 256.60 256.60	-78.21 -64.15 -73.50 -16.70 -20.04	ט ט ט ט	

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# 9041 INTERIOR BEAM PHL-93/P-82 - SPECIFICATION CHECKING (cont.)

#### SHEAR CAPACITY (cont.) Factored Maximum Shear Factored Span Limit No. Dist. State Resistance Vr (kips) Shear Vu (kips) Stiffened/ Code Unstiffened Check\* (ft) 1 33.600 STR-V U 256.60 -64.15 1 35.700 STR-I 256.60 -85.54 STR-IA 256.60 -70.44 STR-II STR-III 256.60 256.60 -80.61 -19.49 U 256.60 -23.38 STR-V 256.60 -70.44 U 1 37.800 STR-I 256.60 -92.94 STR-IA 256.60 -76.78 STR-II 256.60 -88.64 256.60 256.60 -22.27 -26.72 STR-III STR-V 256.60 -76.78 U 1 39.900 STR-I 256.60 -100.39 STR-IA 256.60 -83.17 STR-II STR-III 256.60 256.60 -96.82 -25.05 STR-IV STR-V 256.60 -30.07 -83.17

UNCURED SLAB NET SECTION FRACTURE CHECK

-107.90

-106.04

-27.84

-89.60

-89.60

Not applicable due to absence of section holes

256.60

256.60

256.60

256.60

256.60

256.60

1 42.000 STR-I

STR-IA

STR-II

STR-V

STR-III

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# 9041 INTERIOR BEAM ML-80 - SPECIFICATION CHECKING

# MID-00 - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

												Factored		
												Flex+Lat		
Span			Limit							Resist				
No.	Dist.	T/B S	State				Rh*	Rb*		Mr(e)*		F+*	Calc.**	Chk***
	(ft)					(in)				(kip-ft)				
1	0.000								N/A		-33.0		D	
			ΓR-II						N/A		-33.0	0.0	D	
		BOT ST						N/A			33.0	0.0	J	
		SI	r-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
1	2.100	TOP ST	PD T	POS.	2.2	12 0	1 000	1.000	NT / 70	602 6	-33.0	-7.7	D	
_	2.100		rr-II						N/A		-33.0		D	
		BOT ST		POS.				N/A			33.0		J	
			rr-II					N/A		602.6			J	
		51	LK-II	PUS.	2.2	12.0	1.000	N/A	N/A	602.6	33.0	0.0	U	
1	4.200	TOP ST	rr-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-14.5	D	
		ST	r-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-12.5	D	
		BOT ST	ΓR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.5	J	
		SI	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.5	J	
									/-				_	
1	6.300								N/A		-33.0		D	
			rr-II						N/A		-33.0		D	
		BOT ST						N/A			33.0		J	
		SI	rr-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.6	J	
1	0 400	TOP ST	PD T	POS.	2.2	12 0	1 000	1.000	NT / 70	602 6	-33.0	-25.4	D	
_	0.400		rr-II					1.000				-21.9	D	
		BOT ST		POS.				N/A			33.0		J	
			rr-II					N/A		602.6		21.9	J	
		51	LK-II	ros.	2.2	12.0	1.000	IV/Pi	IV/PI	002.0	33.0	21.5	U	
1	10.500	TOP ST	ΓR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-29.5	D	
		SI	ΓR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-25.5	D	
		BOT ST	ΓR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	29.5	J	
		SI	r-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	25.5	J	
-	12.600	mon on	DD T	POS.	0 0	10 0	1 000	1 000	N/A		-33.0	-32.9	D	
1	12.600		r-i r-ii	POS.	2.2	12.0	1.000	1.000	N/A				D	
								N/A		602.6	-33.0	-28.5 32.9	J	
		BOT ST	rk-I rk-II	POS.				N/A N/A					J	
		51	IK-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	28.5	J	
1	14.700	TOP ST	rr - T	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-35.8	D	A
		ST	r-II	POS.	2.2	12.8	1.000	1.000	N/A		-33.0		D	
		BOT ST						N/A			33.0		J	A
		SI	r-II					N/A		602.6			J	
									/-				_	
1	16.800							1.000			-33.0		D	A
			rr-II					1.000			-33.0		D	_
		BOT ST		POS.				N/A		602.6		37.7	J	A
		SI	r-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	32.6	J	
1	18.900	TOP GT	rr - T	POS.	2 2	12 8	1 000	1 000	N/A	602 6	-33 N	-38.7	D	A
_	10.500	101 01			2.2	12.0	1.000	1.000	1., 11	002.0	55.0	55.7	-	**

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9041 INTERIOR BEAM ML-80 - SPECIFICATION CHECKING (cont.)

## STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

MO	Dict	Tr/D	C+a+a	Flor	** *	Da*	Dh*	Dh*	An / A~+	Flexu Resist Mr(e)*	ance	D : *	Resist.	Chl-***
1	18.900	TOP BOT	STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2	12.8 12.8 12.8	1.000 1.000 1.000	1.000 N/A N/A	N/A N/A N/A	(kip-ft) 602.6 602.6 602.6	-33.0 33.0 33.0	-33.5 38.7 33.5	D J J	A A A
1	21.000L	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-38.8 -33.6 38.8 33.6	D D J	A A A
1	21.000R	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-38.8 -33.6 38.8 33.6	D D J	A A A
1	23.100	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-38.7 -33.5 38.7 33.5	D D J J	A A A
1	25.200	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-37.7 -32.6 37.7 32.6	D D J J	A A
1	27.300	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-35.8 -30.9 35.8 30.9	D D J	A A
1	29.400	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-32.9 -28.5 32.9 28.5	D D J J	
1	31.500	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-29.5 -25.5 29.5 25.5	D D J	
1	33.600	TOP	STR-I STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2 2.2	12.8 12.8 12.8 12.8	1.000 1.000 1.000 1.000	1.000 1.000 N/A N/A	N/A N/A N/A N/A	602.6 602.6 602.6 602.6	-33.0 -33.0 33.0 33.0	-25.4 -21.9 25.4 21.9	D D J	
1	35.700	TOP	STR-I STR-II	POS. POS.	2.2	12.8 12.8	1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-20.4 -17.6	D D	

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9041 INTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

			Flexural	Flex+Lat		
Span Limit	Intermediate Ca	alculations	Resistance	Stress	Resist. Code	
No. Dist. T/B State Flex	. rt* Dc* Rh*	Rb* An/Ag*	Mr(e)* Fr	F+*	Calc. ** Chk*	**
(ft)	(in) (in)		(kip-ft) (ksi)	(ksi)		
1 35.700 BOT STR-I POS.	2.2 12.8 1.000	N/A N/A	602.6 33.	0 20.4	J	
STR-II POS.	2.2 12.8 1.00	N/A N/A	602.6 33.	0 17.6	J	
1 37.800 TOP STR-I POS.	2.2 12.8 1.00	1.000 N/A	602.6 -33.	0 -14.5	D	
STR-II POS.	2.2 12.8 1.000		602.6 -33.	0 -12.5	D	
BOT STR-I POS.	2.2 12.8 1.000	N/A N/A	602.6 33.	0 14.5	J	
STR-II POS.	2.2 12.8 1.00	N/A N/A	602.6 33.	0 12.5	J	
1 39.900 TOP STR-I POS.	2.2 12.8 1.00	1.000 N/A	602.6 -33.	0 -7.7	D	
STR-II POS.	2.2 12.8 1.000	1.000 N/A	602.6 -33.	0 -6.6	D	
BOT STR-I POS.	2.2 12.8 1.000	N/A N/A	602.6 33.	0 7.7	J	
STR-II POS.	2.2 12.8 1.00	N/A N/A	602.6 33.	0 6.6	J	
1 42.000 TOP STR-I POS.	2.2 12.8 1.00	1.000 N/A	602.6 -33.	0.0	D	
STR-II POS.	2.2 12.8 1.000	1.000 N/A	602.6 -33.	0.0	D	
BOT STR-I POS.	2.2 12.8 1.000	N/A N/A	602.6 33.	0.0	J	
STR-II POS.	2.2 12.8 1.000	N/A N/A	602.6 33.	0.0	J	

- \* Legend of General Notes:
  - rt
  - = Effective radius of gyration for lateral torsional buckling = Total depth of the web in compression, per Appendix D6.3.1
  - = Hybrid factor
- Rb = Load shedding factor (only applies to compression flange)
  An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1
- Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr = fbu + (1/3)\*fl, total factored flexural + lateral stress
- due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or
- A6.10.8.1.2-1) and/or user input lateral effects
- \*\* Legend of Resistance Calculation:
  - A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  - B. Composite, noncompact, tension flange, Pr calculated using A6.10.7.2.2-2 C. Noncompos or neg. flexure, compression flange, Pr calculated using A6.10.8.1.3-1 D. Noncompos or neg. flexure, compression flange, Pr calculated using FLB, A6.10.8.2.2-1

  - E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2
    F. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1
    G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1
    H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3

  - I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1 J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1 K. Tension flange, Fr calculated using net section fracture, A6.10.1.8-1

  - X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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#### 9041 INTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

## \*\*\* Legend of Code Check:

A. Insufficient flexural resistance

B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (P+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

### FLANGE LATERAL CAPACITY

This output report is not applicable because no lateral loads (wind or user input lateral loads) have been entered.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Span			Limit		Intermediate Calculation	Flexu Resist		Factored Flexural Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	0.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
1	2.100	TOP	SERV-II	POS.	1.000	482.1		-5.9	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-5.1	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	5.9	C	
			SERV-IIA	POS.	1.000	482.1	26.4	5.1	C	
1	4.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-11.1	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-9.6	C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	9.6	C	
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4		C	
			SERV-IIA	POS.	1.000	482.1			C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	13.5	C	
1	8.400	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1			C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	16.8	C	
1	10.500	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-19.6	C	

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## 9041 INTERIOR BEAM

# ML-80 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

	-									
Span			Limit		Intermediate Calculation Rh*	Flexu Resist	ral ance	Factored Flexural Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	10 500	BOT	SERV-II	POS	1 000	482 1	26 4	22 6	C	
_	10.500	DOI	CEDU II	DOC.	1.000	402.1	20.4	10.0	č	
			SEKV-IIA	FUB.	1.000	402.1	20.4	19.0	C	
-1	10 (00	TOD	CEDM II	DOG	1 000	400 1	20 4	25.2	C	
1	12.600	IOP	SERV-II	PUS.	1.000	402.1	-20.4	-25.2	_	
			SERV-IIA	POS.	1.000	482.1	-26.4	-21.9	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	25.2	C	
			SERV-IIA	POS.	1.000 1.000 1.000 1.000	482.1	26.4	21.9	C	
4	14 700	mon	ODDII TT	DOG	1 000	400 1	06.4	0.77.4		
1	14.700	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.4	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-23.8	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	27.4	C	A
			SERV-IIA	POS.	1.000 1.000 1.000 1.000	482.1	26.4	23.8	C	
1	16.800	TOP	SERV-II	POS.	1.000 1.000 1.000 1.000	482.1	-26.4	-28.9	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4	-25.0	C	
		ROT	CEDV_TT	POS	1 000	482 1	26.4	28 9	C	A
		DOI	CEDU II	DOG.	1.000	402.1	20.4	25.5	C	n
1	18.900	TOP	SERV-II	POS.	1.000 1.000 1.000 1.000	482.1	-26.4	-29.6	C	A
			SERV-TIA	POS	1 000	482 1	-26 4	-25 7	č	
		DOT	CEDU II	DOG.	1.000	402.1	20.4	20.7	C	A
		BUI	SERV-II	PUS.	1.000	402.1	20.4	29.6	~	A
1	21.000Tu	TOP	SERV-II	POS.	1.000 1.000 1.000 1.000	482.1	-26.4	-29.7	C	A
			CEDU-TIA	POS	1 000	482 1	-26 4	-25 8	C	
		DOT	CEDV-TT	DOG.	1 000	102.1	26.4	20.0	Č	А
		DOI	SERV-II	POS.	1.000	402.1	26.4	29.7	~	A
1	21 000P	TOD	GEDW_TT	DOS	1.000 1.000 1.000 1.000	482 1	-26 4	-29 7	C	A
-	21.00010	101	CEDV TTA	DOG.	1 000	102.1	26.1	25.0	Č	**
		DOM	ODDI TI	DOG.	1.000	402.1	20.4	23.0	0	A
		BOI	SERV-II	POS.	1.000	482.1	26.4	29.7	C	A
			SERV-IIA	POS.	1.000	482.1	26.4	25.8	C	
1	23 100	TOD	GEDW_TT	DOS	1 000	482 1	-26 4	-29 6	C	A
_	23.100	101	CEDU II	DOG.	1.000	402.1	20.4	25.0	C	n
			SERV-IIA	PUS.	1.000	402.1	-20.4	-25.7	_	_
		BOT	SERV-II	POS.	1.000	482.1	26.4	29.6	C	A
			SERV-IIA	POS.	1.000 1.000 1.000 1.000	482.1	26.4	25.7	C	
1	25 200	TOP	CEDW_TT	DOG	1 000	482 1	-26 4	-28 6	C	A
_	23.200	105	ODDI TT	POG.	1.000	402.1	-20.4	-20.3	0	PA.
			SERV-IIA	POS.	1.000	482.1	-26.4	-25.0	C	_
		BOT	SERV-II	POS.	1.000	482.1	26.4	28.9	C	A
			SERV-IIA	POS.	1.000 1.000 1.000 1.000	482.1	26.4	25.0	C	
1	27 200	TOP	CPDW_TT	DOG	1 000	100 1	-26 4	-27 4	C	A
1	2/.300	IOP	ODDI TT	POS.	1.000 1.000 1.000	402.1	-20.4	-27.4		A
			SERV-IIA	POS.	1.000	482.1	-26.4	-23.8	C.	_
		BOT	SERV-II	POS.	1.000	482.1	26.4	27.4	C	A

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9041 INTERIOR BEAM ML-80 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

								Factored		
_			- 1 - 1 -		Intermediate			Flexural		
Span		_ /-	Limit		Calculation			Stress	Resist.	
No.		T/B	State	Flex.	Rh*	Mr(e)*		Fu*	Calc.**	Check***
	(ft)					(kip-ft)				
1	27.300	BOT	SERV-IIA	POS.	1.000	482.1	26.4	23.8	C	
1	29.400	TOP	SERV-II	POS.			-26.4		C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-21.9	C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	21.9	C	
1	31.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-22.6	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-19.6	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	22.6	C	
			SERV-IIA	POS.	1.000	482.1	26.4	19.6	C	
1	33.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-19.4	С	
			SERV-IIA	POS.	1.000	482.1	-26.4	-16.8	C	
		BOT	SERV-II	POS.		482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	16.8	C	
1	35.700	TOP	SERV-II	POS.	1.000	482.1	-26.4	-15.6	С	
			SERV-IIA	POS.	1.000	482.1	-26.4	-13.5	C	
		BOT		POS.		482.1			č	
			SERV-IIA	POS.		482.1		13.5	Č	
1	37.800	TOP	SERV-II	POS.	1.000	482.1	-26 4	-11.1	C	
-	37.000	101	SERV-IIA			482.1			č	
		BOT		POS.		482.1			č	
		DOI	SERV-IIA	POS.	1.000	482.1			Č	
1	39.900	TOP	SERV-II	POS.	1.000	482.1	-26 4	-5.9	C	
	39.900	IOF	SERV-IIA			482.1			C	
		BOT	SERV-IIA SERV-II	POS.		482.1			c	
		BUI	SERV-IIA	POS.	1.000	482.1		5.1	C	
			ALL-VAGE	POS.	1.000	462.1	20.4	5.1	C	
1	42.000	TOP	SERV-II	POS.		482.1			C	
		n.o.m	SERV-IIA			482.1			C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	

<sup>\*</sup> Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

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#### 9041 INTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.) .... or brack content of content of the content of

#### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

- \*\* Legend of Resistance Calculation:
  - A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3
- \*\*\* Legend of Code Check:
  A. Insufficient flexural resistance

## SERVICE LIMIT STATE - WEB BEND-BUCKLING

									Factored	
					Interme				Flexural	~ 1
Span	Di-t	m /n	Limit	777	Calcula Dc*			ance		Code
No.	Dist.	T/B	State	Flex.	(in)		Mr(e)* (kip-ft)		fc*	Check**
1	0.000	TOP	SERV-II	POS.		1.000	(Kip-It)	-33.0	(KS1) 0.0	
1	0.000	TOP	SERV-II SERV-IIA	POS.	12.79		602.6	-33.0	0.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	
1	2.100	TOP	SERV-II	POS.	12.79	1.000	602 6	-33.0	-5.9	
-	2.100	TOP	SERV-IIA		12.79				-5.1	
		101	D2111 2111	100.	22.75	1.000	002.0	33.0	3.1	
1	4.200	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-11.1	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-9.6	
1	6.300	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-13.5	
		mon		200						
1	8.400	TOP	SERV-II	POS.	12.79					
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-16.8	
1	10.500	TOP	SERV-II	POS.	12.79	1.000	602 6	-33.0	-22.6	
	10.300	TOP	SERV-IIA	POS.	12.79	1.000	602.6			
		101	DERV IIA	100.	12.75	1.000	002.0	33.0	15.0	
1	12.600	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-25.2	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-21.9	
1	14.700	TOP	SERV-II	POS.	12.79					
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-23.8	
1	16.800	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-25.0	
1	18.900	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-29.6	
1	10.900	TOP	SERV-IIA	POS.	12.79	1.000	602.6		-25.7	
		101	SEKV-IIA	FUB.	12.75	1.000	602.6	-33.0	-23.7	
1	21.000L	TOP	SERV-II	POS.	12.79	1.000	602 6	-33.0	-29.7	
-	21.0002	TOP	SERV-IIA	POS.	12.79	1.000	602.6		-25.8	
1	21.000R	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-29.7	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-25.8	

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# 9041 INTERIOR BEAM

ML-80 - SPECIFICATION CHECKING (cont.)

## SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

									ractored	
Span			Limit		Interme Calcula	tions		ance		Code
No.	Dist. (ft)	T/B	State	Flex.	Dc* (in)	Rh*	Mr(e)* (kip-ft)			Check**
1	23.100	TOP	SERV-II SERV-IIA		12.79	1.000	602.6		-29.6	
		mon								
1	25.200	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000		-33.0 -33.0		
1	27.300	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-23.8	
1	29.400	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0		
		101	DERV 11A	100.	12.75	1.000	002.0	33.0	21.5	
1	31.500	TOP	SERV-II SERV-IIA	POS.	12.79 12.79			-33.0 -33.0		
1	33.600	TOP	SERV-II	POS.	12.79	1.000	602 6	-33.0	-19.4	
1	33.000	TOP	SERV-IIA	POS.	12.79		602.6			
1	35.700	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-13.5	
1	37.800	TOP	SERV-II SERV-IIA	POS.	12.79 12.79		602.6 602.6	-33.0 -33.0	-11.1 -9.6	
1	39.900	TOP	SERV-II SERV-IIA	POS.	12.79 12.79			-33.0 -33.0		
1	42.000	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	0.0	

<sup>\*</sup> Legend of Intermediate Calculations: Dc = Depth of web in compression Rh = Hybrid factor

TOP SERV-IIA POS. 12.79 1.000 602.6 -33.0 0.0

Mr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Forw
Forw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4
fc = Compression-flange stress calculated without flange lateral bending N/A = This check is not required for composite sections in positive

flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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# 9041 INTERIOR BEAM ML-80 - SPECIFICATION CHECKING (cont.) .... or brack of concern (concern)

SHEAR CAPACITY

Span No.	Dist.	Limit State	Factored Shear Resistance Vr	Maximum Factored Shear Vu	Stiffened/ Unstiffened U U	Code Check*
1	0.000	STR-I STR-II	(kips) 256.60 256.60	(kips) 101.12 84.37	U U	
1	2.100	STR-I STR-II	256.60 256.60	93.99 78.24	U U	
1	4.200	STR-I STR-II	256.60 256.60	86.87 72.10	U	
		STR-II	256.60 256.60	65.97	U	
			256.60 256.60			
			256.60 256.60			
		STR-II	256.60 256.60	47.58	U	
		STR-II	256.60 256.60	41.45	U	
			256.60 256.60			
		STR-II	256.60 256.60 256.60	29.19	U	
		STR-II	256.60	23.05	U	
			256.60 256.60			
			256.60 256.60			
	27.300	STR-II STR-I	256.60 256.60	-35.32 -51.25	U U	
1			256.60 256.60			

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# 9041 INTERIOR BEAM ML-80 - SPECIFICATION CHECKING (cont.)

			SHEAR CAPACIT	Y (cont.)		
Span No.		State	Resistance	Factored Shear Vu	Stiffened/ Unstiffened	
1		STR-II		-47.58	U	
1	31.500	STR-I STR-II	256.60 256.60			
1	33.600	STR-I STR-II	256.60 256.60			
1	35.700	STR-I STR-II				
1	37.800	STR-I STR-II	256.60 256.60		U	
1	39.900	STR-I STR-II	256.60 256.60			
1	42.000	STR-I STR-II	256.60 256.60			

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# 9041 INTERIOR BEAM HS20 - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

												actorea		
										Flexu		Flex+Lat		_
Span			Limit					lculati		Resist			Resist.	
No.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Ag*	Mr(e)*		F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	0.000	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
		BOT	STR-I	POS.			1.000		N/A	602.6		0.0	J	
			STR-II				1.000		N/A	602.6		0.0	J	
			0111 11	100.	2.2	12.0	1.000	11/11	/	002.0	33.0	0.0		
1	2.100	TOD	STR-I	POS.	2.2	12 8	1 000	1.000	N/A	602.6	-33.0	-7.1	D	
_	2.100	101	STR-II					1.000			-33.0	-6.2	D	
		DOT	STR-II	POS.			1.000		N/A	602.6		7.1	J	
		BUI	STR-II									6.2	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	6.2	J	
_		mon	amp z						/-				_	
1	4.200	TOP	STR-I	POS.				1.000		602.6		-13.4	D	
			STR-II					1.000		602.6		-11.6	D	
		BOT	STR-I	POS.				N/A		602.6		13.4	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	11.6	J	
1	6.300	TOP	STR-I	POS.	2.2	12.8	1.000	1.000		602.6	-33.0	-18.7	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A			-16.3	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	18.7	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	16.3	J	
1	8.400	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-23.2	D	
_			STR-II					1.000		602.6		-20.2	D	
		BOT	STR-I	POS.			1.000		N/A	602.6		23.2	J	
		201	STR-II		2.2		1.000		N/A	602.6	33.0	20.2	J	
			DIK II	100.	2.2	12.0	1.000	14/11	14/11	002.0	33.0	20.2	U	
1	10.500	TOD	STR-I	POS.	2.2	12 0	1 000	1.000	N/A	602.6	-33.0	-26.8	D	
	10.500	IOF	STR-II					1.000		602.6		-23.4	D	
		DOM	STR-II	POS.			1.000		N/A	602.6	33.0	26.8	J	
		BOIL												
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	23.4	J	
		mon	amp =						/-				_	
1	12.600	TOP	STR-I	POS.				1.000		602.6		-29.5	D	
			STR-II					1.000		602.6		-25.8	D	
		BOT	STR-I	POS.				N/A		602.6		29.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	25.8	J	
1	14.700	TOP	STR-I	POS.				1.000		602.6		-31.6	D	
			STR-II	POS.	2.2	12.8	1.000	1.000		602.6		-27.7	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	31.6	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.7	J	
1	16.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-33.1	D	A
_			STR-II					1.000				-29.1	D	
		BOT	STR-I	POS.			1.000		N/A	602.6	33.0	33.1	J	A
			STR-II				1.000		N/A	602.6	33.0	29.1	J	
				- 00.	2.2	_2.0		,	/	002.0	55.0	22.1	-	

1 18.900 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A 602.6 -33.0 -33.8 D A

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9041 INTERIOR BEAM

9041 INIDATION DELL.
HS20 - SPECIFICATION CHECKING (cont.)

### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

Span No.	Dist.	T/B	Limit State	Flex.	Inte	rmediate Ca Dc* Rh* (in) 12.8 1.000 12.8 1.000	lculat: Rb*	ons An/Ag*	Flexu Resist Mr(e)*	ance Fr	Factored Flex+Lat Stress F+*	Resist. Calc.**	Code Chk**
1	18.900	TOP BOT	STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2	12.8 1.000 12.8 1.000 12.8 1.000	1.000 N/A N/A	N/A N/A N/A	602.6 602.6 602.6	-33.0 33.0 33.0	-29.7 33.8 29.7	D J J	A
1	21.000L	TOP	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-33.6 -29.6	D D	A
													A
1	21.000R	TOP	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-33.6 -29.6	D D	A
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	33.6 29.6	J J	A
1	23.100	TOP	STR-I STR-II	POS.	2.2	12.8 1.000 12.8 1.000	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-33.8	D D	A
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	33.8 29.7	J J	A
1	25.200	TOP	STR-I	POS.	2.2	12.8 1.000	1.000	N/A	602.6	-33.0	-33.1	D D	A
		BOT	STR-I STR-II	POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0	33.1	J J	A
1	27.300	TOP	STR-I	POS.	2.2	12.8 1.000	1.000	N/A N/A	602.6	-33.0	-31.6	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	31.6 27.7	J J	
1	29.400	TOP	STR-I STR-II	POS.	2.2	12.8 1.000 12.8 1.000	1.000	N/A N/A	602.6 602.6	-33.0	-29.5	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	29.5 25.8	J J	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	26.8 23.4	J J	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.000 12.8 1.000 12.8 1.000 12.8 1.000	N/A N/A	N/A N/A	602.6 602.6	33.0	23.2	J J	
1	35.700	TOP	STR-I	POS.	2.2	12.8 1.000 12.8 1.000	1.000	N/A	602.6	-33.0	-18.7	D	

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9041 INTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

## STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

Span			Limit		Inte	rmedia	ate Cai	lculat	ions	Flexu Resist		Flex+Lat Stress	Resist.	Code
	Dist.	T/B	State	Flex.	rt* (in)	Dc*	Rh*	Rb*	An/Ag*	Mr(e)* (kip-ft)	Fr (ksi)	F+* (ksi)	Calc.**	Chk***
1	35.700	BOT	STR-I STR-II	POS. POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6 602.6	33.0	18.7	J J	
1	37.800	TOP	STR-I STR-II	POS.	2.2		1.000		N/A N/A	602.6 602.6	-33.0 -33.0		D D	
		BOT	STR-II STR-II	POS. POS.	2.2	12.8	1.000	N/A	N/A N/A	602.6 602.6	33.0	13.4	J J	
1	39.900	TOP	STR-I STR-II	POS.	2.2		1.000		N/A N/A	602.6 602.6	-33.0		D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8	1.000	N/A	N/A N/A	602.6 602.6	33.0	7.1	J J	
1	42.000	TOP	STR-I STR-II	POS.	2.2		1.000		N/A N/A	602.6 602.6	-33.0		D D	
		BOT	STR-II STR-II	POS. POS.	2.2	12.8	1.000	N/A N/A	N/A N/A	602.6	33.0	0.0	J J	

Factored

- \* Legend of General Notes:
  - rt
  - = Effective radius of gyration for lateral torsional buckling = Total depth of the web in compression, per Appendix D6.3.1
  - = Hybrid factor
- Rb = Load shedding factor (only applies to compression flange)
  An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1
- Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr = fbu + (1/3)\*fl, total factored flexural + lateral stress
- due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or
- A6.10.8.1.2-1) and/or user input lateral effects
- \*\* Legend of Resistance Calculation:
  - A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  - B. Composite, noncompact, tension flange, Pr calculated using A6.10.7.2.2-2 C. Noncompos or neg. flexure, compression flange, Pr calculated using A6.10.8.1.3-1 D. Noncompos or neg. flexure, compression flange, Pr calculated using FLB, A6.10.8.2.2-1

  - E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2
    F. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1
    G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1
    H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3

  - I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1 J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1 K. Tension flange, Fr calculated using net section fracture, A6.10.1.8-1

  - X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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9041 INTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

\*\*\* Legend of Code Check:

A. Insufficient flexural resistance

B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (P+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

### FLANGE LATERAL CAPACITY

This output report is not applicable because no lateral loads (wind or user input lateral loads) have been entered.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Span			Limit	Intermediate Calculation		Flexu		Factored Flexural Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.		Mr(e)*	Fr	Fu*		Check***
	(ft)					(kip-ft)				
1	0.000	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.		482.1			C	
		BOT	SERV-II	POS.		482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-5.5	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-4.8	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	5.5	C	
			SERV-IIA	POS.	1.000	482.1	26.4	4.8	C	
1	4.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-10.3	C	
			SERV-IIA	POS.	1.000	482.1	-26.4		C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	9.0	C	
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-14.4	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-12.6	C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	12.6	C	
1	8.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-17.8	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-15.6	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	17.8	C	
			SERV-IIA	POS.	1.000	482.1	26.4	15.6	C	
1	10.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-20.6	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-18.1	C	

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## 9041 INTERIOR BEAM

# HS20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

					Intermediate Calculation Rh* 1.000 1.000	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	10.500	BOT	SERV-II	POS.	1.000	482.1	26.4	20.6	C	
-	10.500	201	SERV-TTA	POS.	1.000	482.1	26.4	18.1	Č	
									-	
1	12.600	TOD	SERV_TT	DOG	1.000	482 1	-26 4	-22 7	C	
_	12.000	101	SERV_TTA	DOG.	1 000	482.1	-26.4	_19 9	Č	
		BOT	SERV-II	DOG.	1.000	482.1	26.4	22.7	Č	
		DOI	SERV_TTA	DOG.	1.000	482.1	26.4	19 9	Č	
			DHICV IIA	100.	1.000	402.1	20.4	10.0	C	
1	14 700	TOD	CPDV_TT	DOG	1 000	102 1	-26 4	-24 2	C	
-	14.700	101	SERV-TIA	DOG.	1 000	482.1	-26.4	-21.3	č	
		POT	CEDV-TT	DOG.	1.000 1.000 1.000	402.1	26.4	24.3	Č	
		DOI	CEDV-TTA	DOG.	1.000	402.1	26.4	21.3	Č	
			SEK V-IIM	ros.	1.000	402.1	20.4	21.4	C	
1	16.800	TOD	SERV_TT	DOG	1 000	482 1	-26 4	-25 5	C	
_	10.000	101	CEDV-II	DOG.	1.000	402.1	-26.4	-23.3	C	
		DOT	CEDU II	DOC.	1.000	402.1	26.4	25.4	C	
		ВОІ	SERV-II	POS.	1.000	402.1	20.4	25.5	C	
			SERV-IIA	PUS.	1.000	402.1	20.4	22.4	C	
1	18.900	TOD	CPDV_TT	DOG	1.000	102 1	-26 4	-26 0	C	
_	10.500	101	CEDY III	DOC.	1.000	402.1	26.4	-20.0	C	
		DOM	SERV-IIA SERV-II	POS.	1.000	402.1	-26.4	-23.0	C	
		BOI	SERV-II	POS.	1.000 1.000 1.000	482.1	26.4	26.0	C	
			SERV-IIA	PUS.	1.000	402.1	20.4	23.0	C	
1	21 0001	TOD	CPDV_TT	DOG	1 000	100 1	-26 4	25.0	С	
_	21.0001	101	CEDY III	DOC.	1.000 1.000 1.000	402.1	26.4	-23.9	C	
		POT	SERV-IIA	DOG.	1.000	402.1	26.4	-22.9	C	
		БОІ	CEDY III	DOC.	1.000	402.1	20.4	23.3	C	
			SERV-IIA	PUS.	1.000	402.1	20.4	22.9	C	
1	21 0000	TOD	CEDM TT	DOG	1 000	400 1	26.4	25.0	C	
Τ.	21.000K	IOP	SERV-II	DOG.	1.000	402.1	-26.4	-23.9	C	
		DOT	CEDU II	DOC.	1.000	402.1	26.4	-22.9	C	
		ВОІ	SERV-II	POS.	1.000	402.1	20.4	25.9	C	
			SERV-IIA	PUS.	1.000	402.1	20.4	22.9	C	
1	23.100	TOD	CPDV_TT	DOG	1.000	102 1	-26 4	-26 0	C	
Τ.	23.100	IOP	SERV-II	POS.	1.000	402.1	-20.4	-20.0	C	
		DOT	SERV-IIA SERV-II	POS.	1.000	402.1	-20.4	-23.0	C	
		BOI	SERV-II	POS.	1.000	482.1	26.4	26.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	23.0	C	
1	25.200	TOD	CEDM II	DOG	1 000	400 1	20 4	25.5	С	
1	25.200	101	SERV-II	POS.	1.000	402.1	-26.4	-25.5	C	
		DOM	SERV-IIA	POS.	1.000	482.1	-26.4	-22.4	C	
		BOI	SERV-II	POS.	1.000	482.1	26.4	25.5	C	
			SERV-IIA	POS.	1.000	462.I	26.4	22.4	C	
1	27.300	TOD	CEDM II	DOG	1 000	400 1	20 4	24.2	С	
Τ.	27.300	IOP	SERV-II SERV-IIA	POS.	1.000	462.1	-26.4	-24.3	C	
		DOT	SEKV-IIA	POS.	1.000	48Z.I	-26.4	-21.4	C	
		DOT.	OTK A-TI	PUS.	1.000	402.I	20.4	24.3	C	

Factored

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HS20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span No.	Dist. (ft)	T/B		Flex.	Intermediate Calculation Rh*	Resist	ance Fr	Stress Fu* (ksi)		
1	27.300	BOT	SERV-IIA	POS.	1.000	482.1	26.4	21.4	C	
1	29.400	TOP	SERV-II SERV-IIA SERV-II	POS.	1.000 1.000 1.000	482.1	-26.4	-19.9	C	
			SERV-IIA	POS.	1.000	482.1	26.4	19.9	C	
1	31.500	TOP			1.000				C	
		BOT	SERV-II SERV-IIA		1.000	482.1 482.1			C C	
1	33.600	TOP	SERV-IIA	POS.	1.000	482.1	-26.4	-15.6	C	
		BOT	SERV-II SERV-IIA		1.000			17.8 15.6		
1	35.700	TOP	SERV-IIA	POS.		482.1	-26.4	-12.6	C	
		BOT			1.000				C	
1	37.800	TOP	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	-26.4 -26.4	-10.3 -9.0	C	
		BOT	SERV-II SERV-IIA		1.000			-9.0 10.3 9.0	C	
1	39.900	TOP	SERV-II SERV-IIA		1.000	482.1 482.1			C	
		BOT	SERV-II SERV-IIA	POS.	1.000	482.1 482.1	26.4	5.5	C C	
1	42.000	TOP	SERV-II SERV-IIA			482.1 482.1			C	
		BOT	SERV-II SERV-IIA	POS. POS.	1.000	482.1 482.1	26.4 26.4	0.0	C C	

Factored

<sup>\*</sup> Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

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### 9041 INTERIOR BEAM

HS20 - SPECIFICATION CHECKING (cont.)

#### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

## \*\* Legend of Resistance Calculation:

- A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3

Factored

#### SERVICE LIMIT STATE - WEB BEND-BUCKLING

Span No.	. Dist. T/	T/B	Limit State	Flex.	Interme Calcula Dc* (in)	tions Rh*	Flexu Resist Mr(e)* (kip-ft)	ance Fcrw*	Flexural Stress fc*	Code Check*
1	0.000	TOP TOP	SERV-II SERV-IIA	POS.	12.79	1.000	602.6 602.6	-33.0	0.0	
1	2.100	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			
1	4.200	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	6.300	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000	602.6 602.6			
1	8.400	TOP TOP	SERV-II SERV-IIA	POS. POS.			602.6 602.6			
1	10.500	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6			
1	12.600	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6			
1	14.700	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	16.800	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	18.900	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6			
1	21.000L	TOP TOP	SERV-II SERV-IIA	POS.		1.000	602.6 602.6			
1	21.000R	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	23.100	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			

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HS20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

Span			Limit		Interme Calcula		Flexu Resist			Code
No.	Dist.	T/B	State	Flex.	Dc*	Rh*	Mr(e)*	Fcrw*	fc*	Check**
1	(ft) 25.200	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79	1.000		-33.0	-25.5	
1	27.300	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79					
1	29.400	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6			
1	31.500	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			
1	33.600	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			
1	35.700	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			
1	37.800	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			
1	39.900	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			
1	42.000	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79		602.6 602.6			

<sup>\*</sup> Legend of Intermediate Calculations: Dc = Depth of web in compression Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Fcrw
Fcrw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4

fc = Compression-flange stress calculated without flange lateral bending

N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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# HS20 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY Factored Maximum Shear Factored Limit Dist. State Shear Stiffened/ Vu Unstiffened Span No. Resistance Code Unstiffened Check\* Vr (ft) (kips) (kips) (ft) 0.000 STR-I 92.23 77.51 256.60 STR-II 256.60 2.100 STR-I 256.60 85.30 U STR-II 256.60 71.53 U 256.60 1 4.200 STR-I 78.38 U STR-II 256.60 65.55 1 6.300 STR-I 256.60 71.46 256.60 1 8.400 STR-I 256.60 64.53 U 256.60 1 10.500 STR-I 256.60 57.61 U STR-II 256.60 47.62 1 12.600 STR-I 256.60 50.69 U 41.65 STR-II 256.60 1 14.700 STR-I 256.60 43.92 IJ STR-II 256.60 35.79 1 16.800 STR-I 256.60 STR-II 256.60 30.17 1 18.900 STR-I 256.60 30.99 STR-II 256.60 24.54 U 1 21.000L STR-I 256.60 STR-II 256.60 18.92 256.60 1 21.000R STR-I 256.60 18.92

256.60

256.60

256.60

256.60

256.60 256.60

256.60

1 23.100 STR-I

1 25.200 STR-I

1 27.300 STR-I

1 29.400 STR-I

STR-II

STR-II

STR-II

-30.99

-24.54

-30.17

-43.92

-35.79

-50.69

U

U

U

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			SHEAR CAPACIT	Y (cont.)		
Span No.		State	Resistance	Factored Shear Vu	Stiffened/ Unstiffened	
1	29.400	STR-II		-41.65	U	
1	31.500	STR-I STR-II	256.60 256.60			
1	33.600	STR-I STR-II	256.60 256.60			
1	35.700	STR-I STR-II	256.60 256.60			
1	37.800	STR-I STR-II	256.60 256.60		n	
1	39.900	STR-I STR-II	256.60 256.60			
1	42.000	STR-I STR-II		-92.23 -77.51		

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#### 9041 INTERIOR BEAM H20 - SPECIFICATION CHECKING

HZU - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

												Factored		
										Flex		Flex+Lat		
Span			Limit							Resist			Resist.	
No.	Dist.	T/B	State	Flex.			Rh*	Rb*	An/Ag*	Mr(e)*			Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)				
1	0.000	TOP	STR-I	POS.					N/A		-33.0		D	
			STR-II	POS.			1.000			602.6	-33.0	0.0	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
1	2.100	TOP	STR-I	POS.			1.000			602.6	-33.0	-5.8	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6		-5.2	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	5.8	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	5.2	J	
1	4.200	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-11.0	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-9.8	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	11.0	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	9.8	J	
1	6.300	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-15.5	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-13.8	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	15.5	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	13.8	J	
1	8.400	TOP	STR-I	POS.			1.000			602.6			D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-17.3	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	19.4	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.3	J	
1	10.500	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-22.6	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6		-20.2	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	22.6	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	20.2	J	
1	12.600	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6 602.6	-33.0	-25.3	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-22.6	D	
		BOT	STR-I	POS.	2.2		1.000		N/A	602.6	33.0	25.3	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	22.6	J	
1	14.700	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A			-27.3	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-24.4	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.3	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	24.4	J	
1	16.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-28.7	D	
			STR-II				1.000			602.6		-25.6	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	28.7	J	
			STR-II	POS.	2.2		1.000		N/A	602.6	33.0	25.6	J	

1 18.900 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A 602.6 -33.0 -29.4 D

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9041 INTERIOR BEAM H20 - SPECIFICATION CHECKING (cont.)

## STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

Span No.	Dist.	T/B	Limit	Flex.	Inte	rmedia	ate Cai	lculat:	ions An/Aa*	Flexu Resist Mr(e)*	ıral ance Fr	Factored Flex+Lat Stress F+*	Resist.	Code Chk**
1	(ft) 18.900	TOP BOT	STR-II STR-I STR-II	POS. POS. POS.	(in) 2.2 2.2 2.2	(in) 12.8 12.8 12.8	1.000 1.000 1.000	1.000 N/A N/A	N/A N/A N/A	(kip-ft) 602.6 602.6 602.6	(ksi) -33.0 33.0	(ksi) 0 -26.3 0 29.4 0 26.3	D J J	
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6 602.6 602.6				
										602.6 602.6				

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#### 9041 INTERIOR BEAM H20 - SPECIFICATION CHECKING (cont.)

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

Factored Flexural Flex+Lat | Span | Limit | Intermediate Calculations | Resistance | Stress | Res. | The State | Flex. | Tt\* | Dc\* Rh\* | Rh\* | An/Ag\* | Mr(e)\* | Fr | Fr\* | (ft) | (in) | (in) | (kip-ft) | (ksi) Resistance Stress Resist. Code Calc.\*\* Chk\*\*\* 602.6 33.0 15.5 602.6 33.0 13.8 1 37.800 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A 602.6 -33.0 -11.0 STR-II POS. 2.2 12.8 1.000 1.000 N/A BOT STR-I POS. 2.2 12.8 1.000 N/A N/A 602.6 -33.0 -9.8 602.6 33.0 11.0 STR-II POS. 2.2 12.8 1.000 N/A N/A 602.6 33.0 1 39.900 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A STR-II POS. 2.2 12.8 1.000 1.000 N/A 602 6 -33 0 -5 8 602.6 -33.0 -5.2 BOT STR-I POS. 2.2 12.8 1.000 N/A N/A 602.6 33.0 STR-II POS. 2.2 12.8 1.000 N/A N/A 602.6 33.0 1 42.000 TOP STR-I POS. 2.2 12.8 1.000 1.000 N/A STR-II POS. 2.2 12.8 1.000 1.000 N/A BOT STR-I POS. 2.2 12.8 1.000 N/A N/A STR-II POS. 2.2 12.8 1.000 N/A N/A 602.6 -33.0 0.0 602.6 33.0 0.0

# \* Legend of General Notes:

- rt = Effective radius of gyration for lateral torsional buckling
  Dc = Total depth of the web in compression, per Appendix D6.3.1
- = Hybrid factor
- Rb = Load shedding factor (only applies to compression flange)
  An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1
- Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr = fbu + (1/3)\*fl, total factored flexural + lateral stress
- due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects

# \*\* Legend of Resistance Calculation:

- A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1
- B. Composite, noncompact, tension flange, Fr calculated using A6.10.7.2.2-2 C. Noncompos or neg. flexure, compression flange, Fr calculated using A6.10.8.1.3-1
- D. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-1

602.6

33.0

- E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2 F. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1 G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-2
- H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3
- I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1 J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1
- K. Tension flange, Fr calculated using net section fracture, A6.10.1.8-1
- X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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# 9041 INTERIOR BEAM

H20 - SPECIFICATION CHECKING (cont.)

#### FLANGE LATERAL CAPACITY

This output report is not applicable because no lateral loads (wind or user input lateral loads) have been entered.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

#### SERVICE LIMIT STATE - FLEXURAL RESISTANCE

								Factored		
					Intermediate	Florus	7	77 7		
Span			Timit		Calgulation	Pogiat	2220	Ctross	Posist	Codo
Span	Diat	m/p	Chaha	E3 ess	Calculation Rh*	Mm/ol*	ance	Stiess	Colo **	Charlettt
INO.	DISC.	1/B	State	riex.	KII*	(lein ft)	(legi)	(leasi)	Caic.	CHECK
-	(11)	mo p	OPDII TT	DOG	1 000	(KID-IL)	(KSI)	(KSI)	~	
1	0.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000 1.000 1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	С	
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-4.5	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-4.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	4.5	C	
			SERV-IIA	POS.	1.000	482.1	26.4	4.0	C	
1	4.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-8.5	С	
					1.000					
		BOT	SERV-II	POS.	1.000	482.1	26.4	8.5	C	
			SERV-TTA	POS.	1.000	482.1	26.4	7.6	Č	
1	6.300	TOP	SERV-II	POS.	1.000 1.000 1.000	482.1	-26.4	-12.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-10.7	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	12.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	10.7	C	
		mon			1.000				~	
1	8.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-15.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-13.4	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	15.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	13.4	C	
1	10.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-17.5	C	
			SERV-TTA	POS.	1.000	482.1	-26.4	-15.7	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	17.5	Ċ	
			SERV-IIA	POS	1.000 1.000 1.000	482 1	26 4	15 7	Č	
1	12.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-19.5	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-17.5	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	19.5	C	
			SERV-IIA	POS.	1.000	482.1	26.4	17.5	C	
1	14.700	TOD	CPDV_TT	DOG	1.000	402 1	26.4	- 21 1	С	
Τ.	14.700	TOP			1.000					
			SEKV-IIA	POS.	1.000	482.1	-26.4	-18.9	C.	

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## 9041 INTERIOR BEAM

BOT SERV-II

# H20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Factored Intermediate Flexural Flexural Resistance Mr(e)\* Fr (kip-ft) (ksi) Limit Resist. Code Calculation Stress No. Dist. T/B State Flex. Calc.\*\* Check\*\*\* Rh\* Fu\* (ksi) (ft) (ft)
1 14.700 BOT SERV-II POS.
SERV-IIA POS. 1.000 482.1 26.4 21.1 C 1.000 482.1 26.4 18.9 1 16.800 TOP SERV-II POS. 1.000 482.1 -26.4 -22.2 C SERV-IIA POS. BOT SERV-II POS. 1.000 482.1 -26.4 482.1 26.4 -19.9 22.2 SERV-IIA POS. 1.000 482.1 26.4 1 18.900 TOP SERV-II 1 000 482.1 -26.4 -22 7 SERV-IIA POS. 1.000 482.1 -26.4 -20.4 BOT SERV-II POS. 1.000 482.1 26.4 22.7 SERV-IIA POS. 1.000 482.1 26.4 20.4 1 21.000L TOP SERV-II 1.000 482.1 -26.4 SERV-IIA POS. 1.000 482.1 -26.4 -20.5 BOT SERV-II POS. 1.000 482.1 26.4 22.8 SERV-IIA POS. 1.000 482.1 26.4 20.5 1 21.000R TOP SERV-II 1.000 482.1 -26.4 -22.8 SERV-IIA POS. 1.000 482.1 -26.4 -20.5 BOT SERV-II 482.1 26.4 SERV-II POS. SERV-IIA POS. 1.000 482.1 26.4 1 23.100 TOP SERV-II 1.000 482.1 -26.4 -22.7 SERV-IIA 1.000 482.1 -26.4 -20.4 BOT SERV-II POS 1 000 482 1 26 4 22 7 SERV-IIA POS. 1.000 482.1 26.4 20.4 1 25.200 TOP SERV-II 1.000 482.1 -26.4 -22.2 SERV-TIA POS. 1.000 482.1 -26.4 -19.9 BOT SERV-II 482.1 26.4 SERV-IIA POS. 1.000 482.1 26.4 19.9 1 27.300 TOP SERV-II 482.1 -26.4 SERV-IIA POS. 1.000 482.1 -26.4 -18.9 BOT SERV-IIA POS 1 000 482.1 26.4 21 1 SERV-IIA POS. 1.000 482.1 26.4 18.9 1 29.400 TOP SERV-II POS 1 000 482 1 -26 4 SERV-IIA 482.1 -26.4 -17.5 482.1 26.4 19.5 POS. 1.000 BOT SERV-II 1.000 POS. SERV-IIA POS. 1 31.500 TOP SERV-II POS. 1.000 482.1 -26.4 -17.5 482.1 -26.4 -15.7 482.1 26.4 17.5 SERV-IIA POS. 1.000

1.000

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# 9041 INTERIOR BEAM

# H20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

	-									
					Intermediate	Flexu	ral	Factored		
Span			Limit		Calculation			Stress	Resist.	Codo
		m /n								
No.		T/B	State	Fiex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Cneck***
	(ft)					(kip-ft)	(ksi)	(ksi)		
1	31.500	BOT	SERV-IIA	POS.	1.000	482.1	26.4	15.7	C	
1	33.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-15.0	C	
			SERV-IIA					-13.4		
		BOT						15.0		
		BOT								
			SERV-IIA	POS.	1.000	482.1	26.4	13.4	C	
1	35.700	TOP	SERV-II	POS.	1.000	482.1	-26.4	-12.0	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-10.7	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	12.0	C	
			SERV-IIA					10.7	Č	
			SEKV-IIA	FOB.	1.000	402.1	20.4	10.7	C	
1	37.800	TOP	SERV-II	POS.	1.000	482.1	-26.4	-8.5	С	
_	37.000	IOF	SERV-IIA			482.1				
		BOT		POS.	1.000			8.5	C	
			SERV-IIA	POS.	1.000	482.1	26.4	7.6	C	
1	39.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-4.5	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-4.0	C	
		BOT	SERV-II	POS.	1.000		26.4		Č	
		BOI	SERV-II						Č	
			SERV-IIA	POS.	1.000	482.1	26.4	4.0	C	
1	42.000	TOP	SERV-II	POS.	1.000	482.1	-26.4	0.0	С	
Τ.	42.000	101								
			SERV-IIA	POS.		482.1			C	
		BOT	SERV-II				26.4		C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	

<sup>\*</sup> Legend of General Notes:

Rh = Hybrid factor Mr(e) = Flexural resistance in terms of moment, back-calculated

from the stress flexural resistance, Fr

Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

<sup>\*\*</sup> Legend of Resistance Calculation:

A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2

C. Noncomposite, Fr calculated using A6.10.4.2.2-3

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#### 9041 INTERIOR BEAM

# H20 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING

Span No.	Dist.	T/B	Limit State	Flex.	Calcula Dc*	tions	Mr(e)*	ance Fcrw*		Code Check**
1	(ft) 0.000	TOP TOP	SERV-II SERV-IIA			1.000	(kip-ft) 602.6 602.6	-33.0	0.0	
1	2.100	TOP TOP	SERV-II SERV-IIA	POS.		1.000	602.6 602.6			
1	4.200	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6			
1	6.300	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000				
1	8.400	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000	602.6 602.6			
1	10.500	TOP TOP	SERV-II SERV-IIA	POS.		1.000	602.6 602.6			
1	12.600	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6			
1	14.700	TOP TOP	SERV-II SERV-IIA	POS.		1.000				
1	16.800	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000	602.6 602.6	-33.0 -33.0		
1	18.900	TOP TOP	SERV-II SERV-IIA	POS.		1.000	602.6 602.6			
1	21.000L	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000		-33.0 -33.0		
1	21.000R	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000				
1	23.100	TOP TOP	SERV-II SERV-IIA	POS. POS.		1.000		-33.0 -33.0		
1	25.200	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6			
1	27.300	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000		-33.0 -33.0		

1 29.400 TOP SERV-II POS. 12.79 1.000 602.6 -33.0 -19.5

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# 9041 INTERIOR BEAM

H20 - SPECIFICATION CHECKING (cont.) ------(cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

Span			Limit		Interme Calcula		Flexu Resist		Factored Flexural Stress	Code
No.	Dist.	T/B	State	Flex.	DC*	Rh*	Mr(e)*			Check**
	(ft)	1,2	Deace	11011	(in)		(kip-ft)		(ksi)	ciicon
1	29.400	TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-17.5	
-1	21 500	mo p	OPDII TT	DOG	10.70	1 000	600 6	22.0	15.5	
1	31.500	TOP	SERV-II	POS.	12.79	1.000	602.6			
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-15.7	
1	33.600	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-15.0	
-	33.000	TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-13.4	
1	35.700	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-12.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-10.7	
1	37.800	TOP	SERV-II	POS.	12.79	1.000	602.6		-8.5	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-7.6	
1	20 000	TOP	CEDY II	DOG	10 70	1.000	602.6	22.0	4 5	
1	39.900		SERV-II	POS.	12.79				-4.5	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-4.0	

<sup>\*</sup> Legend of Intermediate Calculations: Dc = Depth of web in compression Rh = Hybrid factor

1 4.200 STR-I 256.60 61.69

U

SHEAR CAPACITY

1 42.000 TOP SERV-II POS. 12.79 1.000 602.6 -33.0 0.0 TOP SERV-IIA POS. 12.79 1.000 602.6 -33.0 0.0

Span No.	Dist.	Limit State	Factored Shear Resistance Vr (kips)	Maximum Factored Shear Vu (kips)	Stiffened/ Unstiffened	Code Check*
1	0.000	STR-I	256.60	73.19	U	
		STR-II	256.60	62.82	Ū	
1	2.100	STR-I	256.60	67.40	U	
		STR-II	256.60	57.72	U	

Mr(e) = Flexural resistance in terms of moment, back-calculated from

wr(e) = Flexural resistance in terms of moment, back-calculated from from the stress flexural resistance, Fcrw

Fcrw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4

fc = Compression-flange stress calculated without flange lateral bending

N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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# 9041 INTERIOR BEAM H20 - SPECIFICATION CHECKING (cont.)

			SHEAR CAPACIT			
Span No.	Dist. (ft)	State	Factored Shear Resistance Vr (kips)	Maximum Factored Shear Vu (kips)	Unstiffened	Code Check*
1	4.200	STR-II	256.60	52.68	U	
1	6.300	STR-I STR-II	256.60 256.60	56.06 47.70		
1	8.400	STR-I STR-II	256.60 256.60	50.51 42.78	n n	
1	10.500	STR-I STR-II		45.35 38.16		
1	12.600	STR-I STR-II		40.26 33.61		
1	14.700	STR-I STR-II	256.60 256.60	35.18 29.05		
1	16.800	STR-I STR-II	256.60 256.60	30.10 24.49	n	
1	18.900	STR-I STR-II		25.01 19.93	n n	
1	21.000L	STR-I STR-II	256.60 256.60		n n	
1	21.000R		256.60 256.60		n n	
1	23.100	STR-I STR-II	256.60 256.60	-25.01 -19.93		
1	25.200	STR-I STR-II		-30.10 -24.49	n	
1	27.300	STR-I STR-II	256.60 256.60	-35.18 -29.05		
1	29.400	STR-I STR-II	256.60 256.60	-40.26 -33.61	n n	
1	31.500	STR-I STR-II	256.60 256.60	-45.35 -38.16	n	
1	33.600	STR-I	256.60	-50.51	U	

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DIDENTIFICATION COMMENTS

# 9041 INTERIOR BEAM H20 - SPECIFICATION CHECKING (cont.)

U U

			SHEAR CAPACIT	Y (cont.)		
Span No.	Dist.	Limit State	Factored Shear Resistance Vr (kips)	Shear Vu	Stiffened/ Unstiffened	Code Check*
1	33.600	STR-II	256.60	-42.78	U	
1	35.700	STR-I STR-II	256.60 256.60	-56.06 -47.70	n	
1	37.800	STR-I STR-II	256.60 256.60	-61.69 -52.68	n n	
1	39.900	STR-I STR-II	256.60 256.60	-67.40 -57.72	U	

1 42.000 STR-I 256.60 -73.19 STR-II 256.60 -62.82

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# 9041 INTERIOR BEAM TK527 - SPECIFICATION CHECKING

# STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)

												Factored		
										Flexu		Flex+Lat		
Span			Limit					lculati		Resist			Resist.	
No.	Dist.	T/B	State	Flex.			Rh*	Rb*	An/Ag*	Mr(e)*		F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)			
1	0.000	TOP S	TR-I	POS.				1.000			-33.0	0.0	D	
		S	TR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	0.0	D	
		BOT S	TR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	0.0	J	
		S	TR-II	POS.			1.000		N/A	602.6	33.0	0.0	J	
		_						,	,				-	
1	2.100	TOP S	TR-T	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-7.6	D	
_			TR-II					1.000			-33.0	-6.6	D	
		BOT S		POS.				N/A		602.6	33.0	7.6	J	
				POS.	2.2			N/A		602.6	33.0	6.6	J	
			IK-II	FUB.	2.2	12.0	1.000	IN / Pi	14 / 24	002.0	33.0	0.0	U	
1	4.200	TOP S	TD T	POS.	2.2	12 0	1 000	1.000	N/A	602 6	-33.0	-14.3	D	
1	4.200		TR-II					1.000			-33.0		D	
		BOT S		POS.				N/A		602.6		14.3	J	
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.3	J	
1	6.300	TOP S	mp T	POS.	2.2	10 0	1 000	1.000	37 / 3	600 6	-33.0	-19.9	D	
1	6.300									602.6				
			TR-II					1.000			-33.0		D	
		BOT S		POS.			1.000		N/A	602.6		19.9	J	
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.2	J	
_		mon a	mp =						/-					
1	8.400	TOP S		POS.				1.000			-33.0		D	
			TR-II					1.000			-33.0		D	
		BOT S		POS.				N/A		602.6			J	
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	21.4	J	
1	10.500	TOP S	mp T	POS.	2.2	10 0	1 000	1.000	N/A	C02 C	-33.0	-28.6	D	
1	10.500		TR-I					1.000			-33.0		D	
		BOT S		POS.				N/A		602.6	33.0	28.6	J	
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	24.8	J	
- 1	12.600	TOP S	mp T	POS.	2.2	10 0	1 000	1.000	N/A	602.6	-33.0	-31.9	D	
1	12.000		TR-II					1.000			-33.0		D	
		BOT S		POS.	2.2		1.000		N/A	602.6	33.0	31.9	J	
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	27.7	J	
4	14 700	mon a	mp T	DOG		10 0	1 000	1 000	37 / 3		22.0	24.6	D	
1	14.700	TOP S		POS.				1.000			-33.0			A
			TR-II					1.000			-33.0		D	
		BOT S		POS.				N/A			33.0		J	A
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	30.0	J	
4	16 000	mon a	mp T	DOG	0 0	10.0	1 000	1 000	37 / 3		22.0	26.		
1	16.800	TOP S		POS.				1.000			-33.0		D	A
			TR-II					1.000			-33.0	-31.6	D	
		BOT S		POS.				N/A		602.6	33.0	36.4	J	A
		S	TR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	31.6	J	
1	18.900	TOP S	mp T	POS.	2 2	10 0	1 000	1 000	N/A	c02 c	22 ^	27 0	D	А
Τ.	10.900	TOP S	T L C - T	FUD.	2.2	12.0	1.000	1.000	N/A	00∠.6	-33.0	-37.2	D	A

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# 9041 INTERIOR BEAM

9041 INITATION DELT.
TK527 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (c

pan No.	Dist.	T/B	Limit State	Flex.	Inte	rmediate C Dc* Rh* (in) 12.8 1.00 12.8 1.00	alculat: Rb*	ions An/Ag*	Flexu Resist Mr(e)*	ance Fr	Factored Flex+Lat Stress F+*	Resist. Calc.**	Code Chk**
1	18.900	TOP BOT	STR-II STR-I STR-II	POS. POS. POS.	2.2 2.2 2.2	12.8 1.00 12.8 1.00 12.8 1.00	1.000 N/A N/A	N/A N/A N/A	602.6 602.6 602.6	-33.0 33.0 33.0	-32.4 37.2 32.4	D J J	A
1	21.000L	TOP	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-37.2 -32.4	D D	A
													A
1	21.000R	TOP	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-37.2 -32.4	D D	A
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	37.2 32.4	J J	A
1	23.100	TOP	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	1.000	N/A N/A	602.6 602.6	-33.0 -33.0	-37.2 -32.4	D D	A
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	37.2 32.4	J J	A
1	25.200	TOP	STR-I	POS.	2.2	12.8 1.00	1.000	N/A	602.6	-33.0	-36.4 -31.6	D D	A
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0	36.4 31.6	J J	A
1	27.300	TOP	STR-I	POS.	2.2	12.8 1.00	1.000	N/A N/A	602.6	-33.0	-34.6 -30.0	D D	A
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0	34.6	J J	A
1	29.400	TOP	STR-I	POS.	2.2	12.8 1.00	1.000	N/A N/A	602.6	-33.0	-31.9	D D	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0 33.0	31.9 27.7	J J	
		BOT	STR-I STR-II	POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6 602.6	33.0	28.6	J J	
		BOT	STR-I STR-II	POS. POS.	2.2	12.8 1.00 12.8 1.00 12.8 1.00 12.8 1.00	N/A N/A	N/A N/A	602.6	33.0	24.7	J J	
1	35.700	TOP	STR-I	POS.	2.2	12.8 1.00 12.8 1.00	1.000	N/A N/A	602.6	-33.0	-19.9 -17.2	D D	

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9041 INTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

#### STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

												ractoreu		
										Flexu	ral	Flex+Lat		
Span			Limit		Inter	rmedia	te Cal	culat:	ions	Resist	ance	Stress	Resist.	Code
Ño.	Dist.	T/B	State	Flex.	rt*	Dc*	Rh*	Rb*	An/Aq*	Mr(e)*	Fr	F+*	Calc.**	Chk***
	(ft)				(in)	(in)				(kip-ft)	(ksi)	(ksi)		
1	35.700	BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	19.9	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	17.2	J	
1	37.800	TOP	STR-I	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-14.3	D	
			STR-II	POS.	2.2	12.8	1.000	1.000	N/A	602.6	-33.0	-12.3	D	
		BOT	STR-I	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	14.3	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	12.3	J	
1	39.900	TOP	STR-I	POS.			1.000		N/A	602.6	-33.0		D	
			STR-II	POS.	2.2		1.000		N/A	602.6	-33.0		D	
		BOT	STR-I	POS.	2.2		1.000	N/A	N/A	602.6	33.0	7.6	J	
			STR-II	POS.	2.2	12.8	1.000	N/A	N/A	602.6	33.0	6.6	J	
1	42.000	TOP	STR-I	POS.	2.2	12 0	1.000	1 000	N/A	602.6	-33.0	0.0	D	
_	42.000	101	STR-II	POS.	2.2		1.000		N/A	602.6	-33.0		D	
		POT	STR-II	POS.	2.2		1.000	N/A	N/A	602.6	33.0		J	
		DUI	STR-II	POS.			1.000	N/A	N/A	602.6	33.0		J	
			DIK-II	PUD.	4.4	14.8	1.000	IN / A	IN / A	602.6	23.0	0.0	U	

- \* Legend of General Notes:
  - rt
  - = Effective radius of gyration for lateral torsional buckling = Total depth of the web in compression, per Appendix D6.3.1
  - = Hybrid factor
- Rb = Load shedding factor (only applies to compression flange)
  An/Ag = Net Area / Gross Area for net section fracture, A6.10.1.8-1
- Mr(e) = Flexural resistance in terms of moment, back-calculated from
- from the stress flexural resistance, Fr = fbu + (1/3)\*fl, total factored flexural + lateral stress
- due to wind (per A6.10.7.2.1-2, A6.10.8.1.1-1, or A6.10.8.1.2-1) and/or user input lateral effects
- \*\* Legend of Resistance Calculation:
  - A. Composite, noncompact, compression flange, Fr calculated using A6.10.7.2.2-1

  - B. Composite, noncompact, tension flange, Pr calculated using A6.10.7.2.2-2 C. Noncompos or neg. flexure, compression flange, Pr calculated using A6.10.8.1.3-1 D. Noncompos or neg. flexure, compression flange, Pr calculated using FLB, A6.10.8.2.2-1
  - E. Noncompos or neg. flexure, compression flange, Fr calculated using FLB, A6.10.8.2.2-2
    F. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1
    G. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-1
    H. Noncompos or neg. flexure, compression flange, Fr calculated using LTB, A6.10.8.2.3-3

  - I. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.1.3-1 J. Noncompos or neg. flexure, tension flange, Fr calculated using A6.10.8.3-1 K. Tension flange, Fr calculated using net section fracture, A6.10.1.8-1

  - X. SKW has not been entered. App. A provisions have been skipped but may be applicable.

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#### 9041 INTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) (C

#### \*\*\* Legend of Code Check:

- A. Insufficient flexural resistance
- B. Based on the total stress in the bottom flange, this section is analyzed for positive flexure, so the top flange capacity is based on compression. However, the total factored stress (P+) in the top flange is tensile. The user should verify the acceptability of the section by comparing the top flange stress (F+) to the flexural resistance (Fr) of the top flange in negative flexure.

### FLANGE LATERAL CAPACITY

This output report is not applicable because no lateral loads (wind or user input lateral loads) have been entered.

#### NET SECTION FRACTURE CHECK

Not applicable due to absence of section holes

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE

Span			Limit		Intermediate Calculation	Flexu		Factored Flexural Stress	Resist.	Code
No.	Dist.	T/B	State	Flex.		Mr(e)*	Fr	Fu*		Check***
	(ft)					(kip-ft)				
1	0.000	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.		482.1			C	
		BOT	SERV-II	POS.		482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	
1	2.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-5.8	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-5.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	5.8	C	
			SERV-IIA	POS.	1.000	482.1	26.4	5.0	C	
1	4.200	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1			C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	9.5	C	
1	6.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-15.3	C	
			SERV-IIA	POS.	1.000	482.1			C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	13.3	C	
1	8.400	TOP	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.		482.1			C	
		BOT	SERV-II	POS.	1.000	482.1			C	
			SERV-IIA	POS.	1.000	482.1	26.4	16.4	C	
1	10.500	TOP	SERV-II	POS.	1.000	482.1	-26.4	-21.9	C	
			SERV-IIA	POS.	1.000	482.1	-26.4	-19.1	C	

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#### 9041 INTERIOR BEAM

# TK527 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

Span No.	Dist.	T/B	Limit State	Flex.	Intermediate Calculation Rh*	Flexu Resist Mr(e)*		Factored Flexural Stress Fu*	Resist.	Code Check***
	(ft)	-,-				(kip-ft)	(ksi)			
1	10.500	BOT	SERV-II	POS.	1.000	482.1	26.4		C	
			SERV-IIA	POS.	1.000	482.1	26.4	19.1	Ċ	
1	12.600	TOP	SERV-II	POS.	1.000	482.1	-26.4	-24.5	C	
			SERV-TTA	POS.	1.000	482.1	-26.4		Ċ	
		BOT	SERV-II	POS.	1.000	482.1	26.4		č	
			SERV-TTA	POS.	1.000	482.1	26.4	21.3	Ċ	
									-	
1	14.700	TOP	SERV-II	POS.	1.000	482.1	-26.4	-26.5	C	A
_			SERV-IIA	POS.	1.000	482.1	-26.4		č	
		BOT	SERV-II	POS.	1.000	482.1	26.4		Ċ	A
			SERV-IIA	POS.	1.000	482.1	26.4		Ċ	
			DDICT TITL	100.	1.000	102.1	20.1	23.1	Ü	
1	16.800	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.9	C	A
			SERV-IIA	POS.	1.000	482.1	-26.4		Ċ	
		BOT	SERV-II	POS.	1.000	482.1	26.4		Č	A
		201	SERV-IIA	POS.	1.000	482.1	26.4		Ċ	**
			DERCY IIA	100.	1.000	402.1	20.4	24.5		
1	18.900	TOP	SERV-II	POS.	1.000	482.1	-26.4	-28.6	C	A
-	10.500	101	SERV-IIA	POS.	1.000	482.1	-26.4		Č	**
		BOT	SERV-II	POS.	1.000	482.1	26.4		Č	A
		DOI	SERV-TTA	POS.	1.000	482.1	26.4		Č	-
			DERV IIA	100.	1.000	402.1	20.4	24.5	C	
1	21.000L	TOP	SERV-II	POS.	1.000	482.1	-26.4	-28.6	C	A
-	21.0002	101	SERV-IIA	POS.	1.000	482.1	-26.4		Č	**
		BOT	SERV-II	POS.	1.000	482.1	26.4		č	A
		201	SERV-IIA	POS.	1.000	482.1	26.4		Č	**
			DDICT TITL	100.	1.000	102.1	20.1	22.5	Ü	
1	21.000R	TOP	SERV-II	POS.	1.000	482.1	-26.4	-28.6	C	A
-	22.00010	101	SERV-IIA	POS.	1.000	482.1	-26.4		č	**
		BOT	SERV-II	POS.	1.000	482.1	26.4		Č	A
		201	SERV-IIA	POS.	1.000	482.1	26.4		Ċ	**
			DDICT TITL	100.	1.000	102.1	20.1	22.5	Ü	
1	23.100	TOP	SERV-II	POS.	1.000	482.1	-26.4	-28.6	C	A
-	23.100	101	SERV-IIA	POS.	1.000	482.1	-26.4		Č	**
		BOT	SERV-II	POS.	1.000	482.1	26.4	28.6	Č	A
		201	SERV-TTA	POS.	1.000	482.1	26.4	24.9	Ċ	**
			DDICT TITL	100.	1.000	102.1	20.1	22.5	Ü	
1	25.200	TOP	SERV-II	POS.	1.000	482.1	-26.4	-27.9	C	A
_			SERV-IIA	POS.	1.000	482.1	-26.4		Ċ	
		BOT	SERV-II	POS.	1.000	482.1	26.4		Ċ	A
		201	SERV-IIA	POS.	1.000	482.1	26.4		č	
				- 00.		-02.1	-0.1			
1	27.300	TOP	SERV-II	POS.	1.000	482.1	-26.4	-26.5	C	A
-			SERV-IIA	POS.	1.000	482.1	-26.4		Ċ	
		BOT	SERV-II	POS.	1.000	482.1	26.4		č	A
				- 00.		-02.1	_0.1	-0.5	~	

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# 9041 INTERIOR BEAM

# TK527 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

								Factored		
					Intermediate	Flexu	ral	Flexural		
Span			Limit		Calculation	Resist	ance	Stress	Resist.	Code
Ño.	Dist.	T/B	State	Flex.	Rh*	Mr(e)*	Fr	Fu*	Calc.**	Check***
	(ft)					(kip-ft)				
1	27.300	BOT	CEDW_TTA	DOG	1.000			23.1	С	
_	27.300	DOI	DERV 11A	100.	1.000	402.1	20.4	23.1		
1	29.400	TOP	SERV-II	POS.	1.000	482.1	-26.4	-24.5	С	
_	23.100	101	SERV-IIA			482.1				
		DOT	SERV-II					24.5		
		БОІ	SERV-IIA				26.4			
			SEKV-IIM	FOS.	1.000	402.1	20.4	21.3	C	
1	31.500	TOD	SERV-II	POS.	1.000	482.1	-26.4	-21.9	C	
_	31.300	101	SERV-IIA			482.1				
		DOT	SERV-IIA					21.9		
		BUI							C	
			SERV-IIA	POS.	1.000	482.1	26.4	19.1	C	
1	33.600	mo n	SERV-II	POS.	1.000	482.1	06.4	-18.9	С	
1	33.600	TOP	SERV-II SERV-IIA			482.1				
		n.o.m								
		BO.I.	SERV-II					18.9		
			SERV-IIA	POS.	1.000	482.1	26.4	16.4	C	
		mon		200					~	
1	35.700	TOP	SERV-II	POS.		482.1				
			SERV-IIA				-26.4			
		BOT	SERV-II				26.4			
			SERV-IIA	POS.	1.000	482.1	26.4	13.3	C	
									_	
1	37.800	TOP		POS.		482.1				
			SERV-IIA			482.1	-26.4	-9.5		
		BOT	SERV-II			482.1	26.4	10.9	C	
			SERV-IIA	POS.	1.000	482.1	26.4	9.5	C	
1	39.900	TOP	SERV-II							
			SERV-IIA			482.1				
		BOT	SERV-II	POS.	1.000		26.4		C	
			SERV-IIA	POS.	1.000	482.1	26.4	5.0	C	
1	42.000	TOP	SERV-II	POS.		482.1			C	
			SERV-IIA	POS.	1.000	482.1	-26.4	0.0	C	
		BOT	SERV-II	POS.	1.000	482.1	26.4	0.0	C	
			SERV-IIA	POS.	1.000	482.1	26.4	0.0	C	

<sup>\*</sup> Legend of General Notes:

Legend of General Notes:
Rh = Hybrid factor
Mr(e) = Flexural resistance in terms of moment, back-calculated from the stress flexural resistance, Fr
Fu = For bottom flanges of composite sections or both flanges of noncomposite sections, this value includes lateral stresses when input by the user (A6.10.4.2.2)

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### 9041 INTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

#### SERVICE LIMIT STATE - FLEXURAL RESISTANCE (cont.)

- \*\* Legend of Resistance Calculation:
  - A. Composite, top flange, Fr calculated using A6.10.4.2.2-1 B. Composite, bottom flange, Fr calculated using A6.10.4.2.2-2 C. Noncomposite, Fr calculated using A6.10.4.2.2-3
- \*\*\* Legend of Code Check:
  A. Insufficient flexural resistance

## SERVICE LIMIT STATE - WEB BEND-BUCKLING

									Factored	
_			- 1 - 1 -		Interme				Flexural	
Span		_ ,_	Limit		Calcula			ance		Code
No.	Dist.	T/B	State	Flex.						Check**
_	(ft)	mon			(in)		(kip-ft)	(KS1)	(KS1)	
1	0.000	TOP				1.000	602.6	-33.0	0.0	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	0.0	
1	2.100	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-5.8	
_	2.100	TOP	SERV-IIA		12.79				-5.0	
		101	D2111 2111	100.	12.75	1.000	002.0	33.0	5.0	
1	4.200	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-10.9	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-9.5	
1	6.300	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-13.3	
1	8.400	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-18.9	
1	0.400	TOP	SERV-IIA	POS.	12.79		602.6			
		101	SERV-IIA	FUB.	12.75	1.000	002.0	-33.0	-10.4	
1	10.500	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-21.9	
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-19.1	
1	12.600	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-21.3	
1	14.700	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-26.5	
1	14.700	TOP	SERV-II SERV-IIA	POS.	12.79	1.000		-33.0		
		101	SERV-IIA	PUS.	12.79	1.000	602.6	-33.0	-23.1	
1	16.800	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-27.9	
		TOP	SERV-IIA	POS.	12.79		602.6			
1	18.900	TOP	SERV-II	POS.	12.79		602.6			
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-24.9	
		mon		200						
1	21.000L	TOP	SERV-II	POS.	12.79			-33.0		
		TOP	SERV-IIA	POS.	12.79	1.000	602.6	-33.0	-24.9	
1	21.000R	TOP	SERV-II	POS.	12.79	1.000	602.6	-33.0	-28.6	
_	22.0000	TOP	SERV-IIA	POS.	12.79	1.000	602.6		-24.9	
				- 50.			-02.0	-5.0		

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# 9041 INTERIOR BEAM

TK527 - SPECIFICATION CHECKING (cont.)

# SERVICE LIMIT STATE - WEB BEND-BUCKLING (cont.)

Span No.	Limit Dist. T/B State Flex.		Intermediate Calculations Dc* Rh*		Flexural Resistance Mr(e)* Fcrw*		Flexural Stress fc*	Code Check**		
	(ft)	-, -			(in)		(kip-ft)	(ksi)	(ksi)	
1	23.100	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79			-33.0 -33.0		
1	25.200	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6		-27.9 -24.3	
1	27.300	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6		-26.5 -23.1	
1	29.400	TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6		-24.5 -21.3	
1	31.500	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6		-21.9 -19.1	
1	33.600	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6		-18.9 -16.4	
1	35.700	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6		-15.3 -13.3	
1	37.800	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6		-10.9 -9.5	
1	39.900	TOP TOP	SERV-II SERV-IIA	POS. POS.	12.79 12.79	1.000	602.6 602.6		-5.8 -5.0	
1	42.000	TOP TOP	SERV-II SERV-IIA	POS.	12.79 12.79	1.000	602.6 602.6	-33.0 -33.0	0.0	

<sup>\*</sup> Legend of Intermediate Calculations: Dc = Depth of web in compression Rh = Hybrid factor

Mr(e) = Flexural resistance in terms of moment, back-calculated from

from the stress flexural resistance, Fcrw
Fcrw = Nominal bend-buckling resistance, LRFD Specifications 6.10.4.2.2-4
fc = Compression-flange stress calculated without flange lateral bending N/A = This check is not required for composite sections in positive flexure in which the web satisfies the requirement of LRFD Specifications Article 6.10.2.1.1

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9041 INTERIOR BEAM TK527 - SPECIFICATION CHECKING (cont.)

SHEAR CAPACITY

Span No.	Dist.	Limit State	Factored Shear Resistance Vr	Footomed	Stiffened/ Unstiffened U U	Code Check*
1	0.000	STR-I STR-II	256.60 256.60	100.02 83.52	n n	
1	2.100	STR-I STR-II	256.60 256.60	92.50 77.09	n	
		STR-II	256.60 256.60	70.65	U	
			256.60 256.60			
1	8.400	STR-I STR-II	256.60 256.60	70.03 57.84	n	
		STR-II	256.60 256.60		U	
			256.60	45.69	U	
			256.60 256.60			
		STR-II	256.60 256.60	33.55	U	
		STR-II	256.60 256.60	27.48	U	
			256.60 256.60			
		STR-II	256.60 256.60	21.40	U	
		STR-II	256.60 256.60	-27.48	U	
			256.60 256.60			
		STR-II	256.60 256.60	-39.62	U	
1	29.400	STR-I	256.60	-55.93	U	

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# 9041 INTERIOR BEAM TK527 - SPECIFICATION CHECKING (cont.)

			SHEAR CAPACIT	Y (cont.)		
Span No.	Dist. (ft)	State	Resistance	Factored Shear Vu	Stiffened/ Unstiffened	
1	29.400	STR-II		-45.69	U	
1	31.500		256.60 256.60			
1	33.600	STR-I STR-II	256.60 256.60			
1	35.700		256.60 256.60			
1	37.800	STR-I STR-II	256.60 256.60		n	
1	39.900	STR-I STR-II	256.60 256.60			
1	42.000	STR-I STR-II		-100.02 -83.52		

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9041 INTERIOR BEAM SUMMARY - OVERALL REACTIONS

# REACTIONS & ROTATIONS PER GIRDER (UNFACTORED, W/O IMPACT, W/ DISTRIBUTION) FOR ELASTOMERIC BEARING PAD DESIGN

Support		Minimum	Maximum	Live Load
No.		Reaction LC (kips)	Reaction Lo	C Rotation LC (radians)
1	Total DC1 Total DC2	20.11 2.16	20.11 2.16	
	Total DL LL (PHL-93)	22.27	22.27 36.04	1 0.003972 5
2	Total DC1 Total DC2	20.11 2.16	20.11 2.16	
	Total DL LL (PHL-93)	22.27	22.27	1 0.003972 5

Note: Rotation is about an axis normal to the centerline of the beam. The rotation value given is the larger of the positive rotation and absolute value of the negative rotation due to live load.

- LC (PHL-93 Loading Codes):
  1 Tandem + Lane Governs
  2 Truck + Lane Governs
  3 Tandem Pair + Lane Governs
- 4 Truck Pair + Lane Governs

- 4 Ituck Pair + Lane Governs 5 Truck Alone Governs 6 25% Truck + Lane Governs 7 90% (Truck Pair + Lane) Governs

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9041 INTERIOR BEAM SUMMARY - OVERALL REACTIONS (cont.)

REACTIONS & ROTATIONS PER GIRDER (UNFACTORED, W/ IMPACT, W/ DISTRIBUTION) FOR POT, STEEL OR DISC BEARING DESIGN

_						
	Support No.		Minimum Reaction LC (kips)	Maximum Reaction LC (kips)	Rotation LC (radians)	
	1	Total DC1 Total DC2	20.11	20.11	-0.004949 -0.000532	
		Total DL LL (PHL-93)	22.27 0.00	22.27 45.75 1	-0.005481 -0.005282 5	
	2	Total DC1 Total DC2	20.11 2.16	20.11 2.16	0.004949 0.000532	
		Total DL LL (PHL-93)	22.27	22.27 45.75 1	0.005481 0.005282 5	

Note: Rotation is about an axis normal to the centerline of the beam.

LC (PHL-93 Loading Codes):

- 1 Tandem + Lane Governs 2 Truck + Lane Governs
- 3 Tandem Pair + Lane Governs 4 Truck Pair + Lane Governs

- 5 Truck Alone Governs 6 25% Truck + Lane Governs
- 7 90% (Truck Pair + Lane) Governs

LRFD Steel Girder Design and Rating, Version 2.3.0.0 PAGE 67 Input File: 041 Int.dat 12/14/2015 08:37:37 Input File: 041 Int.dat 12/14/2015 08:37:37

9041 INTERIOR BEAM SUMMARY - OVERALL REACTIONS (cont.)

## REACTIONS (UNFACTORED) FOR ABUTMENT DESIGN

DL REACTIONS (UNFACTORED) PER GIRDER

Support No.	Total Total		Minimum Reaction (kips) 20.11 2.16	Maximum Reaction (kips) 20.11 2.16
	Total	DL	22.27	22.27
2	Total Total		20.11 2.16	20.11 2.16
	Total	DL	22.27	22.27

#### LL REACTIONS PER LANE (UNFACTORED, W/O IMPACT)

Support		Minimu	ım	Maximu	m
No.		Reaction	LC	Reaction	LC
		(kips)		(kips)	
1	PHL-93	0.00		72.96	1
2	PHL-93	0.00		72.96	1

Note: These values are to be used only if the end supports are abutments. Do not use these values for the pier design at a discontinuous superstructure.

- LC (PHL-93 Loading Codes): 1 Tandem + Lane Governs 2 Truck + Lane Governs
- 3 Tandem Pair + Lane Governs 4 Truck Pair + Lane Governs
- 5 Truck Alone Governs
- 6 25% Truck + Lane Governs 7 90% (Truck Pair + Lane) Governs

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9041 INTERIOR BEAM SUMMARY - OVERALL REACTIONS (cont.)

## REACTIONS (UNFACTORED) FOR PIER DESIGN

#### DL REACTIONS (UNFACTORED) PER GIRDER

Support		Minimum	Maximum
No.		Reaction	Reaction
		(kips)	(kips)
1	Total DC1	20.11	20.11
	Total DC2	2.16	2.16
	Total DL	22.27	22.27
2	Total DC1	20.11	20.11
	Total DC2	2.16	2.16
	Total DL	22.27	22.27

#### LL REACTIONS PER LANE (UNFACTORED, W/O IMPACT)

Suppor	t	Mi	nimum	Reaction			ximum	Reaction	
No.		Vehicle (kips)	LC	Lane (kips)	LC	Vehicle (kips)	LC	Lane (kips)	LC
1	PHL-93 P-82	0.00		0.00		59.52 97.71	1	13.44	1
2	PHL-93 P-82	0.00		0.00		59.52 97.71	1	13.44	1

Note: Impact must be added for pier cap design

LC (PHL-93 Loading Codes): 1 - Tandem + Lane Governs 2 - Truck + Lane Governs

3 - Tandem Pair + Lane Governs 4 - Truck Pair + Lane Governs 5 - Truck Alone Governs

6 - 25% Truck + Lane Governs 7 - 90% (Truck Pair + Lane) Governs

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9041 INTERIOR BEAM SUMMARY - RATING FACTORS W/O FWS

	RATING FACTORS - OVERALL SUMMARY W/O FWS									
	Governs	т/в	Rating			Dist.	Limit State			
PHL-93				(COID)		(20)				
Inventory Operating		T T	0.655 0.849		1	21.000L 21.000L				
P-82										
Operating	Flexure	T	0.718	73.2	1	21.000L	STR-II			
ML-80										
Inventory Operating		T T	0.746 0.967	27.3 35.4	1	21.000L 21.000L				
HS20										
Inventory Operating		T T	0.954 1.236	34.3 44.5	1	18.900 18.900				
H20										
Inventory Operating		T T	1.260 1.633	25.2 32.7	1 1	21.000L 21.000L				
TK527										
Inventory Operating		T T	0.801 1.038	32.0 41.5	1	21.000L 21.000L	STR-I STR-II			

LRFD Steel Girder Design and Rating, Version 2.3.0.0 PAGE 70 Input File: 041 Int.dat 12/14/2015 08:37:37 Input File: 041 Int.dat 12/14/2015 08:37:37

9041 INTERIOR BEAM SUMMARY - SPECIFICATION CHECKS

### SPECIFICATION CHECK WARNINGS

For the live loadings input by the user, the program encountered one or more specification check warnings. Specification check warnings indicate conditions that do not fail a specification check, but may need to be reviewed by the user. The following is a list of output table headings, listed separately for each live loading for which warnings have occurred. It should be noted that the program does not perform specification checking corresponding to commands that have not been input by the user.

PHL-93/P-82

%WARNING: \*\*THIS MUST BE APPROVED BY CHIEF BRIDGE ENGINEER\*\* on Page 7 ECONOMIC FEASIBILITY CHECKS

LRFD Steel Girder Design and Rating, Version 2.3.0.0 PAGE 71 12/14/2015 08:37:37 Input File: 041 Int.dat

9041 INTERIOR BEAM

SUMMARY - SPECIFICATION CHECKS (cont.)

### SPECIFICATION CHECK FAILURES

For the live loadings input by the user, the program encountered one or more specification check failures. The following is a list of output table headings, listed separately for each live loading for which failures have occurred. It should be noted that the program does not perform specification checking corresponding to commands that have not been input by the user.

### PHL-93/P-82

DISTRIBUTION FACTORS FOR DESIGN LIVE LOADING (LANE FRACTION, INCL. SKEW) DISTRIBUTION FACTORS FOR FATIGUE VEHICLE (LANE FRACTION, INCL. SKEW) STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)
SERVICE LIMIT STATE - FLEXURAL RESISTANCE
BEARING STIFFEMER CHECK WEB CONCENTRATED LOAD CHECK DEFLECTION LIMITS FOR LIVE LOAD RATING FACTORS - STRESS FLEXURAL CAPACITY

### ML-80

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT)
SERVICE LIMIT STATE - FLEXURAL RESISTANCE
BEARING STIFFEMER CHECK WEB CONCENTRATED LOAD CHECK RATING FACTORS - STRESS FLEXURAL CAPACITY

### HS20

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) BEARING STIFFENER CHECK WEB CONCENTRATED LOAD CHECK RATING FACTORS - STRESS FLEXURAL CAPACITY

## TK527

STRESS FLEXURAL CAPACITY (NONCOMPOSITE OR -FLEX OR COMPOSITE/NONCOMPACT) SERVICE LIMIT STATE - FLEXURAL RESISTANCE BEARING STIFFENER CHECK WEB CONCENTRATED LOAD CHECK RATING FACTORS - STRESS FLEXURAL CAPACITY

#### Table of Contents

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SUMMARY - SPECIFICATION CHECKS	70

# **Load Rating Summary**

BMS No:

48 7208 0684 9041

Feature Carried:

Little Creek Road

Feature Intersected:

Little Martins Creek

Structure Type:

Two Span Simply Supported Encased I-Beam

Inspection Date:

12/5/2012

Analysis Method:

Load Factor Design (LFD) Method

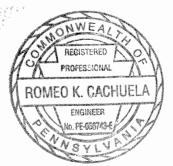
Additional Criteria:

CMA

Date: 8/27/13 Commented Changes: JMF 11/24/15

Chk By: RKC Date: 9/12/13 Checked:

MDR 12/8/15



Romio K. Cachuel-9/23/2013

## Ratings (BAR7 Version 7.13.0.0)

	Inventory Rating						Operating Rating								
		Tons / Load Effect					Tons / Load Effect								
	H20	HS2	0	ML8	30	TK!	527	H2	20	HS	20	ML80		TK527	
Fascia Beam															
no measurable section losses	20 M	28	М	22	М	26	М	34	М	47	М	37	М	43	М
Interior Beam															
no measurable section losses	20 M	28	М	22	М	26	М	34	М	47	М	37	М	43	М
Controlling	20 M	28	М	22	M	26	М	34	М	47	M	37	M	43	M

**Existing Posting:** 

20 Tons

Proposed Posting:

No posting is required. Existing posting can be removed.

Following STV's December 2012 bridge inspection, in order to perform a load rating analysis, it was determined to be necessary to remove some of the concrete encasement at the bottom flange of a beam as well as drill down through the top of the asphalt overlay and deck slab to the top of a beam to obtain beam, deck slab and asphalt overlay measurements. The work was performed in May 2013 (see attached correspondence) and STV was able to match a historic steel beam section based on field measurements and determine the asphalt overlay and deck slab depths.

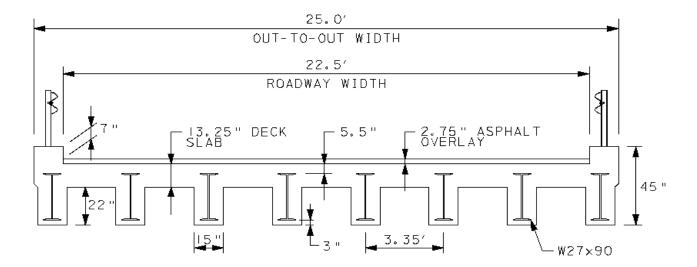
CLIENT	PennDOT District 5-0	STV INCORPORATED						
PROJECT	NBIS Bridge Rating Analysis	MADE	CHK	REV	JOB	NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013	3872		
	Fascia Beams	8/27/13	9/12/13		SHT. NO.			

Output

## **FASCIA BEAMS**

## References

- AASHTO LFD Standard Specifications for Highway Bridges, 16th Edition (A LFD)
- AASHTO LRFD Bridge Design Specifications, 5th Edition (A LRFD)
- PennDOT Design Manual Part 4, May 2012 Edition (DM-4)



## **Notes**

- No reinforcement was noted in the encasement at the area of the beam where a portion of the encasement was removed. According to the BAR7 User's Manual definition of an encased I-beam, the encased I-beam can only be considered composite if there is sufficient reinforcement wrapped around the beam to provide composite action between the beam and the slab. Therefore, per BAR7 User's Manual 3.2.4, the encased I-beam will be considered non-composite and analyzed as a multigirder bridge type "GGG."
- According to Northampton County, a core from the top of asphalt to the top of beam showed a depth of 5.5 inches (see attached correspondence). This would indicate a beam depth of approximately 29.5 inches. No historical sections could be matched to a beam of this depth with similar flange dimensions that were measured in the field by STV. However, if the 5.5 inches measured by the County is taken from the top of the actual deck to the top of the beam, a historical section can be determined. Since this approach conservatively uses a shallower beam, this analysis will utilize this approach.

CLIENT	PennDOT District 5-0	STV INCORPORATED				
PROJECT	NBIS Bridge Rating Analysis	MADE	СНК	CHK REV JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013872	
	Fascia Beams	8/27/13	9/12/13		SHT. NO.	

# Output

# **FASCIA BEAMS**

# **Bridge Data**

Roadway Width= 22.5 ft
Out-to-Out Width= 25 ft
No of Lanes= 2 A LFD 3.6.3
No of Beams= 8
Beam Spacing, S= 3.35 ft

# **Live Load Distribution Factors**

# **Deflection**

Reduction Factor = 1.0 A LFD 3.12.1 DF<sub>DFF</sub> = 0.250

## **Shear**

# **Shear Correction Factor**

Shear Skew Correction Factor=

Span Length, L=	42 ft	field measured	
Slab Depth, t <sub>s</sub> =	13.25 in		STLRFD maximum slab thickness =
PennDOT Skew Angle, ⊖=	30 °	field measured	12". Account for remaining 1.25" in
Longit. Stiffness Parameter, Kg=	$n (I + A \times e_g^2)$	A LRFD 4.6.2.2.1-1	DL1 (see page 4 for changes to exterior girder run and page 8 for
n=	$E_B/E_D$	A LRFD 4.6.2.2.1-2	changes to interior girder run).
E <sub>B</sub> =	28000 ksi		
E <sub>D</sub> =	2850 ksi	based on f'c = 2.5 ksi	i concrete per MBE Table
n=	9	6A.5.2.1-1 (Bridge bu	uilt 1946)
I @ obtuse corner=	2958.30 in <sup>4</sup>	Historic Section (atta	ached)
A @ obtuse corner=	26.34 in <sup>2</sup>	Historic Section (atta	ached)
e <sub>g</sub> =	<b>12.375</b> in		
Deck Y <sub>cg</sub> =	6.625 in	from bottom of deck	•
Beam Y <sub>cg</sub> =	5.75 in	from bottom of deck	· ·
K <sub>g</sub> =	<b>62928.217</b> in <sup>4</sup>		

DM-4 Table 4.6.2.2.3c-1

1.833

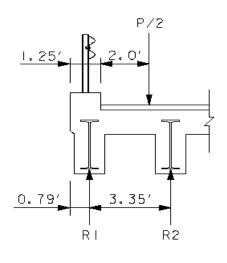
CLIENT	PennDOT District 5-0	STV INCORPORATED					
PROJECT	NBIS Bridge Rating Analysis	MADE	СНК	REV	JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013	4013872	
	Fascia Beams	8/27/13	9/12/13		SHT. NO.		

# Output

# **FASCIA BEAMS**

Live Load Distribution Factor

# A LFD 3.23.1



$$R1 \times 3.35' = P/2 \times (3.35' + 0.79' - 1.25' - 2.0')$$

 $R1 = 0.89' / 3.35' \times P/2$ 

 $R1 = 0.266 \times P/2$ 

 $R1 = 0.133 \times P$ 

DF= 0.133

 $DF_V = 0.133$ 

# Moment

DF= **0.133** A LFD 3.23.2.3.1.2

OR

DF= 1/2 x S / 5.5 A LFD 3.23.2.3.1.5 (in terms of wheel load)

DF= **0.305** 

DF<sub>M</sub>= **0.305** Use max between Lever Rule and LFD Dist. Factor

# **Dead Loads**

# DL1

Encasement

Concrete Wt= 150 pcf A LFD 3.3.6

Width= 15 in

Height= 22 in

DL1= 0.344 klf = Concrete Wt \* Width \* Height

CLIENT	PennDOT District 5-0	STV INCORPORATED				
PROJECT	NBIS Bridge Rating Analysis	MADE	СНК	CHK REV JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013872	
	Fascia Beams	8/27/13	9/12/13		SHT. NO.	

# Output

# **FASCIA BEAMS**

# Beam

The slab DL1 calculated by BAR7 and the encasement DL1 calculated above are based on gross sections. Therefore, a negative DL1 based on the cross sectional area of slab and encasement occupied by the beam will be calculated to input the proper net DL1.

	Concrete Wt= Beam Area= DL1=	150 pcf 26.34 in <sup>2</sup> - <b>0.027</b> klf	A LFD 3.3.6 Historical Section (attached) = -1 * Concrete Wt * Beam Area
Curb			curbs appear to have been poured with deck slab
	Concrete Wt=	150 pcf	A LFD 3.3.6
	Height=	9.75 in	
	Width=	<b>1.25</b> ft	
	DL1 <del>DL2=</del>	<b>0.152</b> klf	= Concrete Wt * Height * Width
Top of Slab	DL1 = 150pc DL1 = 0.049	f * 1.25" * 25' / 8 bms klf	(A LFD 3.23.2.3.1.1)
Total			
	DL1=	<del>- <b>0.469</b> klf</del> 0.518 klf	
DL2			
Guiderail			placed after slab and curbs cured
	Guiderail Wt=	50 plf	
	DL2=	<b>0.013</b> klf	= Guiderail Wt * 2 / No. of Beams (A LFD 3.23.2.3.1.1)
Asphalt Overlay			placed after slab and curbs cured
	Asphalt Wt=	140 pcf	A LFD 3.3.6
	Depth=	2.75 in	field measured
	DL2=	<b>0.090</b> klf	= Asphalt Wt * Depth * Roadway Width / No. of Beams
			(A LFD 3.23.2.3.1.1)
Total			

DL2=

**0.103** klf

CLIENT	PennDOT District 5-0	STV INCORPORATED					
PROJECT	NBIS Bridge Rating Analysis	MADE	СНК	REV	JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013	4013872	
	Fascia Beams	8/27/13	9/12/13		SHT. NO.		

# Output

## **FASCIA BEAMS**

# **Beam Dimensions**

Historic Section (attached)

No section losses noted.

2958.3 in<sup>4</sup> Moment of Inertia= 26.34 in<sup>2</sup> Area= Flange Thickness= 0.7075 in average Flange Width= 9.0 in 27.0 in Beam Depth= Web Thickness= 0.524 in Composite= No Yield Strength= 33 ksi MBE Table 6A.6.2.1-1 (Bridge Built 1946)

# **Lateral Bracing**

# Top Flange

Top flange of non-composite section is fully in contact with the deck and no sign of cracking, rust, or separation along the steel-concrete interface is present. Therefore, consider the top flange continuously braced as per MBE 6A.6.9.3.

# **Bottom Flange**

None noted.

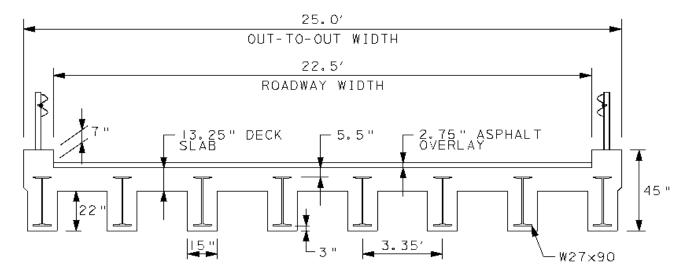
CLIENT	PennDOT District 5-0	STV INCORPORATED					
PROJECT	NBIS Bridge Rating Analysis	MADE	CHK	REV	JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013	4013872	
	Interior Beams	8/27/13	9/10/13		SHT. NO.		

## Output

## **INTERIOR BEAMS**

## References

- AASHTO LFD Standard Specifications for Highway Bridges, 16th Edition (A LFD)
- AASHTO LRFD Bridge Design Specifications, 5th Edition (A LRFD)
- PennDOT Design Manual Part 4, May 2012 Edition (DM-4)



## **Notes**

- No reinforcement was noted in the encasement at the area of the beam where a portion of the encasement was removed. According to the BAR7 User's Manual definition of an encased I-beam, the encased I-beam can only be considered composite if there is sufficient reinforcement wrapped around the beam to provide composite action between the beam and the slab. Therefore, per BAR7 User's Manual 3.2.4, the encased I-beam will be considered non-composite and analyzed as a multi-girder bridge type "GGG."
- According to Northampton County, a core from the top of asphalt to the top of beam showed a depth of 5.5 inches (see attached correspondence). This would indicate a beam depth of approximately 29.5 inches. No historical sections could be matched to a beam of this depth with similar flange dimensions that were measured in the field by STV. However, if the 5.5 inches measured by the County is taken from the top of the actual deck to the top of the beam, a historical section can be determined. Since this approach conservatively uses a shallower beam, this analysis will utilize this approach.

CLIENT	PennDOT District 5-0	STV INCORPORATED					
PROJECT	NBIS Bridge Rating Analysis	MADE	СНК	REV	JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		401	3872	
	Interior Beams	8/27/13	9/10/13		SHT. NO.		

# Output

## **INTERIOR BEAMS**

# **Bridge Data**

Roadway Width= 22.5 ft
Out-to-Out Width= 25 ft
No of Lanes= 2 A LFD 3.6.3
No of Beams= 8
Beam Spacing, S= 3.35 ft

## **Live Load Distribution Factors**

## **Deflection**

Reduction Factor= 1.0 A LFD 3.12.1  $DF_{DEF}$ = 0.250

Shear

 $DF_V$ = 0.500 wheel load directly over beam

**Moment** 

DF=  $1/2 \times S / 5.5$  A LFD Table 3.23.1 (in terms of wheel load)

DF= **0.305** A LFD 3.23.2.2

 $DF_{M} = 0.305$ 

## **Dead Loads**

## DL1

Encasement

Concrete Wt= 150 pcf A LFD 3.3.6

Width= 15 in Height= 22 in

DL1= 0.344 klf = Concrete Wt \* Width \* Height

## Beam

The slab DL1 calculated by BAR7 and the encasement DL1 calculated above are based on gross sections. Therefore, a negative DL1 based on the cross sectional area of slab and encasement occupied by the beam will be calculated to input the proper net DL1.

Concrete Wt= 150 pcf A LFD 3.3.6

Beam Area 26.34 in Historical Section (attached)

DL1 -0.027 klf = -1 \* Concrete Wt \* Beam Area

CLIENT	PennDOT District 5-0	STV INCORPORATED					
PROJECT	NBIS Bridge Rating Analysis	MADE	CHK	REV	JOB NO.		
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013	4013872	
	Interior Beams	8/27/13	9/10/13		SHT. NO.		

## Output

## **INTERIOR BEAMS**

Curb curbs appear to have been poured with deck slab

Concrete Wt= 150 pcf A LFD 3.3.6

Height= 9.75 in Width= **1.25** ft

Top of Slab DL1 = 0.049 klf (A LFD 3.23.2.3.1.1)

Total

DL1= **0.316** klf

0.365 klf

DL2

Guiderail placed after slab and curbs cured

Guiderail Wt= 50 plf

DL2= **0.013** klf = Guiderail Wt \* 2 / No. of Beams (A LFD 3.23.2.3.1.1)

Asphalt Overlay placed after slab and curbs cured

Asphalt Wt= 140 pcf A LFD 3.3.6

Depth= 2.75 in field measured

DL2= 0.090 klf = Asphalt Wt \* Depth \* Roadway Width / No. of Beams

(A LFD 3.23.2.3.1.1)

Page 8

Total

DL2= **0.103** klf

Beam Dimensions Historic Section (attached)

No section losses noted.

Moment of Inertia= 2958.3 in<sup>4</sup>

Area= 26.34 in<sup>2</sup>

Flange Thickness= 0.7075 in average

Flange Width= 9.0 in
Beam Depth= 27.0 in
Web Thickness= 0.524 in
Composite= No

Yield Strength= 33 ksi MBE Table 6A.6.2.1-1 (Bridge Built 1946)

CLIENT	PennDOT District 5-0	STV INCORPORATED					
PROJECT	NBIS Bridge Rating Analysis	MADE	MADE CHK REV JOB NO.			NO.	
SUBJECT	BMS#: 48 7208 0684 9041	CMA	RKC		4013	4013872	
	Interior Beams	8/27/13	9/10/13		SHT. NO.		

Output

**INTERIOR BEAMS** 

# **Lateral Bracing**

Top Flange

Top flange of non-composite section is fully in contact with the deck and no sign of cracking, rust, or separation along the steel-concrete interface is present. Therefore, consider the top flange continuously braced as per MBE 6A.6.9.3.

**Bottom Flange** 

None noted.

Project: E01222- Local NBIS

Subject: Load Rating Analysis - Fascia Beams

Designed By: CMA

Date: 8/27/13

Job No: 4013872

Index No:

Checked By: RKC

Date: 9/12/13

\* BRIDGE ANALYSIS AND RATING (BAR7)

330522 \*

PROGRAM P4353000

330522

VERSION 7.13.0.0

09/16/2013 10:48 DOCUMENTATION 04/2010

INPUT: Fascia.dat

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\*

STRUCTURE ID - 48720806849041 -

PROJECT IDENTIFICATION

S OVER END LIVE OUT- IMP GAGE PASS FAT- CONC RF-TYPE LEV LANES LOAD PUT FACT DIST DIST IGUE DECK SPEC DIST DIR FACTOR PAN 0 0.00 0.0 0.0 GGG

BRIDGE ANALYSIS AND RATING (BAR7)

LAST UPDATED 05/07/2010

SKEW CORR HYB FACTOR 1.833

BRIDGE CROSS SECTION AND LOADING

OVERHANG CL OF DECK ΩR GIRDER OR ROADWAY DISTRIBUTION FACTORS WIDTH SPACING TRUSS TO CURB WIDTH SHEAR MOMENT DEFLECT 0.00 2.45 0.00 22.50 0.133 0.305 0.250

SLAB DEAD LOADS THICKNESS HAUNCH F'C DL2 DL1 N SYMMETRY 13.25 0.00 0.469 0.103 0.000

STRINGER FLOORBEAM UNIT WEIGHT DECK CONCRETE DL1 DL1 0.000 0.000 0.

SPAN LENGTHS (SIMPLE)

SPAN # 42.00 LENGTH

STEEL MEMBER PROPERTIES

WF BM FLANGE WF RM G P M OF I AREA OR WEB OR VRT OR HRZ ANGLE FLANGE A PLATE WFR S N RANGE E LEG THICK WIDTH R DEPTH THICK 26.34 0.7075 2958.30 9.000 27.00 0.5240 COMP FY FY TOP FY BOT CG TOP CG BOT TPW TPT BPT 0.00 0.0000 0.00 0.0000 N 33.0 0.0 0.0 0.000 0.000

I:\Projects\4013872\4013872 0001\50 Discipline Information\61 Bridges\Ratings\Work Order #3\Northampton County\County 9041\Load Rating Analysis Output Fascia.docm

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Project: **E01222- Local NBIS** 

Subject: Load Rating Analysis – Fascia Beams

Index No:

Job No: **4013872** 

Subject: Load Rating Analysis – Fascia Beams	JOD NO: 4013872
LATERAL BRACE POINTS AND STIFFENER SPACINGS  C C C C C B OR S O NO. O NO. O NO. O NO. G OR F D OF D OF D OF CODE SPAN E SPCS SPACING E SPCS SPACING E SPCS SPACING BG 1 C 1 42.00 O 0.00 O 0.00 O 0.00 O 0.00 O 0.00 O 0.00	25.20 0.743 0.079 0.348 0.528 0.617 0.644 29.40 0.635 0.068 0.299 0.453 0.527 0.551 33.60 0.463 0.049 0.217 0.331 0.383 0.400 37.80 0.245 0.026 0.113 0.174 0.201 0.210 42.00 0.000 0.000 0.000 0.000 0.000 0.000  **********
DEFAULT VALUES	MAXIMUM REACTIONS
UNIT INTEGRAL  SLC GAGE PASSING WEIGHT WEARING SKEW CORR LEVEL DISTANCE DISTANCE DECK SURFACE FACTOR I 6.0 4.0 150.0 0.5	SUPPORT DL1 DL2 +(LL+I) -(LL+I) +I.FI.F. +I.FI.F. 1 20.3 2.2 11.8 0.0 1.30
++++++++++++++++++++++++++++++++++++++	NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.
+++++++++++++++++++++++++++++++++++++++	UNFACTORED MOMENTS AND SHEARS
DEAD LOADS ACTING ON GIRDER	SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30  =======  DL1 DL2 +(LL+I) -(LL+I) DL1 DL2 +(LL+I) -(LL+I)
INPUT GIRDER SLAB FL BEAM STRINGER FL BEAM STRINGER TOTAL TOTAL DL1 WEIGHT WEIGHT WEIGHT DL1 DL1 DL1 DL2 0.469 0.090 0.406 0.000 0.000 0.000 0.000 0.964 0.103  NOTE: IF THE LIVE LOAD STRESS IS ZERO AT ANY SECTION THE RATING FACTOR IS PRINTED AS 999.99 INDICATING THAT IT IS INFINITE.	X MOMENT MOMENT MOMENT MOMENT SHEAR SHEAR SHEAR I.F. 0.00 0.0 0.0 0.0 0.0 20.3 2.2 21.7 0.0 1.30 SIMULT SHEAR 0.0 0.0 SIMULT MOM 0.0 0.0 4.20 76.6 8.2 55.5 0.0 16.2 1.7 24.9L -2.3 1.30 SIMULT SHEAR 24.2 0.0 SIMULT MOM 57.1 47.9 8.40 136.1 14.5 97.7 0.0 12.2 1.3 21.4L -4.7 1.30 SIMULT SHEAR 21.3 0.0 SIMULT MOM 97.9 85.2
NOTE: IF A SECTION DOES NOT MEET FLANGE OR WEB BUCKLING CRITERIA OF CURRENT AASHTO SPECIFICATIONS FOR LOAD FACTOR METHOD, THE RATING FACTORS ARE REPRINTED AS 888.88. THIS INDICATES THAT THERE IS A POTENTIAL FATIGUE PROBLEM.	12.60 178.6 19.1 126.5 0.0 8.1 0.9 18.4 -7.0 1.30 SIMULT SHEAR 18.4 0.0 SIMULT MOM 126.5 111.9 16.80 204.1 21.8 142.0 0.0 4.1 0.4 15.5 -9.7 1.30 SIMULT SHEAR 15.5 0.0 SIMULT MOM 142.0 133.2 21.00 212.7 22.7 144.3 0.0 0.0 0.0 12.6 -12.6 1.30 SIMULT SHEAR 12.6 0.0 SIMULT MOM 144.3 144.3 25.20 204.1 21.8 142.0 0.0 -4.1 -0.4 9.7 -15.5 1.30
GIRDER SECTION PROPERTIES  SPAN 1 =======	SIMULT SHEAR -15.5 0.0 SIMULT MOM 133.2 142.0 29.40 178.6 19.1 126.5 0.0 -8.1 -0.9 7.0 -18.4 1.30 SIMULT SHEAR -18.4 0.0 SIMULT MOM 111.9 126.5 33.60 136.1 14.5 97.7 0.0 -12.2 -1.3 4.7 -21.4L 1.30
GROSS MOMENT OF C SECTION MODULUS DEPTH AREA INERTIA BOTTOM TOP BOTTOM NON-COMPOSITE 27.00 26.34 2958.30 13.50 219.13 219.13	SIMULT SHEAR -21.3 0.0 SIMULT MOM 85.2 97.9 37.80 76.6 8.2 55.5 0.0 -16.2 -1.7 2.3 -24.9L 1.30 SIMULT SHEAR -24.2 0.0 SIMULT MOM 47.9 57.1 42.00 0.0 0.0 0.0 0.0 -20.3 -2.2 0.0 -21.7 1.30 SIMULT SHEAR 0.0 0.0 SIMULT MOM 0.0 0.0
DEFLECTIONS	ELEVIDAL CERECCES DEAM
SPAN 1 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.30	FLEXURAL STRESSES - BEAM  SPAN 1 ======  TOP FIBER STEEL STRESS  X DL1 DL2 +(LL+I) -(LL+I) DL1 DL2 +(LL+I) -(LL+I) 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 4.20 -4.192 -0.448 -3.038 0.000 4.192 0.448 3.038 0.000 8.40 -7.453 -0.796 -5.348 0.000 7.453 0.796 5.348 0.000 12.60 -9.782 -1.045 -6.928 0.000 9.782 1.045 6.928 0.000 16.80 -11.179 -1.194 -7.778 0.000 11.179 1.194 7.778 0.000

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SPAN 1

SPAN 1

# **STV INCORPORATED**

Project: **E01222- Local NBIS** 

Subject: Load Rating Analysis - Fascia Beams

21.00	-11.645	-1.244	-7.900	0.000	11.645	1.244	7.900	0.000
25.20	-11.179	-1.194	-7.778	0.000	11.179	1.194	7.778	0.000
29.40	-9.782	-1.045	-6.928	0.000	9.782	1.045	6.928	0.000
33.60	-7.453	-0.796	-5.348	0.000	7.453	0.796	5.348	0.000
37.80	-4.192	-0.448	-3.038	0.000	4.192	0.448	3.038	0.000
42.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

======							
		SHEAR S	STRESSES		ALLOW COMPR	RATING	FACTORS
X	DL1	DL2	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
0.00	1.511	0.161	1.618	0.000	1.000	5.76 V	8.21 V
4.20	1.209	0.129	1.859	-0.173	1.000	4.45 T	6.62 T
8.40	0.906	0.097	1.594	-0.347	1.000	1.85 T	3.09 T
12.60	0.604	0.065	1.373	-0.520	1.000	1.06 T	2.01 T
16.80	0.302	0.032	1.157	-0.723	1.000	0.74 T	1.59 T
21.00	0.000	0.000	0.940	-0.940	1.000	0.67 T	1.50 T
25.20	-0.302	-0.032	0.723	-1.157	1.000	0.74 T	1.59 T
29.40	-0.604	-0.065	0.520	-1.373	1.000	1.06 T	2.01 T
33.60	-0.906	-0.097	0.347	-1.594	1.000	1.85 T	3.09 T
37.80	-1.209	-0.129	0.173	-1.859	1.000	4.45 T	6.62 T
42.00	-1.511	-0.161	0.000	-1.618	1.000	5.76 V	8.21 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

### STRENGTHS AND LOAD FACTOR RATINGS

======								
	NON-COMP	OVERLOAD		NON-COM	PACT	COMPACT	COMPAC	T
	MOMENT	MOMENT	SHEAR	RATING F	ACTORS	MOMENT	RATING FA	ACTORS
X		STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	602.6 B	482.1	256.6	4.84 V	8.06 V	/ 696.2	4.84 V	8.06 V
4.20	602.6 B	482.1	256.6	4.10 T	6.83 1	г 696.2	4.30 o	7.16 o
8.40	602.6 B	482.1	256.6	1.92 T	3.20 1	r 696.2	2.04 o	3.39 o
12.60	602.6 B	482.1	256.6	1.26 T	2.10 7	г 696.2	1.35 o	2.25 o
16.80	602.6 B	482.1	256.6	1.00 T	1.67 1	г 696.2	1.08 o	1.80 o
21.00	602.6 B	482.1	256.6	0.95 T	1.58 7	r 696.2	1.03 o	1.71 o
25.20	602.6 B	482.1	256.6	1.00 T	1.67 1	r 696.2	1.08 o	1.80 o
29.40	602.6 B	482.1	256.6	1.26 T	2.10 7	r 696.2	1.35 o	2.25 o
33.60	602.6 B	482.1	256.6	1.92 T	3.20 1	696.2	2.04 o	3.39 o
37.80	602.6 B	482.1	256.6	4.10 T	6.83 T	696.2	4.30 o	7.16 o
42.00	602.6 B	482.1	256.6	4.84 V	8.06 V	/ 696.2	4.84 V	8.06 V

\*\*\*\*\*\*\*\*\*\* \* GIRDER - LIVE LOAD HS20 \*

### MAXIMUM REACTIONS

					REACTIONS	MOMENTS
					+I.FI.F.	+I.FI.F.
1	20.3	2.2	18.9	0.0	1.30	

NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD

ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.

SPAN 1 - LIVE LOAD IMPACT EACTORS : DOS MOM 1 30

SIMULT SHEAR

#### UNFACTORED MOMENTS AND SHEARS

Index No:

Job No: 4013872

SPAN I -	LIVE LOA	D IMPAG	LI FACIO	KS : PUS	MOM 1.30			
======								
						+(LL+I)		
X			MOMENT	MOMENT			SHEAR	
0.00	0.0	0.0		0.0	20.3 2.2	34.7		1.30
			0.0	0.0	SIMULT MOM		0.0	
4.20	76.6	8.2	81.2	0.0	16.2 1.7			1.30
			35.5	0.0	SIMULT MOM	81.2		
8.40	136.1			0.0	12.2 1.3	30.2		1.30
	SIMULT	SHEAR	30.2	0.0	SIMULT MOM	138.5	85.2	
12.60	178.6	19.1		0.0	8.1 0.9	25.0	-7.0	1.30
		SHEAR		0.0	SIMULT MOM	171.8	111.9	
16.80	204.1	21.8	190.0	0.0	4.1 0.4	20.2	-10.9	1.30
	SIMULT	SHEAR	19.8	0.0	SIMULT MOM	184.7	149.1	
21.00	212.7			0.0	0.0 0.0	15.5	-15.5	1.30
			-14.5	0.0	SIMULT MOM		177.6	
25.20	204.1			0.0	-4.1 -0.4		-20.2	1.30
	SIMULT			0.0	SIMULT MOM		184.7	
29.40	178.6			0.0	-8.1 -0.9	7.0	-25.0	1.30
			-25.0	0.0	SIMULT MOM		171.8	
33.60	136.1			0.0		4.7	-30.2	1.30
			-30.2	0.0			138.5	
37.80	76.6		81.2	0.0			-35.5	1.30
			-35.5				81.2	
42.00	0.0	0.0	0.0	0.0			-34.7	1.30

### FLEXURAL STRESSES - BEAM

SIMULT MOM

0.0

SPAN	1								
=====									
		TOP		TEEL STRE	SS	BOTT		STEEL ST	RESS
X		DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)
0.0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.2	0	-4.192	-0.448	-4.448	0.000	4.192	0.448	4.448	0.000
8.4	0	-7.453	-0.796	-7.584	0.000	7.453	0.796	7.584	0.000
12.6	0	-9.782	-1.045	-9.407	0.000	9.782	1.045	9.407	0.000
16.8	0	-11.179	-1.194	-10.403	0.000	11.179	1.194	10.403	0.000
21.0	0	-11.645	-1.244	-10.331	0.000	11.645	1.244	10.331	0.000
25.2	0	-11.179	-1.194	-10.403	0.000	11.179	1.194	10.403	0.000
29.4	0	-9.782	-1.045	-9.407	0.000	9.782	1.045	9.407	0.000
33.6	0	-7.453	-0.796	-7.584	0.000	7.453	0.796	7.584	0.000
37.8	0	-4.192	-0.448	-4.448	0.000	4.192	0.448	4.448	0.000
42.0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1							
		SHEAR S	TRESSES		ALLOW COMPR	RATING	FACTORS
X	DL1	DL2	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
0.00	1.511	0.161	2.588	0.000	1.000	3.60 V	5.13 V
4.20	1.209	0.129	2.646	-0.173	1.000	3.04 T	4.52 T
8.40	0.906	0.097	2.255	-0.347	1.000	1.31 T	2.18 T
12.60	0.604	0.065	1.865	-0.520	1.000	0.78 T	1.48 T
16.80	0.302	0.032	1.503	-0.810	1.000	0.56 T	1.19 T

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Project: E01222- Local NBIS

Index No:

Job No: 4013872

	Project. Eurzz- Local Nois									
	Subject: Load Rating Analysis – Fascia Beams									
	0.000 -0.302 -0.604 -0.906 -1.209 -1.511	-0.065 -0.097 -0.129	0.520 0.347 0.173	-1.157 -1.503 -1.865 -2.255 -2.646 -2.588	1.000		1.48 T 2.18 T 4.52 T			
Ü	NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.									
STRENGTHS AND LOAD FACTOR RATINGS										
SPAN 1	SPAN 1									
	NON-COM	P OVERLOA	AD.	NON-C	OMPACT	COMPACT	COMPACT			

======								
	NON-COMP	OVERLOAD		NON-COM	PACT	COMPACT	COMPAG	CT
	MOMENT	MOMENT	SHEAR	RATING F	ACTORS	MOMENT	RATING FA	ACTORS
X	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	602.6 E	3 482.1	256.6	3.03 V	5.04 \	√ 696.2	3.03 V	5.04 V
4.20	602.6 E	3 482.1	256.6	2.80 T	4.66	г 696.2	2.94 o	4.89 o
8.40	602.6 E	482.1	256.6	1.36 T	2.26	г 696.2	1.44 O	2.39 o
12.60	602.6 E	3 482.1	256.6	0.93 T	1.55	г 696.2	0.99 0	1.66 0
16.80	602.6 E	3 482.1	256.6	0.75 T	1.25	г 696.2	0.81 0	1.35 o
21.00	602.6 E	3 482.1	256.6	0.73 T	1.21	г 696.2	0.78 0	1.31 0
25.20	602.6 E	482.1	256.6	0.75 T	1.25	г 696.2	0.81 0	1.35 o
29.40	602.6 E	3 482.1	256.6	0.93 T	1.55	г 696.2	0.99 0	1.66 0
33.60	602.6 E	482.1	256.6	1.36 T	2.26	г 696.2	1.44 0	2.39 o
37.80	602.6 E	3 482.1	256.6	2.80 T	4.66	г 696.2	2.94 0	4.89 0
42.00	602.6 E	3 482.1	256.6	3.03 V	5.04 \	√ 696.2	3.03 V	5.04 V

### MAXIMUM REACTIONS

					REACTIONS	MOMENTS
SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	+I.FI.F.	+I.FI.F.
1	20.3	2.2	21.7	0.0	1.30	

NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.

### UNFACTORED MOMENTS AND SHEARS

SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

	DL1 DL2 +	·(LL+I)	-(LL+I)	DL1 DL2	+(LL+I)	-(LL+I)	
X	MOMENT MOMENT	MOMENT	MOMENT	SHEAR SHEAF	SHEAR	SHEAR	I.F.
0.00	0.0 0.0	0.0	0.0	20.3 2.2	39.7	0.0	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT MON	0.0	0.0	
4.20	76.6 8.2	90.8	0.0	16.2 1.7	39.6	-1.6	1.30
	SIMULT SHEAR	39.6	0.0	SIMULT MON	90.8	32.3	
8.40	136.1 14.5	154.4	0.0	12.2 1.3	33.7	-4.6	1.30
	SIMULT SHEAR	33.7	0.0	SIMULT MON	154.4	84.6	
12.60	178.6 19.1	197.2	0.0	8.1 0.9	28.3	-8.3	1.30
	SIMULT SHEAR	18.5	0.0	SIMULT MON	194.6	133.0	
16.80	204.1 21.8	224.4	0.0	4.1 0.4	22.9	-12.6	1.30

	SIMULT SHEAR	13.1	0.0	SIMULT MOM	210.0	173.2	
21.00	212.7 22.7	227.0	0.0	0.0 0.0	17.5	-17.5	1.30
	SIMULT SHEAR	7.7	0.0	SIMULT MOM	200.8	200.8	
25.20	204.1 21.8	224.4	0.0	-4.1 -0.4	12.6	-22.9	1.30
	SIMULT SHEAR	-13.1	0.0	SIMULT MOM	173.2	210.0	
29.40	178.6 19.1	197.2	0.0	-8.1 -0.9	8.3	-28.3	1.30
	SIMULT SHEAR	-18.5	0.0	SIMULT MOM	133.0	194.6	
33.60	136.1 14.5	154.4	0.0	-12.2 -1.3	4.6	-33.7	1.30
	SIMULT SHEAR	-33.7	0.0	SIMULT MOM	84.6	154.4	
37.80	76.6 8.2	90.8	0.0	-16.2 -1.7	1.6	-39.6	1.30
	SIMULT SHEAR	-39.6	0.0	SIMULT MOM	32.3	90.8	
42.00	0.0 0.0	0.0	0.0	-20.3 -2.2	0.0	-39.7	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT MOM	0.0	0.0	

### FLEXURAL STRESSES - BEAM

SPAN 1								
	TOP	FIBER S	TEEL STRE	SS	BOTT	OM FIBER	STEEL ST	RESS
X	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.20	-4.192	-0.448	-4.972	0.000	4.192	0.448	4.972	0.000
8.40	-7.453	-0.796	-8.455	0.000	7.453	0.796	8.455	0.000
12.60	-9.782	-1.045	-10.798	0.000	9.782	1.045	10.798	0.000
16.80	-11.179	-1.194	-12.289	0.000	11.179	1.194	12.289	0.000
21.00	-11.645	-1.244	-12.429	0.000	11.645	1.244	12.429	0.000
25.20	-11.179	-1.194	-12.289	0.000	11.179	1.194	12.289	0.000
29.40	-9.782	-1.045	-10.798	0.000	9.782	1.045	10.798	0.000
33.60	-7.453	-0.796	-8.455	0.000	7.453	0.796	8.455	0.000
37.80	-4.192	-0.448	-4.972	0.000	4.192	0.448	4.972	0.000
42.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1							
		SHEAR ST	TRESSES		ALLOW COMPR	RATING F	ACTORS
X	DL1	DL2 -	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
0.00	1.511	0.161	2.962	0.000	1.000	3.15 V	4.49 V
4.20	1.209	0.129	2.957	-0.117	1.000	2.72 T	4.05 T
8.40	0.906	0.097	2.514	-0.345	1.000	1.17 T	1.95 T
12.60	0.604	0.065	2.112	-0.619	1.000	0.68 T	1.29 T
16.80	0.302	0.032	1.710	-0.940	1.000	0.47 T	1.01 T
21.00	0.000	0.000	1.308	-1.308	1.000	0.42 T	0.95 T
25.20	-0.302	-0.032	0.940	-1.710	1.000	0.47 T	1.01 T
29.40	-0.604	-0.065	0.619	-2.112	1.000	0.68 T	1.29 T
33.60	-0.906	-0.097	0.345	-2.514	1.000	1.17 T	1.95 T
37.80	-1.209	-0.129	0.117	-2.957	1.000	2.72 T	4.05 T
42.00	-1.511	-0.161	0.000	-2.962	1.000	3.15 V	4.49 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

### STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1

NON-COMP OVERLOAD NON-COMPACT COMPACT COMPACT MOMENT MOMENT SHEAR RATING FACTORS MOMENT RATING FACTORS



Project: **E01222- Local NBIS** 

Subject: Load Rating Analysis - Fascia Beams

Index No:

Job No: **4013872** 

X 0.00 4.20 8.40 12.60 16.80 21.00 25.20 29.40 33.60 37.80	STRENGTH ST 602.6 B	482.1 482.1 482.1 482.1 482.1 482.1 482.1 482.1 482.1 482.1	256.6 2 256.6 2 256.6 0 256.6 0 256.6 0 256.6 0 256.6 0 256.6 0 256.6 0 256.6 0	2.50 T 1.22 T 0.81 T 0.64 T 0.60 T 0.64 T 0.81 T 1.22 T 2.50 T	OR 4.41 V 4.17 T 2.03 T 1.35 T 1.06 T 1.06 T 1.35 T 2.03 T 4.17 T	696.2 696.2 696.2 696.2 696.2 696.2 696.2	IR 2.64 V 2.63 O 1.29 O 0.68 O 0.65 O 0.68 O 0.68 O 0.29 O 2.63 O	OR 4.41 V 4.38 O 2.15 O 1.44 O 1.09 O 1.14 O 1.14 O 2.15 O 4.38 O
37.80 42.00	602.6 В 602.6 В				4.17 T 4.41 V	696.2 696.2	2.63 O 2.64 V	4.38 0 4.41 V

### MAXIMUM REACTIONS

SUPPORT DL1 DL2 +(LL+I) -(LL+I) +I.F. -I.F. +I.F. -I.F. 1 20.3 2.2 20.7 0.0 1.30

NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.

### UNFACTORED MOMENTS AND SHEARS

### SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

	DL1 DL2 +	(LL+I)	-(LL+I)	DL1 DL2	+(LL+I)	-(LL+I)	
X	MOMENT MOMENT	MOMENT	MOMENT			SHEAR	I.F.
0.00	0.0 0.0	0.0	0.0	20.3 2.2	37.9	0.0	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT MOM	0.0	0.0	
4.20	76.6 8.2	93.5	0.0	16.2 1.7	40.8	-1.6	1.30
	SIMULT SHEAR	40.8	0.0				
8.40	136.1 14.5	161.9	0.0	12.2 1.3	35.3	-4.7	1.30
	SIMULT SHEAR	35.3	0.0	SIMULT MOM			
12.60	178.6 19.1	208.4	0.0	8.1 0.9	29.9		1.30
	SIMULT SHEAR	20.1	0.0			147.4	
16.80	204.1 21.8	238.5	0.0		24.4	-13.7	1.30
	SIMULT SHEAR	14.6	0.0			188.1	
21.00	212.7 22.7	243.5	0.0		18.9	-18.9	1.30
		9.1		SIMULT MOM			
25.20	204.1 21.8	238.5	0.0	-4.1 -0.4		-24.4	1.30
	SIMULT SHEAR	-14.6	0.0				
29.40	178.6 19.1	208.4	0.0	-8.1 -0.9		-29.9	1.30
	SIMULT SHEAR	-20.1		SIMULT MOM			
33.60	136.1 14.5	161.9	0.0		4.7	-35.3	1.30
	SIMULT SHEAR	-35.3		SIMULT MOM		161.9	
37.80	76.6 8.2	93.5	0.0			-40.8	1.30
	SIMULT SHEAR	-40.8		SIMULT MOM		93.5	
42.00	0.0 0.0	0.0	0.0			-37.9	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT MOM	0.0	0.0	

FLEXURAL STRESSES - BEAM

SPAN 1

	TOP	FIBER S	TEEL STRE	BOTTOM FIBER STEEL STRESS				
X	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.20	-4.192	-0.448	-5.121	0.000	4.192	0.448	5.121	0.000
8.40	-7.453	-0.796	-8.866	0.000	7.453	0.796	8.866	0.000
12.60	-9.782	-1.045	-11.413	0.000	9.782	1.045	11.413	0.000
16.80	-11.179	-1.194	-13.061	0.000	11.179	1.194	13.061	0.000
21.00	-11.645	-1.244	-13.334	0.000	11.645	1.244	13.334	0.000
25.20	-11.179	-1.194	-13.061	0.000	11.179	1.194	13.061	0.000
29.40	-9.782	-1.045	-11.413	0.000	9.782	1.045	11.413	0.000
33.60	-7.453	-0.796	-8.866	0.000	7.453	0.796	8.866	0.000
37.80	-4.192	-0.448	-5.121	0.000	4.192	0.448	5.121	0.000
42.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

#### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

## SPAN 1

======							
		SHEAR S	STRESSES		ALLOW COMPR	RATING	FACTORS
X	DL1	DL2	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
0.00	1.511	0.161	2.824	0.000	1.000	3.30 V	4.71 V
4.20	1.209	0.129	3.046	-0.117	1.000	2.64 T	3.93 T
8.40	0.906	0.097	2.637	-0.351	1.000	1.12 T	1.86 T
12.60	0.604	0.065	2.227	-0.686	1.000	0.64 T	1.22 T
16.80	0.302	0.032	1.818	-1.021	1.000	0.44 T	0.95 T
21.00	0.000	0.000	1.409	-1.409	1.000	0.39 T	0.89 T
25.20	-0.302	-0.032	1.021	-1.818	1.000	0.44 T	0.95 T
29.40	-0.604	-0.065	0.686	-2.227	1.000	0.64 T	1.22 T
33.60	-0.906	-0.097	0.351	-2.637	1.000	1.12 T	1.86 T
37.80	-1.209	-0.129	0.117	-3.046	1.000	2.64 T	3.93 T
42.00	-1.511	-0.161	0.000	-2.824	1.000	3.30 V	4.71 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

### STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1

======								
	NON-COMP	OVERLOAD		NON-COM	1PACT	COMPACT	COMPA	CT
	MOMENT	MOMENT	SHEAR	RATING F	ACTORS	MOMENT	RATING F	ACTORS
X	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	602.6 I	B 482.1	256.6	2.77 V	4.62 V	696.2	2.77 V	4.62 V
4.20	602.6 I	B 482.1	256.6	2.43 T	4.05 T	696.2	2.55 o	4.25 O
8.40	602.6 I	B 482.1	256.6	1.16 T	1.93 T	696.2	1.23 0	2.05 o
12.60	602.6 I	B 482.1	256.6	0.77 T	1.28 T	696.2	0.82 0	1.36 o
16.80	602.6 I	B 482.1	256.6	0.60 T	1.00 T	696.2	0.64 0	1.07 o
21.00	602.6 I	B 482.1	256.6	0.56 T	0.94 T	696.2	0.61 0	1.01 0
25.20	602.6 I	B 482.1	256.6	0.60 T	1.00 T	696.2	0.64 0	1.07 O
29.40	602.6	B 482.1	256.6	0.77 T	1.28 T	696.2	0.82 0	1.36 0
33.60	602.6	B 482.1	256.6	1.16 T	1.93 T	696.2	1.23 0	2.05 o
37.80	602.6	B 482.1	256.6	2.43 T	4.05 T	696.2	2.55 o	4.25 o
42.00	602.6	B 482.1	256.6	2.77 V	4.62 V	696.2	2.77 V	4.62 V



Project: **E01222- Local NBIS**Subject: **Load Rating Analysis – Fascia Beams**Index No: **4013872** 

MEMBER: GIRDER												
	ALLOWABL	E STRESS	RATING	LOAD	FACTOR	RATING						
LOAD	FACTOR	TONS	X SPAN	FACTOR	TONS	X SPAN						
H20 IR (CRITICAL)	0.67 T	13.3	21.00 1	1.03 o	20.5	21.00 1						
OR (CRITICAL)	1.50 T	30.0	21.00 1	1.71 O	34.2	21.00 1						
IR ( POS MOM)	0.67 T	13.3	21.00 1	1.03 o	20.5	21.00 1						
OR ( POS MOM)	1.50 T	30.0	21.00 1	1.71 O	34.2	21.00 1						
HS20 IR (CRITICAL)	0.51 T	18.3	21.00 1	0.78 o	28.3	21.00 1						
OR (CRITICAL)	1.15 T	41.3	21.00 1	1.31 0	47.1	21.00 1						
IR ( POS MOM)	0.51 T	18.3	21.00 1	0.78 o	28.3	21.00 1						
OR ( POS MOM)	1.15 T	41.3	21.00 1	1.31 0	47.1	21.00 1						
TK527 IR (CRITICAL)	0.42 T	16.9	21.00 1	0.65 o	26.1	21.00 1						
OR (CRITICAL)	0.95 T	38.2	21.00 1	1.09 o	43.5	21.00 1						
IR ( POS MOM)	0.42 T	16.9	21.00 1	0.65 0	26.1	21.00 1						
OR ( POS MOM)	0.95 T	38.2	21.00 1	1.09 o	43.5	21.00 1						
ML80 IR (CRITICAL)	0.39 T	14.5	21.00 1	0.61 0	22.3	21.00 1						
OR (CRITICAL)	0.89 T	32.6	21.00 1	1.01 o	37.1	21.00 1						
IR ( POS MOM)	0.39 T	14.5	21.00 1	0.61 0	22.3	21.00 1						
OR ( POS MOM)	0.89 T	32.6	21.00 1	1.01 0	37.1	21.00 1						

### RATING FACTOR CODES:

- T TOP STEEL STRESS/STRENGTH GOVERNS
- B BOTTOM STEEL STRESS/STRENGTH GOVERNS
- C CONCRETE STRESS/STRENGTH GOVERNS
- R REINFORCEMENT STRESS/STRENGTH GOVERNS
- V SHEAR STRESS/STRENGTH GOVERNS
- blank COMPACT MOMENT STRENGTH GOVERNS
- O OVERLOAD PROVISIONS GOVERN
- I MOMENT-SHEAR INTERACTION GOVERNS
- F SECTION DOES NOT MEET FLANGE PROJECTION/THICKNESS RATIO CRITERIA
- W SECTION DOES NOT MEET WEB DEPTH/THICKNESS RATIO CRITERIA

### NON-COMPACT MOMENT STRENGTH CODES:

- B SECTION IS BRACED
- U SECTION IS UNBRACED

NOTE: ALL RATINGS ARE BASED ON THE NUMBER OF DESIGN LANES OR THE ACTUAL TRAFFIC LANES AS DEFINED BY "D" OR "L" ENTERED FOR LANES IN THE PROJECT IDENTIFICATION.

BAR7 v7.13.0.0 PROGRAM WAS EXECUTED COMPLETELY AND SUCCESSFULLY.

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Printed: 9/16/2013 10:49 AM

Project: E01222- Local NBIS

Subject: Load Rating Analysis - Interior Beams

Designed By: CMA

Date: 8/27/13

Index No:

Job No: 4013872

Checked By: RKC

Date: 9/12/13

\* BRIDGE ANALYSIS AND RATING (BAR7)

330522 \*

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\*

BRIDGE ANALYSIS AND RATING (BAR7)

330522

PROGRAM P4353000 **VERSION 7.13.0.0** 

LAST UPDATED 05/07/2010

09/16/2013 10:48 DOCUMENTATION 04/2010

INPUT: Interior.dat

STRUCTURE ID - 48720806849041 -

PROJECT IDENTIFICATION

S OVER END LIVE OUT- IMP GAGE PASS FAT- CONC RF-TYPE LEV LANES LOAD PUT FACT DIST DIST IGUE DECK SPEC DIST DIR FACTOR PAN 0 0.00 0.0 0.0 GGG

SKEW CORR HYB FACTOR 0.000

BRIDGE CROSS SECTION AND LOADING

OVERHANG CL OF DECK ΩR GIRDER OR ROADWAY DISTRIBUTION FACTORS WIDTH SPACING TRUSS TO CURB WIDTH SHEAR MOMENT DEFLECT 3.35 0.00 0.00 22.50 0.500 0.305 0.250

SLAB DEAD LOADS THICKNESS HAUNCH F'C DL1 DL2 N SYMMETRY 13.25 0.00 0.316 0.103 0.000

STRINGER FLOORBEAM UNIT WEIGHT DECK CONCRETE DL1 DL1 0.000 0.000 0.

SPAN LENGTHS (SIMPLE)

SPAN # 42.00 LENGTH

STEEL MEMBER PROPERTIES

WF BM FLANGE WF RM G P M OF I AREA OR WEB OR VRT OR HRZ ANGLE FLANGE A PLATE WFR S N RANGE E LEG THICK WIDTH R DEPTH THICK 26.34 0.7075 2958.30 9.000 27.00 0.5240 COMP FY FY TOP FY BOT CG TOP CG BOT TPW TPT BPT 0.00 0.0000 0.00 0.0000 N 33.0 0.0 0.0 0.000 0.000

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Project: **E01222- Local NBIS** 

Subject: Load Rating Analysis - Interior Beams

Index No:

Job No: **4013872** 

Subject: Load Rating Analysis – Interior Beams	Job No: <b>4013872</b>
LATERAL BRACE POINTS AND STIFFENER SPACINGS  C	25.20 0.740 0.079 0.348 0.528 0.617 0.644 29.40 0.632 0.068 0.299 0.453 0.527 0.551 33.60 0.462 0.049 0.217 0.331 0.383 0.400 37.80 0.244 0.026 0.113 0.174 0.201 0.210 42.00 0.000 0.000 0.000 0.000 0.000 0.000  **********
DEFAULT VALUES	MAXIMUM REACTIONS
SLC GAGE PASSING WEIGHT WEARING SKEW CORR LEVEL DISTANCE DISTANCE DECK SURFACE FACTOR I 6.0 4.0 150.0 0.5 1.000	SUPPORT DL1 DL2 +(LL+I) -(LL+I) +I.FI.F. +I.FI.F. 1 20.2 2.2 22.9 0.0 1.30
++++++++++++++++++++++++++++++++++++++	NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.
+++++++++++++++++++++++++++++++++++++++	UNFACTORED MOMENTS AND SHEARS
	SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30
INPUT GIRDER SLAB FL BEAM STRINGER FL BEAM STRINGER TOTAL TOTAL DL1 WEIGHT WEIGHT WEIGHT DL1 DL1 DL2 0.316 0.090 0.555 0.000 0.000 0.000 0.000 0.000 0.960 0.103  NOTE: IF THE LIVE LOAD STRESS IS ZERO AT ANY SECTION THE RATING FACTOR IS PRINTED AS 999.99 INDICATING THAT IT IS INFINITE.  NOTE: IF A SECTION DOES NOT MEET FLANGE OR WEB BUCKLING CRITERIA OF CURRENT AASHTO SPECIFICATIONS FOR LOAD FACTOR METHOD, THE RATING FACTORS ARE REPRINTED AS 888.88. THIS INDICATES THAT THERE IS A POTENTIAL FATIGUE PROBLEM.  GIRDER SECTION PROPERTIES  SPAN 1 =======  GROSS MOMENT OF C SECTION MODULUS DEPTH AREA INERTIA BOTTOM TOP BOTTOM NON-COMPOSITE 27.00 26.34 2958.30 13.50 219.13 219.13	Note
DEFLECTIONS	FLEXURAL STRESSES - BEAM
SPAN 1 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.30  ======  DEAD LOAD	SPAN 1

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SPAN 1

SPAN 1

# **STV INCORPORATED**

Project: E01222- Local NBIS

Subject: Load Rating Analysis - Interior Beams

-7.900 21.00 -11.598 -1.2440.000 11.598 1.244 0.000 25.20 -11.134 -1.194-7.778 0.000 11.134 1.194 7.778 0.000 29.40 -9.742 -1.045 -6.928 0.000 9.742 1.045 6.928 0.000 33.60 -7.422 -0.796 -5.348 0.000 7.422 0.796 5.348 0.000 37.80 -4.175 -0.448 -3.038 0.000 4.175 0.448 3.038 0.000 42.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

======							
		SHEAR S	STRESSES		ALLOW COMPR	RATING	FACTORS
X	DL1	DL2	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
0.00	1.504	0.161	1.708	0.000	1.000	5.46 V	7.78 V
4.20	1.204	0.129	1.014	-0.095	1.000	4.45 T	6.62 T
8.40	0.903	0.097	0.870	-0.189	1.000	1.86 T	3.09 T
12.60	0.602	0.065	0.749	-0.284	1.000	1.06 T	2.02 T
16.80	0.301	0.032	0.631	-0.394	1.000	0.75 T	1.60 T
21.00	0.000	0.000	0.513	-0.513	1.000	0.67 T	1.51 T
25.20	-0.301	-0.032	0.394	-0.631	1.000	0.75 T	1.60 T
29.40	-0.602	-0.065	0.284	-0.749	1.000	1.06 T	2.02 T
33.60	-0.903	-0.097	0.189	-0.870	1.000	1.86 T	3.09 T
37.80	-1.204	-0.129	0.095	-1.014	1.000	4.45 T	6.62 T
42.00	-1.504	-0.161	0.000	-1.708	1.000	5.46 V	7.78 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

### STRENGTHS AND LOAD FACTOR RATINGS

======								
	NON-COMP	OVERLOAD		NON-CO	MPACT	COMPACT	COMPA	CT
	MOMENT	MOMENT	SHEAR	RATING	FACTORS	MOMENT	RATING F	ACTORS
X	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	602.6 E	482.1	256.6	4.59 V	7.64	v 696.2	4.59 V	7.64 V
4.20	602.6 E	482.1	256.6	4.10 T	6.83	T 696.2	4.30 o	7.17 O
8.40	602.6 E	482.1	256.6	1.93 T	3.21	T 696.2	2.04 o	3.40 o
12.60	602.6 E	482.1	256.6	1.26 T	2.11	T 696.2	1.35 O	2.25 o
16.80	602.6 E	482.1	256.6	1.01 T	1.68	T 696.2	1.09 o	1.81 0
21.00	602.6 E	482.1	256.6	0.95 T	1.59	T 696.2	1.03 o	1.72 O
25.20	602.6 E	482.1	256.6	1.01 T	1.68	T 696.2	1.09 o	1.81 0
29.40	602.6 E	482.1	256.6	1.26 T	2.11	T 696.2	1.35 O	2.25 O
33.60	602.6 E	482.1	256.6	1.93 T	3.21	T 696.2	2.04 o	3.40 o
37.80	602.6 E	482.1	256.6	4.10 T	6.83	T 696.2	4.30 o	7.17 O
42.00	602.6 E	482.1	256.6	4.59 V	7.64	v 696.2	4.59 V	7.64 V

\*\*\*\*\*\*\*\*\*\* \* GIRDER - LIVE LOAD HS20 \*

### MAXIMUM REACTIONS

REACTIONS MOMENTS +(LL+I) -(LL+I) +I.F. -I.F. +I.F. -I.F. SUPPORT DL1 DL2 20.2 30.3 0.0 1.30

NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD

ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.

LIVE LOAD IMPACT FACTORS : DOS MOM 1 20

SPAN 1

SIMULT SHEAR

#### UNFACTORED MOMENTS AND SHEARS

Index No:

Job No: 4013872

SPAN I -	LIVE LOAD IMPACT FA	ACTORS : POS	MOM 1.30			
======						
	DL1 DL2 +(LL-	+I) -(LL+I)	DL1 DL2	+(LL+I)	-(LL+I)	
X	MOMENT MOMENT MOMI	ENT MOMENT	SHEAR SHEAR	SHEAR	SHEAR	I.F.
0.00	0.0 0.0	0.0	20.2 2.2	30.3	0.0	1.30
	SIMULT SHEAR (					
4.20	76.2 8.2 8.			19.3		
	SIMULT SHEAR 19		SIMULT MOM			
8.40	135.5 14.5 138			16.5		1.30
	SIMULT SHEAR 10		SIMULT MOM			
12.60		L.8 0.0				1.30
	SIMULT SHEAR 13		SIMULT MOM			
16.80		0.0		11.0		1.30
	SIMULT SHEAR 10		SIMULT MOM			
21.00			0.0 0.0			1.30
	SIMULT SHEAR -7		SIMULT MOM			
25.20			-4.0 -0.4			
			SIMULT MOM			
29.40			-8.1 -0.9		-13.6	1.30
			SIMULT MOM			
33.60		3.5 0.0				1.30
	SIMULT SHEAR -10		SIMULT MOM			
37.80	76.2 8.2 8.					
	SIMULT SHEAR -19	9.3 0.0	SIMULT MOM	47.9	81.2	
42.00	0.0 0.0					

### FLEXURAL STRESSES - BEAM

SIMULT MOM

SPAN	1							
=====	==							
	TOF	FIBER S	TEEL STRE	SS	BOTT	OM FIBER	STEEL ST	RESS
X	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.20	-4.175	-0.448	-4.448	0.000	4.175	0.448	4.448	0.000
8.40	7.422	-0.796	-7.584	0.000	7.422	0.796	7.584	0.000
12.60	9.742	-1.045	-9.407	0.000	9.742	1.045	9.407	0.000
16.80	) -11.134	-1.194	-10.403	0.000	11.134	1.194	10.403	0.000
21.00	) -11.598	-1.244	-10.331	0.000	11.598	1.244	10.331	0.000
25.20	) -11.134	-1.194	-10.403	0.000	11.134	1.194	10.403	0.000
29.40	9.742	-1.045	-9.407	0.000	9.742	1.045	9.407	0.000
33.60	7.422	-0.796	-7.584	0.000	7.422	0.796	7.584	0.000
37.80	-4.175	-0.448	-4.448	0.000	4.175	0.448	4.448	0.000
42.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

#### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

==	=====							
			SHEAR S	TRESSES		ALLOW COMPR	RATING	FACTORS
	X	DL1	DL2	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
	0.00	1.504	0.161	2.260	0.000	1.000	4.13 V	5.88 V
	4.20	1.204	0.129	1.443	-0.095	1.000	3.04 T	4.52 T
	8.40	0.903	0.097	1.230	-0.189	1.000	1.31 T	2.18 T
1	12.60	0.602	0.065	1.017	-0.284	1.000	0.78 T	1.48 T
1	16.80	0.301	0.032	0.820	-0.442	1.000	0.56 T	1.19 T

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SPAN 1

# **STV INCORPORATED**

Project: E01222- Local NBIS

Subject: Load Rating Analysis - Interior Beams

Index No: Job No. 4013872

	U	OD INO.	7010	<u> </u>
SIMULT 0.0 SIMULT	0.0	210.0 9.6 200.8	173.2 -9.6 200.8	1.30

2.5

0.9

0.0

0.0

84.6

-12.5

210.0

-15.4

194.6

154.4

90.8

0.0

-18.4 1.30

-21.6 1.30

-30.1 1.30

1.30

21.00	0.000	0.000	0.631	-0.631	1.000	0.51 T	1.15 T
25.20	-0.301	-0.032	0.442	-0.820	1.000	0.56 T	1.19 T
29.40	-0.602	-0.065	0.284	-1.017	1.000	0.78 T	1.48 T
33.60	-0.903	-0.097	0.189	-1.230	1.000	1.31 T	2.18 T
37.80	-1.204	-0.129	0.095	-1.443	1.000	3.04 T	4.52 T
42.00	-1.504	-0.161	0.000	-2.260	1.000	4.13 V	5.88 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

# 0.0 FLEXURAL STRESSES - BEAM

0.0

0.0

0.0

0.0

-8.1

-4.0 -0.4 SIMULT MOM 173.2

-12.1 -1.3

-16.1 -1.7

-20.2 -2.2

SIMULT MOM

SIMULT MOM

SIMULT MOM

-0.9

SIMULT MOM 133.0

SIMULT SHEAR

22.7

21.8

19.1

14.5

8.2

0.0

227.0

-7.1

-10.1

154.4

-18.4

90.8

-21.6

0.0

0.0

211.8

203.3

177.9

135.5

76.2

0.0

21.00

25.20

29.40

33.60

37.80

42.00

#### STRENGTHS AND LOAD FACTOR RATINGS

======								
	NON-COMP	OVERLOAD		NON-CC	MPACT	COMPACT	COMPA	CT
	MOMENT	MOMENT	SHEAR	RATING	FACTORS	MOMENT	RATING FA	ACTORS
X	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	602.6 B		256.6	3.47 V			3.47 V	5.78 V
4.20	602.6 B	482.1	256.6	2.80 T	4.67	г 696.2	2.94 o	4.90 o
8.40	602.6 B	482.1	256.6	1.36 T	2.26	г 696.2	1.44 O	2.40 o
12.60	602.6 B		256.6	0.93 T			1.00 o	1.66 o
16.80	602.6 B	482.1	256.6	0.75 T	1.26	г 696.2	0.81 0	1.35 o
21.00	602.6 B	482.1	256.6	0.73 T	1.21	г 696.2	0.79 o	1.31 o
25.20	602.6 B	482.1	256.6	0.75 T	1.26	г 696.2	0.81 0	1.35 o
29.40	602.6 B	482.1	256.6	0.93 T	1.55	г 696.2	1.00 o	1.66 o
33.60	602.6 B	482.1	256.6	1.36 T	2.26	г 696.2	1.44 O	2.40 o
37.80	602.6 B	482.1	256.6	2.80 T	4.67	г 696.2	2.94 o	4.90 o
42.00	602.6 B	482.1	256.6	3.47 V	ر 5.78 ۱	√ 696.2	3.47 V	5.78 V

\*\*\*\*\*\*\* \* GIRDER - LIVE LOAD TK527 \* \*\*\*\*\*\*\*\*

### MAXIMUM REACTIONS

					REACTIONS	MOMENTS
SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	+I.FI.F.	+I.FI.F.
1	20.2	2.2	30.1	0.0	1.30	

NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.

#### UNFACTORED MOMENTS AND SHEARS

SPAN	Τ	-	LIVE	LOAD	IMPACT	FACTORS	:	POS	MOM	1.30
------	---	---	------	------	--------	---------	---	-----	-----	------

	DL1 DL2 +	(LL+I)	-(LL+I)	DL1 DL	.2 +(LL+I)	-(LL+I)	
X	MOMENT MOMENT	MOMENT	MOMENT	SHEAR SHE	EAR SHEAR	SHEAR	I.F.
0.00	0.0 0.0	0.0	0.0	20.2	2.2 30.1	0.0	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT N	0.0 MON	0.0	
4.20	76.2 8.2	90.8	0.0	16.1	L.7 21.6	-0.9	1.30
	SIMULT SHEAR	21.6	0.0	SIMULT N	иом 90.8	32.3	
8.40	135.5 14.5	154.4	0.0	12.1	L.3 18.4	-2.5	1.30
	SIMULT SHEAR	18.4	0.0	SIMULT N	MOM 154.4	84.6	
12.60	177.9 19.1	197.2	0.0	8.1 (	0.9 15.4	-4.5	1.30
	SIMULT SHEAR	10.1	0.0	SIMULT N	иом 194.6	133.0	
16.80	203.3 21.8	224.4	0.0	4.0 (	).4 12.5	-6.9	1.30

SPAN 1								
	TOF	FIBER S	TEEL STRE	SS	BOTT	OM FIBER	STEEL ST	RESS
X	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.20	-4.175	-0.448	-4.972	0.000	4.175	0.448	4.972	0.000
8.40	-7.422	-0.796	-8.455	0.000	7.422	0.796	8.455	0.000
12.60	-9.742	-1.045	-10.798	0.000	9.742	1.045	10.798	0.000
16.80	-11.134	-1.194	-12.289	0.000	11.134	1.194	12.289	0.000
21.00	-11.598	-1.244	-12.429	0.000	11.598	1.244	12.429	0.000
25.20	-11.134	-1.194	-12.289	0.000	11.134	1.194	12.289	0.000
29.40	-9.742	-1.045	-10.798	0.000	9.742	1.045	10.798	0.000
33.60	-7.422	-0.796	-8.455	0.000	7.422	0.796	8.455	0.000
37.80	-4.175	-0.448	-4.972	0.000	4.175	0.448	4.972	0.000
42.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

======							
		SHEAR S	STRESSES		ALLOW COMPR	RATING F	ACTORS
X	DL1	DL2	+(LL+I)	-(LL+I)	REDUCTION	IR	OR
0.00	1.504	0.161	2.245	0.000	1.000	4.16 V	5.92 V
4.20	1.204	0.129	1.613	-0.064	1.000	2.72 T	4.05 T
8.40	0.903	0.097	1.372	-0.188	1.000	1.17 T	1.96 T
12.60	0.602	0.065	1.152	-0.338	1.000	0.68 T	1.29 T
16.80	0.301	0.032	0.933	-0.513	1.000	0.47 T	1.01 T
21.00	0.000	0.000	0.714	-0.714	1.000	0.43 T	0.96 T
25.20	-0.301	-0.032	0.513	-0.933	1.000	0.47 T	1.01 T
29.40	-0.602	-0.065	0.338	-1.152	1.000	0.68 T	1.29 T
33.60	-0.903	-0.097	0.188	-1.372	1.000	1.17 T	1.96 T
37.80	-1.204	-0.129	0.064	-1.613	1.000	2.72 T	4.05 T
42.00	-1.504	-0.161	0.000	-2.245	1.000	4.16 V	5.92 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

### STRENGTHS AND LOAD FACTOR RATINGS

SPAN	1

SPAN 1

NON-COMP OVERLOAD NON-COMPACT COMPACT COMPACT MOMENT MOMENT SHEAR RATING FACTORS MOMENT RATING FACTORS



Project: **E01222- Local NBIS** 

Subject: Load Rating Analysis - Interior Beams

Index No:

Job No: **4013872** 

X 0.00 4.20 8.40 12.60 16.80 21.00 25.20 29.40 33.60	STRENGTH ST 602.6 B 602.6 B 602.6 B 602.6 B 602.6 B 602.6 B 602.6 B 602.6 B	482.1 482.1 482.1 482.1 482.1 482.1 482.1 482.1 482.1	256.6 256.6 256.6 256.6 256.6 256.6 256.6 256.6	IR 3.49 V 2.51 T 1.22 T 0.81 T 0.64 T 0.64 T 0.64 T 0.81 T 1.22 T	OR 5.82 V 4.18 T 2.03 T 1.35 T 1.06 T 1.06 T 1.35 T 2.03 T	STRENGTH 696.2 696.2 696.2 696.2 696.2 696.2 696.2 696.2	IR 3.49 V 2.63 O 1.29 O 0.87 O 0.69 O 0.69 O 0.87 O 1.29 O 0.87 O	OR 5.82 V 4.38 O 2.15 O 1.45 O 1.09 O 1.15 O 1.45 O 2.15 O
37.80 42.00	602.6 B 602.6 B	482.1	256.6 256.6 256.6	2.51 T 3.49 V	4.18 T 5.82 V	696.2 696.2	2.63 0 3.49 V	4.38 0 5.82 V

#### MAXIMUM REACTIONS

SUPPORT DL1 DL2 +(LL+I) -(LL+I) +I.F. -I.F. +I.F. -I.F. 1 20.2 2.2 30.5 0.0 1.30

NOTE: ALL SUPPORT REACTIONS AND END SHEARS IN EACH SPAN DUE TO A LIVE LOAD ARE CALCULATED BASED ON AASHTO ARTICLE 3.23.1 AS INTERPRETED IN SOL 431-93-05.

### UNFACTORED MOMENTS AND SHEARS

### SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

	DL1 DL2 +	(LL+I)	-(LL+I)	DL1 DL2	+(LL+I)	-(LL+I)	
X	MOMENT MOMENT I	MOMENT	MOMENT	SHEAR SHEAR	SHEAR	SHEAR	I.F.
0.00	0.0 0.0	0.0	0.0	20.2 2.2	30.5	0.0	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT MOM	0.0	0.0	
4.20	76.2 8.2	93.5	0.0	16.1 1.7		-0.9	1.30
	SIMULT SHEAR	22.3	0.0	SIMULT MOM	93.5	32.3	
8.40	135.5 14.5	161.9	0.0	12.1 1.3	19.3	-2.6	1.30
		19.3	0.0	SIMULT MOM	161.9	86.2	
12.60	177.9 19.1	208.4	0.0	8.1 0.9	16.3	-5.0	1.30
	SIMULT SHEAR	11.0	0.0	SIMULT MOM	205.2	147.4	
16.80	203.3 21.8	238.5	0.0	4.0 0.4		-7.5	1.30
	SIMULT SHEAR	8.0	0.0	SIMULT MOM		188.1	
21.00	211.8 22.7	243.5	0.0	0.0 0.0	10.3	-10.3	1.30
	SIMULT SHEAR	5.0	0.0	SIMULT MOM		216.3	
25.20	203.3 21.8	238.5	0.0		7.5	-13.3	1.30
		-8.0	0.0	SIMULT MOM		223.3	
29.40	177.9 19.1	208.4	0.0		5.0	-16.3	1.30
	SIMULT SHEAR	-11.0	0.0	SIMULT MOM		205.2	
33.60	135.5 14.5	161.9	0.0	-12.1 -1.3	2.6	-19.3	1.30
	SIMULT SHEAR	-19.3	0.0	SIMULT MOM		161.9	
37.80	76.2 8.2	93.5	0.0	-16.1 -1.7	0.9	-22.3	1.30
	SIMULT SHEAR	-22.3	0.0	SIMULT MOM		93.5	
42.00	0.0 0.0	0.0	0.0	-20.2 -2.2		-30.5	1.30
	SIMULT SHEAR	0.0	0.0	SIMULT MOM	0.0	0.0	

FLEXURAL STRESSES - BEAM

SPAN 1

	TOP	FIBER S	TEEL STRE	SS	BOTTOM FIBER STEEL STRESS						
X	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)			
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
4.20	-4.175	-0.448	-5.121	0.000	4.175	0.448	5.121	0.000			
8.40	-7.422	-0.796	-8.866	0.000	7.422	0.796	8.866	0.000			
12.60	-9.742	-1.045	-11.413	0.000	9.742	1.045	11.413	0.000			
16.80	-11.134	-1.194	-13.061	0.000	11.134	1.194	13.061	0.000			
21.00	-11.598	-1.244	-13.334	0.000	11.598	1.244	13.334	0.000			
25.20	-11.134	-1.194	-13.061	0.000	11.134	1.194	13.061	0.000			
29.40	-9.742	-1.045	-11.413	0.000	9.742	1.045	11.413	0.000			
33.60	-7.422	-0.796	-8.866	0.000	7.422	0.796	8.866	0.000			
37.80	-4.175	-0.448	-5.121	0.000	4.175	0.448	5.121	0.000			
42.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			

#### SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

## SPAN 1

ORS
OR
.85 V
.93 T
.86 T
.22 T
.95 T
.89 т
.95 T
.22 T
.86 T
.93 T
.85 V

NOTE: THE SHEAR CAPACITIES CALCULATED HEREIN ARE BASED ON STIFFENED OR UNSTIFFENED EQUATIONS AS SPECIFIED BY INPUT REGARDLESS OF THE STIFFENER SPACINGS INPUT AND ARE NOT CHECKED AGAINST AASHTO CRITERIA.

### STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1

======											
	NON-COMP	OVERLOAD		NON-CO	MPACT		COMPACT	COMPACT			
	MOMENT	MOMENT	SHEAR	RATING FACTORS			MOMENT	RATING FACTORS			
X	STRENGTH	STRENGTH	STRENGTH	IR	OR		STRENGTH	IR	OR		
0.00	602.6 E	482.1	256.6	3.45 V	5.74	٧	696.2	3.45 V	5.74 V		
4.20	602.6 E	3 482.1	256.6	2.43 T	4.05	Т	696.2	2.55 O	4.25 o		
8.40	602.6 E	482.1	256.6	1.16 T	1.94	Т	696.2	1.23 o	2.05 o		
12.60	602.6 E	482.1	256.6	0.77 T	1.28	Т	696.2	0.82 0	1.37 O		
16.80	602.6 E	3 482.1	256.6	0.60 T	1.00	Т	696.2	0.65 0	1.08 o		
21.00	602.6 E	3 482.1	256.6	0.56 T	0.94	Т	696.2	0.61 0	1.02 o		
25.20	602.6 E	3 482.1	256.6	0.60 T	1.00	Т	696.2	0.65 0	1.08 o		
29.40	602.6 E	3 482.1	256.6	0.77 T	1.28	Т	696.2	0.82 0	1.37 o		
33.60	602.6 E	3 482.1	256.6	1.16 T	1.94	Т	696.2	1.23 0	2.05 o		
37.80	602.6 E	482.1	256.6	2.43 T	4.05	Т	696.2	2.55 o	4.25 o		
42.00	602.6 E	3 482.1	256.6	3.45 V	5.74	٧	696.2	3.45 V	5.74 V		



Project: **E01222- Local NBIS** Index No:

Subject: Load Rating Analysis – Interior Beams

Job No: 4013872

THE TELL CENTER						
	ALLOWABL	.E STRESS	RATING	LOAD	FACTOR	RATING
LOAD	FACTOR	TONS	X SPAN	FACTOR	TONS	X SPAN
H20 IR (CRITICAL)	0.67 T	13.4	21.00 1	1.03 O	20.6	21.00 1
OR (CRITICAL)	1.51 T	30.1	21.00 1	1.72 o	34.3	21.00 1
IR ( POS MOM)	0.67 T	13.4	21.00 1	1.03 o	20.6	21.00 1
OR ( POS MOM)	1.51 T	30.1	21.00 1	1.72 O	34.3	21.00 1
HS20 IR (CRITICAL)	0.51 T	18.5	21.00 1	0.79 o	28.3	21.00 1
OR (CRITICAL)	1.15 T	41.5	21.00 1	1.31 0	47.2	21.00 1
IR ( POS MOM)	0.51 T	18.5	21.00 1	0.79 o	28.3	21.00 1
OR ( POS MOM)	1.15 T	41.5	21.00 1	1.31 0	47.2	21.00 1
TK527 IR (CRITICAL)	0.43 T	17.1	21.00 1	0.65 0	26.2	21.00 1
OR (CRITICAL)	0.96 T	38.3	21.00 1	1.09 o	43.6	21.00 1
IR ( POS MOM)	0.43 T	17.1	21.00 1	0.65 0	26.2	21.00 1
OR ( POS MOM)	0.96 T	38.3	21.00 1	1.09 o	43.6	21.00 1
ML80 IR (CRITICAL)	0.40 T	14.6	21.00 1	0.61 0	22.4	21.00 1
OR (CRITICAL)	0.89 T	32.7	21.00 1	1.02 o	37.3	21.00 1
IR ( POS MOM)	0.40 T	14.6	21.00 1	0.61 0	22.4	21.00 1
OR ( POS MOM)	0.89 T	32.7	21.00 1	1.02 o	37.3	21.00 1

### RATING FACTOR CODES:

- T TOP STEEL STRESS/STRENGTH GOVERNS
- B BOTTOM STEEL STRESS/STRENGTH GOVERNS
- C CONCRETE STRESS/STRENGTH GOVERNS
- R REINFORCEMENT STRESS/STRENGTH GOVERNS
- V SHEAR STRESS/STRENGTH GOVERNS
- blank COMPACT MOMENT STRENGTH GOVERNS
- O OVERLOAD PROVISIONS GOVERN
- I MOMENT-SHEAR INTERACTION GOVERNS
- F SECTION DOES NOT MEET FLANGE PROJECTION/THICKNESS RATIO CRITERIA
- W SECTION DOES NOT MEET WEB DEPTH/THICKNESS RATIO CRITERIA

### NON-COMPACT MOMENT STRENGTH CODES:

- B SECTION IS BRACED
- U SECTION IS UNBRACED

NOTE: ALL RATINGS ARE BASED ON THE NUMBER OF DESIGN LANES OR THE ACTUAL TRAFFIC LANES AS DEFINED BY "D" OR "L" ENTERED FOR LANES IN THE PROJECT IDENTIFICATION.

BAR7 v7.13.0.0 PROGRAM WAS EXECUTED COMPLETELY AND SUCCESSFULLY.

I:\Projects\4013872\4013872\_0001\50\_Discipline Information\61\_Bridges\Ratings\Work Order #3\Northampton County\County 9041\Load Rating Analysis Output\_Interior.docm

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CI919 CI920 CI921

CI923

# 27"BEAMS

REFERENCES; SEE COLUMN (1) AND PAGE 4

HEFERENCES; S 4 9 C1913 C8 271 C1915 C1929 5 C8 271, 27 x 9 3/4 C1916 C1930

II CB272,27XI4 CB27I,27XIO CI933 CI934 ILI934 27 WFCB272,27XI4 27 WFCB271,27XIO

CIL 1940

13 CIL 1946 CIL 1948 USI950 2,3,6,10 See Page 45  $\begin{array}{c|c}
 & b \\
\hline
 & 2 \\
\hline
 & 1 \\
\hline
 & 1 \\
\hline
 & R \\
 & R \\$ 

						·							* Co	mputed		
SECT.	WEIGHT	T .		FLANGE WEB			DIMENSIONS			SLOPE	SLOPE AXIS I			─I AXIS 2—2		
OR	PER	AREA	1 .	WIDTH	THICK	m	n	R	R'	INSIDE	т	S	_	т	S	_
NOM. (1)	FOOT	Sa.In.	ln.	ln.	In.	ln.	In.	In.	In.	FLANGE	In.4	In.3	ln.	In.4	In.3	ln,
c827 "		J. J.						11111	<u> </u>	/0		<u>''''</u>	- ''''	11.6	1111	- '''
27X10	1	31.17	27.140	10.035	.535	.862	.862	.64	0	0	37612	277.2	10.98	136.1	27.1	2.09
(B27) 27X10	1	31.17	27.140	10.035	.535	.8	62 <sup>†</sup>	.60	0	5.0	3761.2	277.2	10.98	136.1	27.1	2.09
CB27N 10	104.0	30.60	27.450	10.040	.490	.883	.883	.65	0	0	3867.1		11.24	149.2		2.21
27WF 13 CB271 27X10	102.0	30.01	27070	10.018	.518	.827	.827	.64	0	0	3604.1	266.3	10.96	129.5	25.9	2.08
27WF 3				10.010	.010			.04			3004.1	200.3	10.36	1232	25.5	2.00
(B27) 27X10 CB271 6	102.0	30.01	27.070	10.018	.518	.8	27 <sup>†</sup>	.60	0	5.0	3604.1	266.3	10.96	129.5	25.9	2.08
27X9¾		29.70	27.166	9.799	.510	.838	.838	.65	0	0	3595.7	264.7	11.00	131.7	26.9	2.11
27W II CB27 27X IO	98.0	28.82	27.000	10.000	.500	.792	.792	.64	0	0	3446.5	255.3	10.94	122.9	24.6	2.07
27WF 2 (B27) 27X10							-									
CB27IN 10				10.000		.79	92 <sup>†</sup>	.60	-	5.0	3446.5		10.94	1229	24.6	2.07
27X10 27WF 13		28.53	27326	10.010	.460	.821	.821	.65	0	0	3582.6	262.2	11.21	137.5	27.5	2.20
CB271 27X10	94.0	27.65	26,910	9.990	.490	.747	.747	.64	0	0	3266.7	242.8	10.87	115.1	23.0	2.04
27WF 3 (B27)																
27X10		27.65	26910	9.990	.490	.7	47 <sup>†</sup>	.60	0	5.0	3266.7	242.8	10.87	115.1	23.0	2.04
(B27) 27X10	91.0	26,77	26840	9.983	.483	.7	12	.60	0	5.0	3129.2	233.2	10.81	0.001	21.8	2.02
27WF 11 CB271 27X 10	91.0	26.77	26840	9.983	.483	.712	.712	.64	0	0	3 129.2	233.2	10.81	109.0	21.8	2.02
CB271N 10 27X10	91.0	26.76	27.162	10.005	.455	.739	.739	.65	0	0	3269.7	2408	11.05	123.6	24.7	2.15
CB27] 6 27X934	9 1.0	26,76	27000	9.750	.461	.755	.755	.65	0	0	32 17.0		10.97	116.9		2.09
861 5	90.0	26.34	27.000	9.000	.524	.900	.515	.46	0	9.1	2958.3		10.60	75.3	16.7	1.69
CB 271 N 10 27X 10		25.00	27.000	10.000	.450	.658	.658	.65	0	0	2964.3	219.6	10.89	109.9	22.0	2.10
CB27 <u>1</u> 9 27X9₹4	85.0	25.00	26820	9.750	.461	.665	.665	.65	0	0	2899.3	216.2	10.77	103.0	21.1	2.03
B31 4	83.0	24.41	27.000		.424	L185	.596	.65	0	162/3*	2888.6	214.0	10.88	53.1	14.1	1.47
								-								
•																

# Christopher M. Alvaro

From: Brent D. Miller

**Sent:** Monday, August 26, 2013 2:43 PM

To: Christopher M. Alvaro

**Subject:** FW: Encased beam shot crete removal

**From:** Tom Kohler [mailto:TKohler@northamptoncounty.org]

**Sent:** Friday, June 28, 2013 7:31 AM

To: Brent D. Miller

Subject: RE: Encased beam shot crete removal

We drilled holes from the top of the macadam down and thru the concrete deck until we hit the top of the beam.

**From:** Brent D. Miller [mailto:BRENT.MILLER@stvinc.com]

**Sent:** Thursday, June 27, 2013 3:01 PM

To: Tom Kohler

**Subject:** RE: Encased beam shot crete removal

Tom,

We did go out and get some measurements around the perimeters, but the shotcrete on the bottom, as well as the macadam thickness is throwing things off. You wouldn't happen to know how much of the deck thickness is concrete and how much is macadam (it matters)? Also, were these slab thicknesses measured to the top flanges of the steel beam?

**From:** Tom Kohler [mailto:TKohler@northamptoncounty.org]

**Sent:** Thursday, June 27, 2013 1:49 PM

To: Brent D. Miller

**Subject:** RE: Encased beam shot crete removal

Brent,

Yes, they include the total thickness of the macadam as well as the thickness of the concrete deck.

We took these same types of measurement on previously requested structures to be calculated for beam size and STV was able to take some other field measurements to determine the beam height. Not sure if someone has done that to date? If not, I can do it, but it won't be for a while.

ΤK

**From:** Brent D. Miller [mailto:BRENT.MILLER@stvinc.com]

**Sent:** Thursday, June 27, 2013 10:50 AM

To: Tom Kohler

Cc: Romeo K. Cachuela

**Subject:** RE: Encased beam shot crete removal

Tom,

Can you tell me of these slab thicknesses include the bituminous wearing surface – and if the drills/cores stopped when they hit the top flange of the beam?

We are having difficulty coming up with a beam section (especially figuring out the height of the beam) from our shapes manuals.

If possible, can your guys also (some time) drill through the entire slab and pressure mortar covering the bottom to get an overall thickness – this may help?

# Thanks, Brent

**From:** Tom Kohler [mailto:TKohler@northamptoncounty.org]

Sent: Monday, May 20, 2013 8:10 AM

**To:** Barry K. Moyer **Cc:** Carl T. McGloughlin

Subject: Encased beam shot crete removal

Barry,

Per your previous request, we have removed a small portion of shotcrete on an bridge beam at the three bridges listed below. This was completed so that STV could determine the beam size in each structure and to perform a structural and load analysis of each structure. We have drilled a hole into each bridge deck to determine the deck thickness as well and that information is provided with the location of the shotctrete removal below.

Bridge #41 – Little Creek Rd. / Lower Mt. Bethel Twp.

Deck Thickness – 5.5" Beam #7 at Near Abutment

Bridge #138 – Club Rd. / Moore Twp.

Deck Thickness – 6.25" Beam # 6 at Far abutment

Bridge #205 – S. Cottonwood Dr. / Lehigh Twp.

Deck Thickness – 9.25" Beam # 9 at Far abutment

Let me know when STV has completed their analysis so that these beams can be resealed.

Northampton County Bridge Division Thomas A. Kohler - Supt. 14 Gracedale Ave. Greystone Building Rm. 305 Nazareth. Pa. 18064

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