



LUC-2-18.62

**Anthony Wayne Bridge
Rehabilitation**

PID 80551

Bridge Load Rating Report

April 29, 2011

Document Developed by:
ARCADIS U.S. Inc.
Gannett Fleming Engineers and Architects, P.C.
Modjeski & Masters Inc.

LUC-2-18.62 Approach Span Summary

SFN: 4800303

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River	
SPECIAL ASSUMPTIONS & COMMENTS:	Historical records from AISC were used to determine section properties of existing rolled beams. Steel material properties were pulled from the original plans. No future wearing surface was used in the analysis.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.17	HS-20-44
OPERATING CURRENT DESIGN	1.86	HS-20-44
OHIO LEGAL - 2F1	3.20	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.30	150%
OHIO LEGAL - 4F1	2.10	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.24	OHIO LEGAL - 4F1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

Bridge Load Rating Summary
LUC-2-18.62

ARCADIS

Prepared By: MDB

Date: 4/28/2011

Checked By: SKK

Date: 4/28/2011

Span(s)	Beam	INVENTORY	OPERATING	2F1	3F1	4F1	5C1
8W	Int Stringer	1.62	2.54	4.69	3.19	2.89	3.28
	Ext Stringer	1.25	2.17	3.82	2.61	2.39	2.70
7W	Girder	1.19	2.10	4.58	3.07	2.70	2.55
	Floorbeam	1.17	1.86	3.45	2.34	2.12	2.41
	Stringer	1.44	2.13	3.20	2.30	2.11	2.43
5-6W	Girder	1.20	2.10	4.58	3.07	2.70	2.54
	Floorbeam	1.18	1.88	3.47	2.35	2.13	2.42
	Stringer	1.46	2.15	3.25	2.34	2.14	2.46
4W	Girder	1.20	2.19	4.85	3.24	2.83	2.50
	Floorbeam	1.36	2.10	3.70	2.53	2.31	2.61
	Stringer	1.39	2.03	3.25	2.39	2.11	2.39
3W	Girder	1.27	2.49	5.64	3.74	3.25	2.65
	Floorbeam	1.27	1.99	3.59	2.44	2.22	2.52
	Stringer	1.61	2.35	3.65	2.65	2.39	2.72
2W	Girder	1.44	2.59	5.79	3.85	3.36	2.86
	Floorbeam	1.19	1.89	3.55	2.36	2.14	2.43
	Stringer	1.48	2.17	3.29	2.37	2.17	2.48
1W	Girder	2.16	4.07	9.48	6.25	5.40	4.40
	Floorbeam	1.24	1.95	3.54	2.41	2.19	2.48
	Stringer	1.56	2.28	3.50	2.54	2.30	2.62
WR/ER	Int PG	1.24	2.07	4.43	2.97	2.58	2.43
	Ext PG	1.63	2.72	5.81	3.89	3.39	3.19
1E	Girder	1.37	2.53	5.39	3.59	3.14	3.12
	Floorbeam	1.18	1.87	3.46	2.35	2.12	2.41
	Stringer	1.38	2.02	3.23	2.38	2.10	2.38
2E-7E	Girder	1.31	2.33	5.15	3.44	3.01	2.67
	Floorbeam	1.39	2.14	3.73	2.55	2.34	2.64
	Stringer	1.42	2.07	3.31	2.44	2.16	2.44
8-9E	Int Stringer	1.79	2.75	4.82	3.29	3.01	3.41
	Ext Stringer	1.25	2.17	3.82	2.61	2.39	2.70
10-11E	Int Stringer	2.53	3.66	6.34	4.45	4.02	3.81
	Ext Stringer	1.90	3.19	5.53	3.88	3.51	3.13
12-13E	Int Stringer	1.59	2.40	4.15	2.91	2.64	2.85
	Ext Stringer	1.17	1.95	3.37	2.37	2.14	2.24
14-15E	Int Stringer	1.53	2.39	5.11	3.50	3.03	3.49
	Ext Stringer	1.19	2.03	4.32	2.95	2.57	2.96

Control: 1.17 1.86 3.20 2.30 2.10 2.24

LUC-2-18.62 Multi-Beam Spans

SFN: 4800303

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
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FEATURE INTERSECTED:	S.R. 2 over the Maumee River - Multibeam spans, interior beams	
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RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.53	HS-20-44
OPERATING CURRENT DESIGN	2.39	HS-20-44
OHIO LEGAL - 2F1	4.15	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.91	150%
OHIO LEGAL - 4F1	2.64	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.85	OHIO LEGAL - 4F1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

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SPECIAL ASSUMPTIONS & COMMENTS:	Historical records from AISC were used to determine section properties of existing rolled beams. Steel material properties were pulled from the original plans. No future wearing surface was used in the analysis.	
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AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

Project Name: LUC-2-18.62 over Maumee River

Designed By: MDB

Date: 4/14/11

Checked By: SKK

Date: 4/28/11

Input for BARS-PC *Spans 8E-12E Load Rating*

General Structure Data

Number of Beams & Spacing:	$No_{beams} := 11$	$Beam_{spa} := 5.375ft$
Haunch Depth & Width:	$d_h := 2in$	$w_h := 6in$
Stringer Top Flange Thickness:	$t_{fl.s} := 0.963in$	Beam type: CB30 1/8 x 126
Stringer Top Flange Width:	$w_{fl.s} := 10.551in$	
Span Length:	$Span_S := 40.0ft$	
	$Span_{fas} := 10ft$	
Deck Slab Thickness:	$t_{slab} := 8.5in$	
Future Wearing Surface:	$P_{FWS} := 0.060 \frac{kip}{ft^2}$	
Materials:	$\gamma_{conc} := 0.150 \frac{kip}{ft^3}$	$\gamma_{steel} := 0.490 \frac{kip}{ft^3}$
Stay in Place Forms:	$P_{sip} := 15psf$	
Median Barrier:	$A_{median} := 32in \cdot 0.5 \cdot (12in + 24in)$	$A_{median} = 4 \cdot ft^2$
Sidewalk Width:	$w_{walk} := 6ft$	
Sidewalk deck thickness:	$t_{walk} := 5.25in$	

Exterior Stringers (continued)

Misc Steel Framing Loads:

Fascia Stringer:

$$\text{String}_{\text{fas}} := 37.8 \frac{\text{lbf}}{\text{ft}}$$

Cantilevered Framing:

$$\text{Frame} := 125 \text{ lbf}$$

Concrete Deck, Sidewalk, and Transition Loads:

$$\text{Sidewalk} := ?_{\text{conc}} \cdot (w_{\text{walk}} \cdot t_{\text{walk}})$$

$$\text{Sidewalk} = 393.7 \frac{\text{lbf}}{\text{ft}}$$

$$\text{Transition} := ?_{\text{conc}} \cdot \left[0.5 \cdot (12 \text{ in} - t_{\text{walk}})^2 + (12 \text{ in} - t_{\text{walk}}) \cdot (t_{\text{slab}} + w_{\text{h}} + 0.5 w_{\text{fl.s}} - 2.5 \text{ in}) \right]$$

$$\text{Transition} = 145.2 \frac{\text{lbf}}{\text{ft}}$$

$$\text{Fence}_{\text{curb}} := ?_{\text{conc}} \cdot 1 \text{ ft} \cdot (6 \text{ in} + t_{\text{walk}})$$

$$\text{Fence}_{\text{curb}} = 140.6 \frac{\text{lbf}}{\text{ft}}$$

Misc Loads:

$$\text{Forms} := P_{\text{sip}} \cdot w_{\text{walk}}$$

$$\text{Forms} = 90.0 \frac{\text{lbf}}{\text{ft}}$$

Fence and Railing:

$$\text{Fence} := 50 \frac{\text{lbf}}{\text{ft}}$$

$$\text{Subtotal} := \text{String}_{\text{fas}} + \text{Sidewalk} + \text{Transition} + \text{Fence}_{\text{curb}} + \text{Forms} + \text{Fence}$$

$$P_{\text{stringer}} := \text{Frame} + (\text{Span}_{\text{fas}} \cdot \text{Subtotal})$$

$$P_{\text{stringer}} = 8.70 \cdot \text{kip}$$

Additional Dead Loads

Interior Stringers

Calculate distributed loads. No detail factor needed. Bars-PC calculates dead load from deck and haunch for composite beam spans.

$$\text{Forms} := P_{\text{sip}} \cdot [\text{Beam}_{\text{spa}} - w_{\text{fl.s}} - (2 \cdot w_h)]$$

$$\text{Forms} = 50.6 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Median} := A_{\text{median}} \cdot \gamma_{\text{conc}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Median} = 54.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Guardrail} := 43 \frac{\text{lbf}}{\text{ft}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Guardrail} = 3.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$W_{\text{stringer}} := \text{Forms} + \text{Median} + \text{Guardrail}$$

$$W_{\text{stringer}} = 109.1 \cdot \frac{\text{lbf}}{\text{ft}}$$

Exterior Stringers

Distributed load is similar to interior stringers. Calculate point loads from cantilevered sidewalk supports.

$$\text{Forms} := P_{\text{sip}} \cdot 0.5 \cdot [\text{Beam}_{\text{spa}} - w_{\text{fl.s}} - (2 \cdot w_h)]$$

$$\text{Forms} = 25.3 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Median} := A_{\text{median}} \cdot \gamma_{\text{conc}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Median} = 54.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Guardrail} := 43 \frac{\text{lbf}}{\text{ft}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Guardrail} = 3.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$W_{\text{girder}} := \text{Forms} + \text{Median} + \text{Guardrail}$$

$$W_{\text{girder}} = 83.8 \cdot \frac{\text{lbf}}{\text{ft}}$$

R480030_12E-13E_I.DAT

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AA      NEW      X
99480030
01      041411MDB ARCADIS      HS20HS20      2F1 3F1 4F1      *77*      POST
02480030MDB ARCADIS      32131 3219      54      01 HS20HS20
03      1 2F10210.0      10      20.0
03      1 3F10312.0      10      17.0      4      17.0
03      1 4F10412.0      10      14.0      4      14.0      4      14.0
03      1SPEC0512.0      12      17.0      4      17.0      31      17.0      4
03      2SPEC 17.0
054800304800303 BLUC      2SH 18.6210421.09      F      SR2
064800301LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
064800302LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4"
064800303+-C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
0648003041" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, B01=EXIST INTERIOR BM, LLDF=0.98;
064800305CONSTR. 1931
08480030G01 02      390906      320204      CSC3000004500 0.98
10480030G01 01      W110.9      390906
10480030G01 02      W109.1      320204
11480030G01 0101      39090601
11480030G01 0201      32020201
12480030G01      01      2401      12P 0.78 23.61
12480030G01      01      02 0.47 22.44 12
12480030G01      01      03 12 0.78 0.39
14480030G01 0101      390906C 01      64.5 8.512.0 2.0 64.5 8.5 4.252.0134.7760000
14480030G01 0201      320204C 01      64.5 8.512.0 2.0 64.5 8.5 4.252.0134.7760000
16480030G01 01T01      390906 C
16480030G01 01B01      390906SPSP 2      191011
16480030G01 02T01      320204 C
16480030G01 02B01      320204SPSP 2      160102

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RATE2.LIS

STRUCTURE I.D. = 480-030

*
*

STRUCTURE HEADER AND DESCRIPTION

100-- 2 MDB ARCADIS EA/I/O/P = 321 LEN = 31 FTLE REQUESTS AND OUTPUT DATA EXCEPTIONS
TYPE = 321 YEAR = 31 INV.LL.TRK.= HS20 OP.LL.TRK.= HS20 WIDTH = 54.00 FT. 1 SPANS SP.LOAD =

*
*

STRUCTURE LOCATION AND PERMANENT IDENTIFICATION FACTORS

200-- 5 BRIDGE=4800303 DIST./CO.= B LUC CONST. ROUTE = 2 CONST. SECT.= SH 18.62 CONST. STA.=1042+1.09
MICROFILM REEL NO. DESIGN PLANS= COMPUTATIONS= CORRESPONDENCE=
ROUTE I.D.= F MARKED ROUTE = SRZ

*
*

COMMENTS

300-- 6 1 LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
400-- 6 2 LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4"
500-- 6 3 +-C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
600-- 6 4 1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, B01=EXIST INTERIOR BM, LLDF=0.98;
700-- 6 5 CONSTR. 1931

*
*

MEMBER SPECIFICATIONS AND REQUIRED ANALYSIS-GIRDER, STRINGER AND FLOOR BEAM

MEMBER ID	SPANS	STIFF. SYMM CODE (SPAN 4)	SPAN 1 (SPAN 4)	SPAN 2 (SPAN 5)	SPAN 3 (SPAN 6)	MATL CODE	ALLOWABLE STRESS FY	FB FC**	LL DIST. FACTOR	END THRU FL.BM DECK INV	MAX IMPACT OP.	POST SPEC
800-- 8	G 1 2		39.781	32.188	.000	CSC	30000.00	4500.00	.980	.00	.00	.00

*
*

SUPERIMPOSED DEAD LOADS-GIRDERS, STRINGERS AND FLOOR BEAMS

MEMBER ID	SYMM.	SPAN NO.	DISTANCE FR. LEFT SUPP.	LOAD TYPE	P OR W(L)	LOAD W(R)	LENGTH
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INPUT CODING ---		STRUCTURE 4800303		D/P STR. I.D. --- 480-030	
DATE	4/14/11	INVENTORY		OPERATING	
BY	MDB ARCADIS	LIVE LOAD	RATING	LIVE LOAD	RATING
		HS20	HS 31.88	HS20	HS 48.08

STRUCTURE DESCRIPTION	--	LOCATION	--
IDENTIFICATION	4800303	DISTRICT	B
TYPE OF CONSTR.	321	COUNTY	LUC
LENGTH	1931	CONSTR. RTE.	2
ROADWAY WIDTH	3219.00 FEET	CONSTR. SEC.	SH 18.62
NUMBER OF SPANS	54.00 FEET	CONSTR. STA.	1042+1..09
	1	KEY RTE.	F
		MARKED RTE.	SR2

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4"
+-C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, B01=EXIST INTERIOR BM, LLDF=0.98;
CONSTR. 1931

INVENTORY RATING SUMMARY --		OPERATING RATING SUMMARY --	
MEMBER ID.	G 1	MEMBER ID.	G 1
SPAN	1	SPAN	1
CRITICAL C.P. DIST.	15.9 FEET	CRITICAL C.P. DIST.	15.9 FEET
LIVE LOAD DESIGNATION	HS20	LIVE LOAD DESIGNATION	HS20
SHEAR (KIPS)		SHEAR (KIPS)	
MEMBER CAPACITY	470.9	MEMBER CAPACITY	658.9
DL EFFECT	100.7	DL EFFECT	100.7
CAPACITY FOR (LL+I)		CAPACITY FOR (LL+I)	
ACTUAL (LL+I)	370.2	ACTUAL (LL+I)	558.2
INVENTORY RATING		OPERATING RATING	
	HS 31.88		HS 48.08
SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER POSTING ANALYSIS		SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER POSTING ANALYSIS	
		G 1	BARS-PC RELEASE 5.5

INPUT CODING -- STRUCTURE 4800303

RATE2.LIS

VEH.SPEC 114.15

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 321	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. 2	CORRESPONDENCE
LENGTH 3219.00 FEET	SH 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1.09	
NUMBER OF SPANS 1	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4"
+-C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, B01=EXIST INTERIOR BM, LLDF=0.98;
CONSTR. 1931

TRUCK TYPE VEH. SPEC
MEMBER ID. G 1
SPAN 2
CRITICAL C.P. DIST. .0 FEET

SHEAR (KIPS)
MEMBER CAPACITY -224.5
DL EFFECT -131.2

CAPACITY FOR (LL+I) -355.7
ACTUAL (LL+I) -124.6
POSTING GROSS TONNAGE 114.1

*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

INPUT CODING--	STRUCTURE 4800303	D/P STR. ID-- 480-030
DATE 4/14/11	INVENTORY	
BY MDB ARCADIS	LIVE LOAD HS 31.9	
	RATING	
	HS20 HS 48.1	

ROADWAY WIDTH
NUMBER OF SPANS

54.00 FEET
1

RATE2.LIS
CONSTR. STA.
KEY RTE.
MARKED RTE.

1042+1..09
F
SR2

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
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1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, B01=EXIST INTERIOR BM, LLDF=0.98;
CONSTR. 1931

POSTING RATING SUMMARY

TRUCK TYPE MEMBER I.D. SPAN	VEH. 2F1 G 1 1	TRUCK TYPE MEMBER I.D. SPAN	VEH. 3F1 G 1 1	TRUCK TYPE MEMBER I.D. SPAN	VEH. 4F1 G 1 1
CRITICAL C.P. DIST.	15.9 FEET	CRITICAL C.P. DIST.	15.9 FEET	CRITICAL C.P. DIST.	15.9 FEET
MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 658.9 100.7	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 658.9 100.7	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 658.9 100.7
CAPACITY FOR (LL+I) ACTUAL (LL+I)	558.2 134.5	CAPACITY FOR (LL+I) ACTUAL (LL+I)	558.2 191.8	CAPACITY FOR (LL+I) ACTUAL (LL+I)	558.2 211.8

POSTING GROSS TONNAGE 62.3 POSTING GROSS TONNAGE 66.9 POSTING GROSS TONNAGE 71.2

*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING--

DATE 4/14/11 BY MDB ARCADIS	INVENTORY LIVE LOAD RATING	OPERATING LIVE LOAD RATING	SPECIAL LOAD TRUCK TYPE GROSS TONS	D/P STR. ID-- 480-030
	HS20 HS 31.88	HS20 HS 48.08	VEH. SPEC 114.1	

STRUCTURE DESCRIPTION--

IDENTIFICATION 4800303
TYPE 321
YEAR OF CONSTR. 1931
LENGTH 3219.00 FEET
ROADWAY WIDTH 54.00 FEET
NUMBER OF SPANS 1

LOCATION--

DISTRICT B
COUNTY LUC
CONSTR. RTE. 2
CONSTR. SEC. SH 18.62
CONSTR. STA. 1042+1..09
KEY RTE. F
MARKED RTE. SR2

MICROFILM REEL NUMBERS--

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E

REPORT.LIS

DETAIL DATA FOR FLEXURAL MEMBER

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01

DATE 04/14/11
NO. SPANS = 2
NOT SYMMETRICAL

MATERIAL--CSC
LL DIST. FACT. = .980
SUPERIMPOSED CONCENTRATED DL(S)
DIST. FROM LT SUPPORT*****

SPAN LENGTH		RNG.		LENGTH		VAR		DL DUE TO		SUPERIMPOSED DISTRIBUTED DL(S)		STIFF		SPAN		P		KIPS		FT.	
NO.	FT.	NO.	FT.	NO.	FT.	CODE	SEC.NO.	LT	RT	MEM.	W(LT)	W(RT)	NO.	LBS/FT	LBS/FT	NO.	LT	SPRT	NO.	LT	SPRT
1	39.781	1	39.781	01	01	S	01	01	01	99.6	99.6	99.6	1	110.9	110.9	1	109.1	109.1	1	109.1	109.1
2	32.188	1	32.188	01	01	T	01	01	01	99.6	99.6	99.6	2	109.1	109.1	2	109.1	109.1	2	109.1	109.1

CHECK POINTS RATED--
SPAN DIS FRM FUNC SPAN DIS FRM FUNC
NO. LT SPRT M VL VR NO. LT SPRT M VL VR

1	.000	X	X	X	X	1	15.912	X	X	X	X
2	.000	X	X	X	X	2	19.313	X	X	X	X
2	32.188	X	X	X	X	2	32.188	X	X	X	X

6.177 247.1

BARS RELEASE 5.5

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION

ULUS-----	BOTTOM
TTOM	- BEND
BEND	IN**3
NN*3	247.2
	247.2
	376.1
	339.5

*****	ALLOWABLE	*****	MOMENT CAPACITY
	STRESS		TOP TOP

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*****		AVAIL. CAPAC. FOR		LL+IMPACT	
		TOP	TOP	BOT	BOT
		+BEND	-BEND	+BEND	-BEND
		F-KPS	F-KPS	F-KPS	F-KPS
STORY	14603.3	440.7	370.2	440.7	370.2
TTING	21777.8	564.3	558.2	564.3	558.2
1	21777.8	564.3	558.2	564.3	558.2
2	21777.8	564.3	558.2	564.3	558.2
3	21777.8	564.3	558.2	564.3	558.2
AL	21777.8	564.3	558.2	564.3	558.2

LOADING FACT.	SAFE LOAD CAPACITY TONS	RATING VALUE
0.594	57.4	HS 31.9
0.404	86.5	HS 48.1
0.151	62.3	
0.910	66.9	

FLEX.LTS

POST 3F1 +BEND -BEND	92.9	0	71.5	0	0.000	L	3.829	88.1
POST 4F1 +BEND -BEND	106.0	0	81.5	0	0.000	L	3.355	90.6
POST SPEC +BEND -BEND	124.6	0	95.9	0	0.000	L	2.854	114.1

DETAIL DATA AT MOMENT CHECK POINT FOR
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBER

DATE 04/14/11

***** SECTION PROPERTIES IN COMPOSITE RANGE *****

***** SECTION PROPERTIES IN COMPOSITE RANGE										10F SPAN 2		***** SECTION MODULUS									
---NET AREA---												-----SECTION-----									
GROSS										IX		TOP									
H										+ BEND		+ BEND									
IN										IN**4		IN**3									
SQ.IN.										SQ.IN.		IN**3									
24.00										29.27		247.2									
29.27										2966.8		247.2									
29.27										8795.0		14349.0									
29.27										6492.2		1331.3									
NON-COM																					
COM (N=N)																					
COM (N=3N)																					
												</									

***** ALLOWABLE STRESS *****

MOMENT CAPACITY

TOP + BEND - BEND

FT-KIPS FT-KIPS FT-KIPS

ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN)									
T 0	SPAN 1	SPAN 2	SPAN 3	SPAN 4	SPAN 5	SPAN 6	INVENTORY	OPERATING	POST VEH1
0.000	0.000	0.000	0.000	0.000	0.000	0.000	16500.0	22500.0	22500.0
E 1	-299	810	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
N 2	-586	1.802	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
T 3	-849	2.957	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
H 4	-1.076	4.252	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
5	-1.254	5.617	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
P 6	-1.372	7.021	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
O 7	-1.384	5.238	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
I 8	-1.181	3.479	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
N 9	-730	1.735	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0
T 0	0.000	0.000	0.000	0.000	0.000	0.000	22500.0	22500.0	22500.0

LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .300 FOR +BEND AND = .300 FOR -BEND)									
LIVE LOAD	LL+IMP	LL	LOC.NO. 1 WHEEL	DIR	AXLE SPACE	LL+IMP	LL	LOC.CONC LOAD	LOC.CONC LOAD 2
HS20 +BEND	172.8	132.9	73.094	R	0	123.6	95.1	59.094	59.094
-BEND	49.2	37.9	3.825	L	0	30.2	23.2	27.847	27.847
OPER HS20 +BEND	172.8	132.9	73.094	R	0	123.6	95.1	59.094	59.094
-BEND	49.2	37.9	3.825	L	0	30.2	23.2	27.847	27.847

FLEX.LIS												
OPER	HS20	+BEND	.0	.0	.0	.0	.0	.0	.0	4.331	155.9	HS 86.6
		-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	2F1	+BEND	.0	.0	.0	.0	.0	.0	.0	8.009	120.1	
		-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	3F1	+BEND	.0	.0	.0	.0	.0	.0	.0	5.626	129.4	
		-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	4F1	+BEND	.0	.0	.0	.0	.0	.0	.0	5.232	141.3	
		-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	SPEC	+BEND	.0	.0	.0	.0	.0	.0	.0	7.485	299.4	
		-BEND	.0	.0	.0	.0	.0	.0	.0			

SUMMARY OF SHEAR ANALYSIS

D/P STRUCTURE I.D. 480-030

DATE 04/14/11

MEMB. ID	SPAN NO.	DIS LT	FRM R	DL SHEAR	SDL SHEAR	---INVENTORY---			---OPERATING---			--VEH. 1--			--VEH. 2--			--VEH. 3--			--SPECIAL--		
						LL+I MAX.V	T MIN.V	L KIPS	LL+I MAX.V	T MIN.V	L KIPS	LL+I MAX.V	T MIN.V	L KIPS	LL+I MAX.V	T MIN.V	L KIPS	LL+I MAX.V	T MIN.V	L KIPS	LL+I MAX.V	T MIN.V	L KIPS
G01	CSC	1	.000	L	10.9	1.8	33.4	T	1.8	T	33.4	T	1.8	T	17.2	1.0	24.9	1.5	27.2	1.6	21.2	1.3	
		1	15.912	L	.2	.1	14.1	T	10.7	T	14.1	T	10.7	T	8.5	7.1	11.6	9.3	12.0	9.4	9.0	10.3	
		2	.000	L	14.8	2.2	34.0	T	.0	T	34.0	T	.0	T	17.6	.0	25.6	.0	28.2	.0	25.9	.0	
		2	19.313	L	1.4	1.1	9.8	L	13.4	T	9.8	L	13.4	T	6.4	8.3	8.3	11.2	8.4	11.2	11.2	10.4	
		2	32.188	L	7.6	1.3	3.8	T	31.2	T	3.8	T	31.2	T	1.9	16.8	2.9	24.0	3.3	25.8	2.7	18.0	

LISTA.LIS

BARS-PC R5.5-MOD 3.0

	RECORD	2F1	3F1	4F1	*77*	POST	REC.NO.
01 041411MDB ARCADIS	HS20HS20						100
03 1 2F10210.0	10	20.0					200
03 1 3F10312.0	10	17.0	4	17.0			300
03 1 4F10412.0	10	14.0	4	14.0	4		400
03 1SPEC0512.0	12	17.0	4	17.0	31	17.0	500
03 2SPEC 17.0						4	600
02480030MDB ARCADIS		32231	3219		54	01 HS20HS20	100
054800304800303 BLUC	SH 2	18.6210421.09			F	SR2	200
064800301LUC-2-18.62	SR 2	OVER MAUMEE RIVER;	SFN: 4800303;	STRINGER SPAN 12E-13E			300
064800302LOADING H20;	PID NO. 80551;	MAINTAIN & INSP BY ODOT;	SPAN: 32'-2 1/4"±				400
064800303C/C BRGS.;	STRUCTURAL STEEL BEAMS, 8.5"	COMPOSITE CONC DECK INCLUDES					500
0648003041" MWS;	11 BEAMS @5'-4 1/2";	NO SKEW, G01=EXIST EXTERIOR BM, LLDF=0.98					600
064800305CONSTR. 1931							700
08480030G01 02	390906	320204		CSC3000004500	0.98		800
10480030G01 01		W 84.7		390906			900
10480030G01 01	10	P 8.70					1000
10480030G01 01	20	P 8.70					1100
10480030G01 01	30	P 8.70					1200
10480030G01 02		W 83.8		320204			1300
10480030G01 02	1010	P 9.47					1400
10480030G01 02	21 8	P 9.47					1500
11480030G01 0101	39090601						1600
11480030G01 0201	32020401						1700
12480030G01		01	2401	12P	0.78	23.61	1800
12480030G01		01		02	0.47	22.44	1900
12480030G01		01		03	12	0.78	2000
14480030G01 0101	390906C 01	41.25	8.512.0	2.041.25	8.5	4.251.7064.5460000	2100
14480030G01 0201	320204C 01	41.25	8.512.0	2.041.25	8.5	4.251.7064.5460000	2200
16480030G01 01T01	390906 C						2300
16480030G01 01B01	390906SPSP 2	191011					2400
16480030G01 02T01	320204 C						2500
16480030G01 02B01	320204SPSP 2	160102					2600

THE FOLLOWING STRUCTURES WERE SELECTED

480030

RATE2.LIS

MEMBER ID	SYMM.	SPAN NO.	DISTANCE LEFT	FR. SUPP.	LOAD TYPE	P OR W(L)	LOAD W(R)	LENGTH
900--10	G 1	1	.000FT.	W	84.7	.0	39.781FT.	
1000--10	G 1	1	10.000FT.	P	8.7	.0	.000FT.	
1100--10	G 1	1	20.000FT.	P	8.7	.0	.000FT.	
1200--10	G 1	1	30.000FT.	P	8.7	.0	.000FT.	
1300--10	G 1	2	.000FT.	W	83.8	.0	32.188FT.	
1400--10	G 1	2	10.833FT.	P	9.5	.0	.000FT.	
1500--10	G 1	2	21.667FT.	P	9.5	.0	.000FT.	

SECTION RANGE SPECIFICATIONS

MEMBER ID	SYMM.	SPAN NO.	RANGE NO.	RANGE LENGTH	SECTION LEFT	SECTION NO. RIGHT	VAR. CODE	HINGE 1 DIST.	HINGE 2 DIST.	CODE	HYBRID GIRD. CODE	FY
1600--11	G 1	1	1	39.781FT.	1	0		.000FT.	.000FT.		0.	0.
1700--11	G 1	2	1	32.188FT.	1	0		.000FT.	.000FT.		0.	0.

SECTION PROPERTIES (STEEL OR TIMBER) - GIRDERS STRINGERS, FLOOR BEAMS

MEMBER ID	SEC.	A	I	S	CODE	SAME	ADR	H	ELE	A	IX	DY	DX
1800--12	G 1	0	.00	.0	.0	1	0	24.00	1	12.00P	.8	23.6	.0
1900--12	G 1	0	.00	.0	.0	1	0	.00	2	.47	22.4	12.0	.0
2000--12	G 1	0	.00	.0	.0	1	0	.00	3	12.00	.8	.4	.0

SECTION PROPERTIES (COMPOSITE) - GIRDERS, STRINGERS, FLOOR BEAMS

MEMBER ID	SPAN SYMM	SPAN RANGE	RANGE LENGTH	COMP CODE	N	SECT	A	WIDTH	THICK -NESS	FILLET WIDTH	FILLET THICK.	EFFECT. WIDTH	EFFECT. THICK.	DIST TO TOP SECT.
2100--14	G 1	1	39.781FT.	C	0	1	0	41.25	8.50	12.00	2.00	41.25	8.50	4.25
2200--14	G 1	2	32.188FT.	C	0	1	0	41.25	8.50	12.00	2.00	41.25	8.50	4.25

BRACING LENGTH SPECIFICATIONS - LOAD FACTOR ANALYSIS

MEMBER ID	SPAN SYMM	SPAN RANGE	RANGE LENGTH	SUPPORT LEFT	SUPPORT RIGHT	COND.	SPACES	SPACING DISTANCE	STIFF SPACING
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RATE2.LIS

MEMBER CAPACITY DL EFFECT	(KIPS) 454.8 183.5	MEMBER CAPACITY DL EFFECT	(KIPS) 635.6 183.5
CAPACITY FOR (LL+I) ACTUAL (LL+I)	271.3 231.4	CAPACITY FOR (LL+I) ACTUAL (LL+I)	452.2 231.4
INVENTORY RATING	HS 23.45	OPERATING RATING	HS 39.08

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
POSTING ANALYSIS

INPUT CODING -- STRUCTURE 4800303 D/P STR. I.D.-- 480-030

DATE	INVENTORY	OPERATING	POSTING
BY	LIVE LOAD	LIVE LOAD	TRUCK TYPE GROSS TONS
4/14/11	HS20	HS 23.45	HS 39.08
MDB ARCADIS			VEH. 2F1 50.62
			VEH. 3F1 54.43
			VEH. 4F1 57.86

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 322	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. SH 2	CORRESPONDENCE
LENGTH 3219.00 FEET	CONSTR. SEC. 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1.09	
NUMBER OF SPANS 1	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4"+-
C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, G01=EXIST EXTERIOR BM, LLDf=0.98
CONSTR. 1931

TRUCK TYPE VEH. 2F1	TRUCK TYPE VEH. 4F1
MEMBER ID. G 1	MEMBER ID. G 1
SPAN 1	SPAN 1
CRITICAL C.P. DIST. 15.9 FEET	CRITICAL C.P. DIST. 15.9 FEET

RATE2.LIS
SHEAR
(KIPS)
MEMBER CAPACITY
DL EFFECT

CAPACITY FOR (LL+I) -285.0
ACTUAL (LL+I) -127.4
POSTING GROSS TONNAGE 89.5

*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

D/P STR. ID-- 480-030

INPUT CODING--

DATE 4/14/11
BY MDB ARCADIS

INVENTORY
LIVE LOAD HS 23.5
RATING
HS20 HS 39.1

STRUCTURE 4800303

STRUCTURE DESCRIPTION--

IDENTIFICATION 4800303
TYPE 322
YEAR OF CONSTR. 1931
LENGTH 3219.00 FEET
ROADWAY WIDTH 54.00 FEET
NUMBER OF SPANS 1

LOCATION--

DISTRICT B
COUNTY LUC
CONSTR. RTE. SH 2
CONSTR. SEC. 18.62
CONSTR. STA. 1042+1..09
KEY RTE. F
MARKED RTE. SR2

MICROFILM REEL NUMBERS--

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 12E-13E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4"+-
C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, G01=EXIST EXTERIOR BM, LLDf=0.98
CONSTR. 1931

INVENTORY RATING SUMMARY

MEMBER I.D. G 1
SPAN 1
CRITICAL C.P. DIST. 15.9 FEET
LIVE LOAD DESIGNATION HS20

OPERATING RATING SUMMARY
MEMBER I.D. G 1
SPAN 1
CRITICAL C.P. DIST. 15.9 FEET
LIVE LOAD DESIGNATION HS20

SHEAR
(KIPS)

SHEAR
(KIPS)

RATE2.LIS

CAPACITY FOR (LL+I)	452.2	CAPACITY FOR (LL+I)	452.2	CAPACITY FOR (LL+I)	452.2
ACTUAL (LL+I)	134.0	ACTUAL (LL+I)	191.1	ACTUAL (LL+I)	211.0

POSTING GROSS TONNAGE	50.6	POSTING GROSS TONNAGE	54.4	POSTING GROSS TONNAGE	57.9
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*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

STRUCTURE 4800303 D/P STR. ID-- 480-030

INPUT CODING--

DATE	4/14/11	INVENTORY	OPERATING	SPECIAL LOAD
BY	MDA ARCADIS	LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
		HS20	HS 23.45	HS20 HS 39.08
				VEH.SPEC 89.5

STRUCTURE DESCRIPTION--

IDENTIFICATION 4800303
TYPE 322
YEAR OF CONSTR. 1931
LENGTH 3219.00 FEET
ROADWAY WIDTH 54.00 FEET
NUMBER OF SPANS 1

LOCATION--

DISTRICT B
COUNTY LUC
CONSTR. RTE. SH 2
CONSTR. SEC. 18.62
CONSTR. STA. 1042+1.09
KEY RTE. F
MARKED RTE. SR2

MICROFILM REEL NUMBERS--

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SPN: 4800303; STRINGER SPAN 12E-13E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 32'-2 1/4" +
C/C BRGS.; STRUCTURAL STEEL BEAMS, 8.5" COMPOSITE CONC DECK INCLUDES
1" MWS; 11 BEAMS @5'-4 1/2"; NO SKEW, G01=EXIST EXTERIOR BM, LLDf=0.98
CONSTR. 1931

SPECIAL LOAD SUMMARY

TRUCK TYPE	VEH.SPEC
MEMBER I.D.	G 1
SPAN	2
CRITICAL C.P. DIST.	.0 FEET

MEMBER CAPACITY	SHEAR
DL EFFECT	(KIPS)
	-83.3
	-201.7

CAPACITY FOR (LL+I)	-285.0
ACTUAL (LL+I)	-127.4

DETAIL DATA FOR FLEXURAL MEMBER

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
MATERIAL--CSC
LL DIST FACT. = .980

LL DIST. FACT. = .980
SUPERIMPOSED CONCENTRATED DL(S)
DIST. FROM LT SUPPORT***

SUPERIMPOSED DISTRIBUTED DL(S)
LENGTH DISTRIBUTED*****

STIFF NS. LONG.	SPAN NO.	P KIPS	* FT.
1	1	8.7	10.000
1	1	8.7	20.000
2	2	8.7	30.000
2	2	9.5	50.615
2	2	9.5	61.448

CHECK POINTS RATED--					
SPAN DIS FRM	FUNC	SPAN DIS FRM	FUNC		
NO. LT SPRT	M VL VR	NO. LT SPRT	M VL VR	FT.	
				FT.	

1	.000	X	X	X	X
1	15.912		X	X	X
2	.000	X	X	X	X
2	19.313				
2	32.188	X	X	X	X

FLEX.LIS

DETAIL DATA AT MOMENT CHECK POINT FOR
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBER

BARS RELEASE 5.5
D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 1.40

DATE 04/14/11

***** SECTION PROPERTIES IN COMPOSITE RANGE

---NET AREA---
GROSS AREA
H IN. 24.00
SQ.IN. 29.27
BEND SQ.IN. 29.27
BEND SQ.IN. 29.27
NON-COM (N=N)
COM (N=3N)

LOF SPAN 1
IX + BEND
IN**4 2966.8
IX - BEND
IN**4 2966.8
C (BOT) IN. 12.00
+ BEND IN**3 247.2
- BEND IN**3 247.2
21.74 3485.5
17.41 854.1
5628.1

MODULUS
+ BEND
IN**3 247.2
- BEND
IN**3 247.2
361.7
323.3

***** ALLOWABLE STRESS *****
MOMENT CAPACITY
TOP + BEND - BEND
+ BEND - BEND
FT-KIPS FT-KIPS FT-KIPS FT-KIPS

***** ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN)

SPAN 1 SPAN 2 SPAN 3 SPAN 4 SPAN 5 SPAN 6
T 0 .000 .000 .000 .000 .000 .000
E 1 2.078 -.479 .000 .000 .000 .000
N 2 4.168 -.777 .000 .000 .000 .000
T 3 6.285 -.915 .000 .000 .000 .000
H 4 8.442 -.914 .000 .000 .000 .000
H 5 6.673 -.840 .000 .000 .000 .000
P 6 4.970 -.724 .000 .000 .000 .000
O 7 3.376 -.573 .000 .000 .000 .000
I 8 1.995 -.396 .000 .000 .000 .000
N 9 .860 -.203 .000 .000 .000 .000
T 0 .000 .000 .000 .000 .000 .000
POS AREA 154.5 .0 .0 .0 .0 .0
NEG AREA .0 18.7 .0 .0 .0 .0
INVENTORY 16500.0
OPERATING 22500.0
POST VEH1 22500.0
POST VEH2 22500.0
POST VEH3 22500.0
POST SPEC 22500.0
***** DL MOMENT EFFECT *****
DL EFFECT
FT-KIPS FT-KIPS
60.2 123.3
INVENTORY 3440.6
OPERATING 5183.4
VEH. 1 5183.4
VEH. 2 5183.4
VEH. 3 5183.4
SPECIAL 5183.4
AREA TOTALS
154.5
18.7

***** AVAIL. CAPAC. FOR LL+IMPACT *****
TOP + BEND - BEND
+ BEND - BEND
FT-KIPS FT-KIPS FT-KIPS FT-KIPS
INVENTORY 3440.6
OPERATING 5183.4
VEH. 1 5183.4
VEH. 2 5183.4
VEH. 3 5183.4
SPECIAL 5183.4

***** LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .300 FOR +BEND AND = .300 FOR -BEND)

---TRUCK LOAD---
LL+IMP LL LOC.NO. 1 WHEEL
FT-KIPS FT-KIPS FT. FT.
231.4 178.0 1.913 L
29.5 22.7 74.220 R
INV HS20 +BEND 231.4 178.0 1.913 L
-BEND 29.5 22.7 74.220 R
OPER HS20 +BEND 231.4 178.0 1.913 L
-BEND 29.5 22.7 74.220 R
POST 2F1 +BEND 134.0 103.1 25.913 R
-BEND 16.2 12.4 59.438 R
POST 3F1 +BEND 191.1 147.0 25.916 R
-BEND 23.7 18.2 62.656 R
POST 4F1 +BEND 211.0 162.3 29.913 R
-BEND 26.5 20.4 64.219 R
POST SPEC +BEND 163.6 125.8 -31.090 L
-BEND 20.9 16.0 43.095 L
---LANE LOAD---
LL+IMP LL LOC.CONC LOC.CONC
LOAD 2 LOAD 2
FT. FT.
159.6 122.8 15.912
18.2 14.0 49.438
INVENTORY 16500.0
OPERATING 22500.0
POST VEH1 22500.0
POST VEH2 22500.0
POST VEH3 22500.0
POST SPEC 22500.0
***** DL MOMENT EFFECT *****
DL EFFECT
FT-KIPS FT-KIPS
60.2 123.3
INVENTORY 3440.6
OPERATING 5183.4
VEH. 1 5183.4
VEH. 2 5183.4
VEH. 3 5183.4
SPECIAL 5183.4
RATING FACT. SAFE LOAD CAPACITY TONS
1.173 42.2 HS 23.5
1.954 70.4 HS 39.1
3.375 50.6
2.366 54.4
2.143 57.9
2.764 110.6

DATE 04/14/11

FLEX.LIS
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBER

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 2.60

SECTION PROPERTIES IN COMPOSITE RANGE									
---NET AREA---									
	H IN.	GROSS AREA SQ.IN.	+ BEND		- BEND		IX		C (BOT) IN.
			SQ.IN.	29.27	SQ.IN.	29.27	+ BEND IN**4	- BEND IN**4	
NON-COM	24.00	29.27					2966.8	2966.8	12.00
COM (N=N)							7864.6		21.74
COM (N=3N)							5628.1		17.41

ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN)									
SPAN 1 SPAN 2 SPAN 3 SPAN 4 SPAN 5 SPAN 6									
T 0	.000	.000	.000	.000	.000	.000	.000	.000	PSI
E 1	-.309	.809	.000	.000	.000	.000	.000	.000	INVENTORY 16500.0
N 2	-.606	1.798	.000	.000	.000	.000	.000	.000	OPERATING 22500.0
T 3	-.875	2.948	.000	.000	.000	.000	.000	.000	POST VEH1 22500.0
H 4	-1.106	4.236	.000	.000	.000	.000	.000	.000	POST VEH2 22500.0
5	-1.284	5.597	.000	.000	.000	.000	.000	.000	POST VEH3 22500.0
P 6	-1.395	7.001	.000	.000	.000	.000	.000	.000	POST SPEC 22500.0
O 7	-1.397	5.221	.000	.000	.000	.000	.000	.000	DL EFFECT
I 8	-1.187	3.466	.000	.000	.000	.000	.000	.000	DL MOMENT
N 9	-.731	1.729	.000	.000	.000	.000	.000	.000	FT-KIPS 28.1
T 0	.000	.000	.000	.000	.000	.000	.000	.000	SDI 63.4
POS AREA	.0	105.6	.0	.0	.0	.0	.0	.0	INVENTORY 4138.0
NEG AREA	35.4	.0	.0	.0	.0	.0	.0	.0	OPERATING 5880.8
TOTALS									
AREA									
TOTALES									
105.6									
35.4									

LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .300 FOR +BEND AND = .300 FOR -BEND)									
---TRUCK LOAD---									
LIVE LOAD		LL+IMP		LL		LL+IMP		LL	
		FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS
INV	+BEND	172.3	132.5	73.094	73.094	123.2	94.8	59.094	59.094
	-BEND	50.0	38.5	3.826	3.826	30.6	23.5	27.847	27.847
OPER	+BEND	172.3	132.5	73.094	73.094	123.2	94.8	59.094	59.094
	-BEND	50.0	38.5	3.826	3.826	30.6	23.5	27.847	27.847
POST	2F1 +BEND	107.2	82.5	49.094	49.094				
	-BEND	25.4	19.5	17.847	17.847				
POST	3F1 +BEND	149.3	114.9	49.093	49.093				
	-BEND	37.8	29.1	13.874	13.874				
POST	4F1 +BEND	163.3	125.6	45.095	45.095				
	-BEND	43.0	33.1	13.826	13.826				
POST SPEC	+BEND	143.9	110.7	47.095	47.095				
	-BEND	34.9	26.8	31.912	31.912				

DETAIL DATA AT MOMENT CHECK POINT FOR
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBER

BARS RELEASE 5.5

MEMB. ID	SPAN NO.	DIS LT	FRM SPRT	L R	DL SHEAR	SDL SHEAR	FLEX.LIS															
							---INVENTORY---			---OPERATING---			--VEH. 1--			--VEH. 2--			--VEH. 3--			--SPECIAL--
MATL					KIPS	KIPS	LL+I T	LL+I L	LL+I MIN.V	LL+I T	LL+I L	LL+I MIN.V	LL+I T	LL+I L	LL+I MIN.V	LL+I T	LL+I L	LL+I MIN.V	LL+I T	LL+I L	LL+I MIN.V	
G01	CSC	1		.000	L	7.7	11.7	33.4	T	1.9	T	17.2	1.0	24.8	1.5	27.2	1.7	21.2	1.3			
		1	15.912	L	.1	1.6	14.0	T	10.7	T	8.4	7.1	11.6	9.4	11.9	9.5	8.9	10.4				
		2	.000	L	10.4	14.4	34.1	T	.0	T	17.6	.0	25.6	.0	28.2	.0	26.0	.0				
		2	19.313	L	1.0	3.4	9.9	L	13.4	T	6.5	8.3	8.4	11.2	8.5	11.2	11.2	10.3				
		2	32.188	L	5.3	7.2	3.9	T	31.1	T	2.0	16.8	2.9	24.0	3.3	25.8	2.7	18.0				

Additional Dead Loads

Interior Stringers

Calculate distributed loads. No detail factor needed. Bars-PC calculates dead load from deck and haunch for composite beam spans.

$$\text{Forms} := P_{\text{sip}} \cdot [\text{Beam}_{\text{spa}} - w_{\text{fl.s}} - (2 \cdot w_{\text{h}})]$$

$$\text{Forms} = 50.6 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Median} := A_{\text{median}} \cdot ?_{\text{conc}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Median} = 54.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Guardrail} := 43 \frac{\text{lbf}}{\text{ft}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Guardrail} = 3.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$W_{\text{stringer}} := \text{Forms} + \text{Median} + \text{Guardrail}$$

$$W_{\text{stringer}} = 109.1 \cdot \frac{\text{lbf}}{\text{ft}}$$

Exterior Stringers

Distributed load is similar to interior stringers. Calculate point loads from cantilevered sidewalk supports.

$$\text{Forms} := P_{\text{sip}} \cdot 0.5 \cdot [\text{Beam}_{\text{spa}} - w_{\text{fl.s}} - (2 \cdot w_{\text{h}})]$$

$$\text{Forms} = 25.3 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Median} := A_{\text{median}} \cdot ?_{\text{conc}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Median} = 54.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Guardrail} := 43 \frac{\text{lbf}}{\text{ft}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Guardrail} = 3.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$W_{\text{girder}} := \text{Forms} + \text{Median} + \text{Guardrail}$$

$$W_{\text{girder}} = 83.8 \cdot \frac{\text{lbf}}{\text{ft}}$$

Project Name: LUC-2-18.62 over Maumee River

Designed By: MDB

Date: 4/14/11

Checked By: SKK

Date: 4/28/11

Input for BARS-PC *Span 15E Load Rating*

General Structure Data

Number of Beams & Spacing:	$No_{beams} := 11$	$Beam_{spa} := 5.375ft$
Haunch Depth & Width:	$d_h := 2in$	$w_h := 6in$
Stringer Top Flange Thickness:	$t_{fl.s} := 0.671in$	Beam type: CB21.125 x 64
Stringer Top Flange Width:	$w_{fl.s} := 8.0in$	
Span Length:	$Span_S := 20.0ft$ $Span_{fas} := 10.0ft$	
Deck Slab Thickness:	$t_{slab} := 8.5in$	
Future Wearing Surface:	$P_{FWS} := 0.060 \frac{kip}{ft^2}$	
Materials:	$?_{conc} := 0.150 \frac{kip}{ft^3}$	$?_{steel} := 0.490 \frac{kip}{ft^3}$
Stay in Place Forms:	$P_{sip} := 15psf$	
Median Barrier:	$A_{median} := 32in \cdot 0.5 \cdot (12in + 24in)$	$A_{median} = 4 \cdot ft^2$
Sidewalk Width:	$w_{walk} := 6ft$	
Sidewalk deck thickness:	$t_{walk} := 5.25in$	

Exterior Stringers (continued)

Misc Steel Framing Loads:

Fascia Stringer:

$$\text{String}_{\text{fas}} := 37.8 \frac{\text{lbf}}{\text{ft}}$$

Cantilevered Framing:

$$\text{Frame} := 125 \text{ lbf}$$

Concrete Deck, Sidewalk, and Transition Loads:

$$\text{Sidewalk} := ?_{\text{conc}} \cdot (w_{\text{walk}} \cdot t_{\text{walk}})$$

$$\text{Sidewalk} = 393.7 \frac{\text{lbf}}{\text{ft}}$$

$$\text{Transition} := ?_{\text{conc}} \cdot \left[0.5 \cdot (12 \text{ in} - t_{\text{walk}})^2 + (12 \text{ in} - t_{\text{walk}}) \cdot (t_{\text{slab}} + w_{\text{h}} + 0.5 w_{\text{fl.s}} - 2.5 \text{ in}) \right]$$

$$\text{Transition} = 136.2 \frac{\text{lbf}}{\text{ft}}$$

$$\text{Fence}_{\text{curb}} := ?_{\text{conc}} \cdot 1 \text{ ft} \cdot (6 \text{ in} + t_{\text{walk}})$$

$$\text{Fence}_{\text{curb}} = 140.6 \frac{\text{lbf}}{\text{ft}}$$

Misc Loads:

$$\text{Forms} := P_{\text{sip}} \cdot w_{\text{walk}}$$

$$\text{Forms} = 90.0 \frac{\text{lbf}}{\text{ft}}$$

Fence and Railing:

$$\text{Fence} := 50 \frac{\text{lbf}}{\text{ft}}$$

$$\text{Subtotal} := \text{String}_{\text{fas}} + \text{Sidewalk} + \text{Transition} + \text{Fence}_{\text{curb}} + \text{Forms} + \text{Fence}$$

$$P_{\text{stringer}} := \text{Frame} + (\text{Span}_{\text{fas}} \cdot \text{Subtotal})$$

$$P_{\text{stringer}} = 8.61 \cdot \text{kip}$$

LISTA.LIS

BARS-PC R5.5-MOD 3.0

	RECORD								REC.NO.	
01	041411MDB	ARCADIS	HS20HS20	2F1	3F1	4F1	*77*	POST	100	
03	1	2F10210.0	10	20.0					200	
03	1	3F10312.0	10	17.0	4	17.0			300	
03	1	4F10412.0	10	14.0	4	14.0			400	
03	1	SPEC0512.0	12	17.0	4	17.0	31	17.0	500	
03	2	SPEC 17.0							600	
02480030	MDB	ARCADIS		32131	3219		54	01 HS20HS20	100	
05480030	4800303	BLUC	2SH 18.6210421.09					F SR2	200	
06480030	1LUC-2-18.62	SR 2	OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 14E-15E						300	
06480030	2LOADING H20;	PID NO. 80551;	MAINTAIN & INSP BY ODOT; SPAN: 40' +- C/C						400	
06480030	3BRGS.;	STRUCTURAL STEEL BEAMS, 8.0"	COMPOSITE CONC DECK INCLUDES 1" MWS						500	
06480030	411	BEAMS @5'-4 1/2";	NO SKEW, G01=EXIST INTERIOR BM, LDDF=0.98;						600	
06480030	5CONSTR. 1931								700	
08480030	G01	02	32	20	CSC3000004500	0.98			800	
10480030	G01	01		W109.1	32				900	
10480030	G01	02		W114.1	20				1000	
11480030	G01	0101	32	0101					1100	
11480030	G01	0201	20	0202					1200	
12480030	G01			01	2401	12P	0.78	23.61	1300	
12480030	G01			01	02	0.47	22.44	12	1400	
12480030	G01			01	03	12	0.78	0.39	1500	
12480030	G01			02	21.1301	8.04P	0.67	20.80	1600	
12480030	G01			02	02	0.40	19.79	10.57	1700	
12480030	G01			02	03	8.04	0.67	0.34	1800	
14480030	G01	0101	32	C 01	64.5	8.512.0	2.0	64.5	8.5	4.252.0134.7760000
14480030	G01	0201	20	C 01	64.5	8.512.0	2.0	64.5	8.5	4.252.0134.7760000
16480030	G01	01T01	32	C						2100
16480030	G01	01B01	32	SPSP 2	16					2200
16480030	G01	02T01	20	C						2300
16480030	G01	02B01	20	SPSP 2	10					2400

THE FOLLOWING STRUCTURES WERE SELECTED

480030

RATE2.LIS

MEMBER ID	SYMM.	SPAN NO.	DISTANCE LEFT	FR. SUPP.	LOAD TYPE	P OR W(L)	W(R)	LENGTH
900--10	G 1	1	.000FT.	W	109.1	.0		32.000FT.
1000--10	G 1	2	.000FT.	W	114.1	.0		20.000FT.

*
*

SECTION RANGE SPECIFICATIONS

MEMBER ID	SYMM.	SPAN NO.	RANGE NO.	RANGE LENGTH	SECTION LEFT	SECTION NO. RIGHT	VAR. CODE	HINGE 1 DIST.	HINGE 2 DIST.	HYBRID CODE	GIRDER CODE	FY
1100--11	G 1	1	1	32.000FT.	1	1		.000FT.	.000FT.	0.		0.
1200--11	G 1	2	1	20.000FT.	2	2		.000FT.	.000FT.	0.		0.

*
*

SECTION PROPERTIES (STEEL OR TIMBER) - GIRDERS STRINGERS, FLOOR BEAMS

MEMBER ID	SEC.	A	I	S	CODE	SAME	ADR	H	ELE	A	IX	DY	DX
1300--12	G 1	0	.00	.0	.0	1	0	24.00	1	12.00P	.8	23.6	.0
1400--12	G 1	0	.00	.0	.0	1	0	.00	2	.47	22.4	12.0	.0
1500--12	G 1	0	.00	.0	.0	1	0	.00	3	12.00	.8	.4	.0
1600--12	G 1	0	.00	.0	.0	2	0	21.13	1	8.04P	.7	20.8	.0
1700--12	G 1	0	.00	.0	.0	2	0	.00	2	.40	19.8	10.6	.0
1800--12	G 1	0	.00	.0	.0	2	0	.00	3	8.04	.7	.3	.0

*
*

SECTION PROPERTIES (COMPOSITE) - GIRDERS, STRINGERS, FLOOR BEAMS

MEMBER ID	SYMM	SPAN RANGE	RANGE LENGTH	COMP CODE	N SECT	A	WIDTH	THICK -NESS	FILLET WIDTH	FILLET THICK.	EFFECT. WIDTH	EFFECT. THICK.	DIST TO TOP SECT.
1900--14	G 1	1 1	32.000FT.	C	0	1	0	64.50	8.50	12.00	2.00	64.50	8.50
2000--14	G 1	2 1	20.000FT.	C	0	1	0	64.50	8.50	12.00	2.00	64.50	8.50

*
*

BRACING LENGTH SPECIFICATIONS - LOAD FACTOR ANALYSIS

MEMBER ID	SYMM	SPAN T/B	RANGE LENGTH	SUPPORT LEFT	COND. RIGHT	SPACES	SPACING DISTANCE	STIFF SPACING
2100--16	G 1	1 T 1	32.000FT.	C		0	.000FT.	.000IN.

RATE2.LIS

DL EFFECT	-64.5	DL EFFECT	-64.5
CAPACITY FOR (LL+I) ACTUAL (LL+I)	-130.7 -85.3	CAPACITY FOR (LL+I) ACTUAL (LL+I)	-204.1 -85.3
INVENTORY RATING	HS 30.65	OPERATING RATING	HS 47.89

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
POSTING ANALYSIS

INPUT CODING --

DATE 4/14/11	INVENTORY	OPERATING	POSTING
BY MDB ARCADIS	LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
	HS20	HS 30.65	HS20 HS 47.89 VEH. 2F1 76.65
			VEH. 3F1 80.38
			VEH. 4F1 81.75

STRUCTURE 4800303 D/P STR. I.D.-- 480-030

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 321	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. 2	CORRESPONDENCE
LENGTH 3219.00 FEET	SH 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1.09	
NUMBER OF SPANS 1	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 14E-15E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 40' +- C/C
BRGS.; STRUCTURAL STEEL BEAMS, 8.0" COMPOSITE CONC DECK INCLUDES 1" MWS
11 BEAMS @5'-4 1/2"; NO SKEW, G01=EXIST INTERIOR BM, LDDF=0.98;
CONSTR. 1931

TRUCK TYPE VEH. 2F1	TRUCK TYPE VEH. 4F1
MEMBER ID. G 1	MEMBER ID. G 1
SPAN 2	SPAN 2
CRITICAL C.P. DIST. .0 FEET	CRITICAL C.P. DIST. .0 FEET

SHEAR (KIPS)	SHEAR (KIPS)

RATE2.LIS
MEMBER CAPACITY -139.6
DL EFFECT -64.5

CAPACITY FOR (LL+I) -204.1
ACTUAL (LL+I) -58.5

POSTING GROSS TONNAGE 139.6

*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

D/P STR. ID-- 480-030

STRUCTURE 4800303

INPUT CODING--

DATE 4/14/11
BY MDB ARCADIS

INVENTORY
LIVE LOAD HS 30.7
HS20 RATING
OPERATING
LIVE LOAD HS 47.9
HS20 RATING

STRUCTURE DESCRIPTION--

IDENTIFICATION 4800303
TYPE 321
YEAR OF CONSTR. 1931
LENGTH 3219.00 FEET
ROADWAY WIDTH 54.00 FEET
NUMBER OF SPANS 1

LOCATION--

DISTRICT B
COUNTY LUC
CONSTR. RTE. 2
CONSTR. SEC. SH 18.62
CONSTR. STA. 1042+1.09
KEY RTE. F
MARKED RTE. SR2

MICROFILM REEL NUMBERS--

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 14E-15E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 40' +- C/C
BRGS.: STRUCTURAL STEEL BEAMS, 8.0" COMPOSITE CONC DECK INCLUDES 1" MWS
11 BEAMS @5'-4 1/2"; NO SKEW, G01=EXIST INTERIOR BM, LDDF=0.98;
CONSTR. 1931

INVENTORY RATING SUMMARY

MEMBER I.D. G 1
SPAN 2
CRITICAL C.P. DIST. .0 FEET
LIVE LOAD DESIGNATION HS20

OPERATING RATING SUMMARY

MEMBER I.D. G 1
SPAN 2
CRITICAL C.P. DIST. .0 FEET
LIVE LOAD DESIGNATION HS20

SHEAR
(KIPS)
MEMBER CAPACITY -66.2
DL EFFECT -64.5

SHEAR
(KIPS)
MEMBER CAPACITY -139.6
DL EFFECT -64.5

ACTUAL (LL+I) -39.9 RATE2.LIS -58.4 ACTUAL (LL+I) -67.4

POSTING GROSS TONNAGE 76.7 POSTING GROSS TONNAGE 80.4 POSTING GROSS TONNAGE 81.7

*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING--
DATE 4/14/11
BY MDB ARCADIS

STRUCTURE 4800303
INVENTORY LIVE LOAD RATING OPERATING LIVE LOAD RATING SPECIAL LOAD
HS20 HS 30.65 HS20 HS 47.89 TRUCK TYPE GROSS TONS
VEH.SPEC 139.6

STRUCTURE DESCRIPTION--
IDENTIFICATION 4800303
TYPE 321
YEAR OF CONSTR. 1931
LENGTH 3219.00 FEET
ROADWAY WIDTH 54.00 FEET
NUMBER OF SPANS 1

LOCATION--
DISTRICT B
COUNTY LUC
CONSTR. RTE. 2
CONSTR. SEC. SH 18.62
CONSTR. STA. 1042+1...09
KEY RTE. F
MARKED RTE. SR2

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; STRINGER SPAN 14E-15E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 40' +- C/C
BRGS.; STRUCTURAL STEEL BEAMS, 8.0" COMPOSITE CONC DECK INCLUDES 1" MWS
11 BEAMS @5'-4 1/2"; NO SKEW, G01=EXIST INTERIOR BM, LDDF=0.98;
CONSTR. 1931

SPECIAL LOAD SUMMARY

TRUCK TYPE VEH.SPEC
MEMBER I.D. G 1
SPAN 2
CRITICAL C.P. DIST. .0 FEET

SHEAR
(KIPS)
MEMBER CAPACITY -139.6
DL EFFECT -64.5

CAPACITY FOR (LL+I) -204.1
ACTUAL (LL+I) -58.5

POSTING GROSS TONNAGE 139.6

FLEX.LIS

DETAIL DATA AT MOMENT CHECK POINT FOR
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBERBARS RELEASE 5.5
D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 1.00

DATE 04/14/11

SECTION PROPERTIES IN COMPOSITE RANGE									
LOF SPAN 1									
-----NET AREA-----									
GROSS AREA									
H IN SQ. IN.									
+ BEND SQ. IN.									
- BEND SQ. IN.									
IX IN**4									
+ BEND IN**4									
- BEND IN**4									
C (BOT) IN**4									
+ BEND IN**4									
- BEND IN**4									
MODULUS									
TOP BEND IN**3									
- BEND IN**3									
BOT BEND IN**3									
+ BEND IN**3									
- BEND IN**3									
NON-COM	24.00	29.27	29.27	29.27	29.27	29.27	29.27	247.2	247.2
COM (N=N)								376.1	376.1
COM (N=3N)								339.5	339.5

***** ALLOWABLE STRESS *****									
***** MOMENT CAPACITY *****									
TOP BEND + BEND TOP BEND - BEND									
FT-KIPS FT-KIPS FT-KIPS FT-KIPS									
INVENTORY	16500.0								
OPERATING	22500.0								
POST VEH1	22500.0								
POST VEH2	22500.0								
POST VEH3	22500.0								
POST SPEC	22500.0								
***** DL MOMENT EFFECT *****									
***** AVAIL. CAPAC. FOR LL+IMPACT *****									
TOP BEND + BEND TOP BEND - BEND									
FT-KIPS FT-KIPS FT-KIPS FT-KIPS									
INVENTORY	19729.8								
OPERATING	26904.3								
VEH. 1	26904.3								
VEH. 2	26904.3								
VEH. 3	26904.3								
SPECIAL	26904.3								

***** LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .300 FOR +BEND AND = .300 FOR -BEND)

TRUCK LOAD									
LL+IMP LL									
FT-KIPS FT-KIPS									
LL+IMP LL									
FT-KIPS FT-KIPS									
LL+IMP LL									
FT-KIPS FT-KIPS									
LL+IMP LL									
FT-KIPS FT-KIPS									
LL+IMP LL									
FT-KIPS FT-KIPS									
INV HS20 +BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
INV HS20 -BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
OPER HS20 +BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
OPER HS20 -BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST 2F1 +BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST 2F1 -BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST 3F1 +BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST 3F1 -BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST 4F1 +BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST 4F1 -BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST SPEC +BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0
POST SPEC -BEND	.0	.0	.0	.0	.0	.0	.0	.0	.0

FLEX.LIS

DATE 04/14/11

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 3.00

***** SECTION PROPERTIES IN COMPOSITE RANGE *****

	COMPOSITE RANGE				10F SPAN	2
	---NET AREA---					
	GROSS					
	AREA					
	IN.	IN.	IN.	IN.		
NON-COM	21.13	18.69	18.69	18.69		
COM (N=N)						
COM (N=3N)						

	SECTION		MODULUS	
	TOP	BOTTOM	TOP	BOTTOM
	+ BEND	- BEND	+ BEND	- BEND
	IN**3	IN**3	IN**3	IN**3
	1386.2	131.3	131.1	131.1
	4781.8	30743.6	228.0	199.8
	3268.2	684.6		

***** ALLOWABLE STRESS *****

	MOMENT CAPACITY	
	TOP	BOTTOM
	+ BEND	- BEND
	FT-KIPS	FT-KIPS
	FT-KIPS	FT-KIPS

***** ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN) *****

	SPAN					
	1	2	3	4	5	6
T 0	.000	.000	.000	.000	.000	.000
E 1	.000	.000	.000	.000	.000	.000
N 2	.000	.000	.000	.000	.000	.000
T 3	.000	.000	.000	.000	.000	.000
H 4	.000	.000	.000	.000	.000	.000
5	.000	.000	.000	.000	.000	.000
P 6	.000	.000	.000	.000	.000	.000
O 7	.000	.000	.000	.000	.000	.000
I 8	.000	.000	.000	.000	.000	.000
N 9	.000	.000	.000	.000	.000	.000
T 0	.000	.000	.000	.000	.000	.000

***** DL MOMENT EFFECT *****

	DL		FT-KIPS		SPECIAL	
	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
INVENTORY	16500.0	22500.0	16500.0	22500.0	16500.0	22500.0
OPERATING	22500.0	22500.0	22500.0	22500.0	22500.0	22500.0
POST VEH1	22500.0	22500.0	22500.0	22500.0	22500.0	22500.0
POST VEH2	22500.0	22500.0	22500.0	22500.0	22500.0	22500.0
POST VEH3	22500.0	22500.0	22500.0	22500.0	22500.0	22500.0
POST SPEC	22500.0	22500.0	22500.0	22500.0	22500.0	22500.0

***** AVAIL. CAPAC. FOR LL+IMPACT *****

	AVAIL. CAPAC. FOR		LL+IMPACT	
	TOP	BOTTOM	TOP	BOTTOM
INVENTORY	42272.5	180.5	42272.5	180.5
OPERATING	57644.3	246.1	57644.3	246.1
VEH. 1	57644.3	246.1	57644.3	246.1
VEH. 2	57644.3	246.1	57644.3	246.1
VEH. 3	57644.3	246.1	57644.3	246.1
SPECIAL	57644.3	246.1	57644.3	246.1

***** LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .300 FOR +BEND AND = .300 FOR -BEND) *****

	TRUCK LOAD				LANE LOAD				RATING	SAFE LOAD	RATING
	LL+IMP	LL	LOC. NO.	DIR	LL+IMP	LL	LOC. CONC	LOC. CONC			
	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FT-KIPS	FACT.	TONS	VALUE
INV	HS20 +BEND	.0	.0	.0	.0	.0	.0	.0	3.016	108.6	HS 60.3
	-BEND	.0	.0	.0	.0	.0	.0	.0			
OPER	HS20 +BEND	.0	.0	.0	.0	.0	.0	.0	4.179	150.5	HS 83.6
	-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	2F1 +BEND	.0	.0	.0	.0	.0	.0	.0	6.702	100.5	
	-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	3F1 +BEND	.0	.0	.0	.0	.0	.0	.0	4.987	114.7	
	-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	4F1 +BEND	.0	.0	.0	.0	.0	.0	.0	4.946	133.5	
	-BEND	.0	.0	.0	.0	.0	.0	.0			
POST	SPEC +BEND	.0	.0	.0	.0	.0	.0	.0	5.414	216.6	
	-BEND	.0	.0	.0	.0	.0	.0	.0			

SUMMARY OF SHEAR ANALYSIS

DATE 04/14/11

D/P STRUCTURE I.D. 480-030

LUC-2-18.62 Two-Girder Spans

SFN: 4800303

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River - Two girder spans, girders	
SPECIAL ASSUMPTIONS & COMMENTS:	Historical records from AISC were used to determine section properties of existing rolled beams. Steel material properties were pulled from the original plans. No future wearing surface was used in the analysis.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.19	HS-20-44
OPERATING CURRENT DESIGN	2.10	HS-20-44
OHIO LEGAL - 2F1	4.58	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	3.07	150%
OHIO LEGAL - 4F1	2.70	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.55	OHIO LEGAL - 5C1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River - Two girder spans, floorbeams	
SPECIAL ASSUMPTIONS & COMMENTS:	Historical records from AISC were used to determine section properties of existing rolled beams. Steel material properties were pulled from the original plans. No future wearing surface was used in the analysis.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.17	HS-20-44
OPERATING CURRENT DESIGN	1.86	HS-20-44
OHIO LEGAL - 2F1	3.45	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.34	150%
OHIO LEGAL - 4F1	2.12	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.41	OHIO LEGAL - 4F1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River - Two girder spans, stringers	
SPECIAL ASSUMPTIONS & COMMENTS:	Historical records from AISC were used to determine section properties of existing rolled beams. Steel material properties were pulled from the original plans. No future wearing surface was used in the analysis.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.38	HS-20-44
OPERATING CURRENT DESIGN	2.02	HS-20-44
OHIO LEGAL - 2F1	3.20	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.30	150%
OHIO LEGAL - 4F1	2.11	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.43	OHIO LEGAL - 4F1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

Project Name: LUC-2-18.62 over Maumee River

Designed By: MDB

Date: 4/14/11

Checked By: SKK

Date: 4/28/11

Input for BARS-PC *Span 1E Load Rating*

General Structure Data

Number of Beams & Spacing:	$No_{beams} := 11$	$Beam_{spa} := 5.375ft$
Haunch Depth & Width:	$d_h := 2in$	$w_h := 6in$
Stringer Top Flange Thickness:	$t_{fl.s} := 0.663in$	Beam type: CB24x70
Stringer Top Flange Width:	$w_{fl.s} := 8.5in$	
Girder Top Flange Thickness:	$t_{fl.g} := 1.375in$	Girder G5E (sheet 107)
Girder Top Flange Width:	$w_{fl.g} := 18in$	
Span Lengths:	Girders	$Span_G := 85.30ft$
	Floorbeams	$Span_F := 43.0ft$
	Stringers	$Span_S := 22.83ft$ (longest span)
Deck Slab Thickness:	$t_{slab} := 8.5in$	
Future Wearing Surface:	$P_{FWS} := 0.060 \frac{kip}{ft^2}$	
Materials:	$?_{conc} := 0.150 \frac{kip}{ft^3}$	$?_{steel} := 0.490 \frac{kip}{ft^3}$
Stay in Place Forms:	$P_{sip} := 15psf$	
Median Barrier:	$A_{median} := 32in \cdot 0.5 \cdot (12in + 24in)$	$A_{median} = 4 \cdot ft^2$
Sidewalk Width:	$w_{walk} := 6ft$	
Sidewalk deck thickness:	$t_{walk} := 5.25in$	

Girders

Distributed load is similar to stringers but includes detail factor. Calculate point loads from floorbeam reactions.

$$\text{Deck} := ?_{\text{conc}} \cdot \text{Beam}_{\text{spa}} \cdot t_{\text{slab}} \quad \text{Deck} = 571.1 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Haunch} := ?_{\text{conc}} \cdot \left[(d_h \cdot w_{\text{fl.g}}) + \left[2 \cdot 0.5 \cdot w_h \cdot (d_h + t_{\text{fl.g}}) \right] \right] \quad \text{Haunch} = 58.6 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Forms} := P_{\text{slip}} \cdot \left[\text{Beam}_{\text{spa}} - w_{\text{fl.g}} - (2 \cdot w_h) \right] \quad \text{Forms} = 43.1 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Median} := A_{\text{median}} \cdot ?_{\text{conc}} \cdot \text{No}_{\text{beams}}^{-1} \quad \text{Median} = 54.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Guardrail} := 43 \cdot \frac{\text{lbf}}{\text{ft}} \cdot \text{No}_{\text{beams}}^{-1} \quad \text{Guardrail} = 3.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{FWS} := P_{\text{FWS}} \cdot \text{Beam}_{\text{spa}} \quad (\text{NOT INCLUDED}) \quad \text{FWS} = 322.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Area of beam:} \quad A_G := 130.35 \text{ in}^2$$

$$\text{Girder detail factor:} \quad \text{detail}_G := 0.22$$

$$W_{\text{girder}} := (A_G \cdot \text{detail}_G \cdot ?_{\text{steel}}) + \text{Deck} + \text{Haunch} + \text{Forms} + \text{Median} + \text{Guardrail}$$

$$W_{\text{girder}} = 828.8 \cdot \frac{\text{lbf}}{\text{ft}}$$

Seven stringers supported by each floorbeam, half of load to each girder:

$$P_{\text{girder.F}} := 0.5 \cdot \left[\text{Span}_F \cdot \left[W_{\text{floorbeam}} + (A_F \cdot ?_{\text{steel}}) \right] + (7 \cdot P_{\text{floorbeam}}) \right] \quad P_{\text{girder.F}} = 62.2 \cdot \text{kip}$$

Sidewalk bracket loads (see previous analysis for additional framing details):

$$\text{Fascia Stringer:} \quad \text{String}_{\text{fas}} := 37.8 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Web Plate:} \quad \text{Web} := 622 \text{ lbf}$$

$$\text{Cantilevered Framing:} \quad \text{Frame} := 670 \text{ lbf}$$

$$\text{Exterior Stringer:} \quad \text{CB21.125x64} \quad \text{String}_{\text{ext}} := 64 \cdot \frac{\text{lbf}}{\text{ft}}$$

[illegible]

LISTA.LIS

BARS-PC R5.5-MOD 3.0

RECORD										REC.NO.
			HS20	HS20	2F1	3F1	4F1	*77*	POST	
01	041411	MDB	ARCADIS							100
03	1	2F10210.0	10	20.0						200
03	1	3F10312.0	10	17.0	4	17.0				300
03	1	4F10412.0	10	14.0	4	14.0	4	14.0		400
03	1	SPEC0512.0	12	17.0	4	17.0	31	17.0	4	500
03	2	SPEC	17.0							600
02480030	MDB	ARCADIS			36131	3215		43	27	100
054800304800303	BLUC									200
0648003011	LUC-2-18.62	SR 2	OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E							300
064800302	LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6" +/- CL									400
064800303C/C	BRGS: 85'-4" +/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC									500
064800304	DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW									600
064800305G01	=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTEROR									700
064800306BM; S04	=EXIST SHORT INTEROR BM; LLDF=0.98; CONSTR.1931									800
08480030B02	01	4300			SS30000		22.83		X	900
08480030G01	01	8508			SS30000		3.59		X	1000
08480030S03	01	2000			SS30000		0.98			1100
08480030S04	01	2210			SS30000		0.98			1200
10480030B02	01		W 32.5		4300					1300
10480030B02	01	50408	P 16.4							1400
10480030B02	01	1009	P 16.4							1500
10480030B02	01	160108	P 16.4							1600
10480030B02	01	2106	P 16.4							1700
10480030B02	01	261008	P 16.4							1800
10480030B02	01	3203	P 16.4							1900
10480030B02	01	370708	P 16.4							2000
10480030G01	01		W828.8		8508					2100
10480030G01	01	00	P 47.7							2200
10480030G01	01	2000	P 95.4							2300
10480030G01	01	4000	P 95.4							2400
10480030G01	01	6210	P 95.4							2500
10480030G01	01	8508	P 47.7							2600
10480030S03	01		W718.9		2000					2700
10480030S04	01		W718.9		2210					2800
11480030B02	0101	604	0303							2900
11480030B02	0102	211	0202							3000
11480030B02	0103	2406	0101							3100
11480030B02	0104	211	0202							3200
11480030B02	0105	604	0303							3300
11480030G01	0101	1507	0303							3400
11480030G01	0102	601	0202							3500
11480030G01	0103	4204	0101							3600
11480030G01	0104	601	0202							3700
11480030G01	0105	1507	0303							3800
11480030S03	0101	2000	0101							3900
11480030S04	0101	2210	0101							4000
12480030B02				01	61.501	14P	.7561.125			4100
12480030B02				01	02	21	.5 60.5			4200
12480030B02				01	03	.375	59 30.75			4300
12480030B02				01	04	21	.5 1			4400
12480030B02				01	05	14	.75 0.375			4500

BARS-PC R5.5-MOD 3.0

RECORD										REC.NO.
12480030B02				02	60.7501	14P	.37560.563			4600
12480030B02				02	02	21	.560.125			4700
12480030B02				02	03	.375	5930.375			4800
12480030B02				02	04	21	.5 0.625			4900
12480030B02				02	05	14	.3750.1875			5000
12480030B02				03	6001	21P	.5 59.75			5100
12480030B02				03	02	.375	59 30			5200
12480030B02				03	03	21	.5 .25			5300
12480030G01				01	122.7501	18P	1.375122.06			5400
12480030G01				01	02	28	.75 121			5500
12480030G01				01	03	0.5	118.561.375			5600
12480030G01				01	04	28	.75 1.75			5700
12480030G01				01	05	18	1.3750.6875			5800
12480030G01				02	121.3801	18P	0.6875121.03			5900
12480030G01				02	02	28	.75120.31			6000
12480030G01				02	03	0.5	118.560.688			6100
12480030G01				02	04	28	.751.0625			6200
12480030G01				02	05	18	0.6875.34375			6300
12480030G01				03	12001	28P	.75119.63			6400
12480030G01				03	02	0.5	118.5 60			6500
12480030G01				03	03	28	.75 .375			6600
12480030S03				01	21.12501	8P	.67 20.79			6700
12480030S03				01	02	.4	19.78510.563			6800
12480030S03				01	03	8	.67 .335			6900
12480030S04				01	2401	8.5P	.66 23.65			7000
12480030S04				01	02	.4	22.68 12			7100
12480030S04				01	03	8.5	.66 .35			7200

STRUCTURE I.D. = 480-030

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100-- 2      MDB ARCADIS      EA/I/O/P =      FILE REQUESTS AND OUTPUT DATA EXCEPTIONS
              TYPE =          361  YEAR =          31  LEN = 3215.00 FT.      WIDTH = 43.00 FT.
              INV.LL, TRK.=      OP.LL, TRK.=
                                27 SPANS SP. LOAD =

```

200-- 5 BRIDGE=4800303 DIST./CO.= B LUC CONST. ROUTE = CONST. SECT.= 0+
MICROFILM REEL NO. DESIGN PLANS= COMPUTATIONS= CORRESPONDENCE=
ROUTE I.D.= MARKED ROUTE =

1	LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
2	LOADING H20; PID NO.805511; MAINTAIN & INSP BY ODOT; SPAN: 83' -6" +/- CL
3	C/C BRGS: 85'-4" +/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
4	DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
5	GO1=EXIST INTERIOR BM; BO2=EXIST INTERIOR BM; SO3=EXIST SHORT INTER
6	BM; SO4=EXIST SHORT INTER BM; LLDFO=0.98; CONSTR.1931

	MEMBER ID	SPANS	STIFF. SYMM CODE	SPAN 1 (SPAN 4)	SPAN 2 (SPAN 5)	SPAN 3 (SPAN 6)	MATL CODE	ALLOWABLE STRESS FY FB FC* FC**	LL DIST. FACTOR	THRU DECK	MAX INV.	IMPACT OP.	POST SPEC
900--8	B 2	1	X	43.000	.000	.000	SS	30000.00 .00	22.830	.00	.00	.00	.00
1000--8	G 1	1	X	85.667	.000	.000	SS	30000.00 .00	3.590	.00	.00	.00	.00
1100--8	S 3	1		20.000	.000	.000	SS	30000.00 .00	.980	.00	.00	.00	.00
1200--8	S 4	1		22.833	.000	.000	SS	30000.00 .00	.980	.00	.00	.00	.00

CAPACITY FOR (LL+I) 1229.9 1951.5
ACTUAL (LL+I) 1045.6 1045.6

INVENTORY RATING HS 23.52

RATE2.LIS

CAPACITY FOR (LL+I) 1951.5
ACTUAL (LL+I) 1045.6

OPERATING RATING HS 37.33

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER B 2 BARS-PC RELEASE 5.5
POSTING ANALYSIS

INPUT CODING --

DATE 4/14/11
BY MOB ARCADIS

INVENTORY RATING HS 23.52

OPERATING RATING HS 37.33

STRUCTURE 4800303

D/P STR. I.D.-- 480-030

INVENTORY RATING HS 23.52

OPERATING RATING HS 37.33

STRUCTURE 4800303

D/P STR. I.D.-- 480-030

STRUCTURE DESCRIPTION --

IDENTIFICATION 4800303

TYPE 361

YEAR OF CONSTR. 1931

LENGTH 3215.00 FEET

ROADWAY WIDTH 43.00 FEET

NUMBER OF SPANS 27

LOCATION --

DISTRICT B

COUNTY LUC

CONSTR. RTE. 0+

CONSTR. SEC.

CONSTR. STA.

KEY RTE.

MARKED RTE.

MICROFILM REEL NUMBERS --

DESIGN PLANS

COMPUTATIONS

CORRESPONDENCE

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6" +/- CL
C/C BRGS: 85'-4" +/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLDf=0.98; CONSTR.1931

TRUCK TYPE VEH. 2F1

MEMBER ID. B 2

SPAN 1

CRITICAL C.P. DIST. 20.8 FEET

TRUCK TYPE VEH. 4F1

MEMBER ID. B 2

SPAN 1

CRITICAL C.P. DIST. 20.8 FEET

SHEAR (KIPS) 2706.2

MEMBER CAPACITY 2706.2

DL EFFECT 754.7

SHEAR (KIPS) 2706.2

MEMBER CAPACITY 2706.2

DL EFFECT 754.7

RATE2.LIS

CAPACITY FOR (LL+I) 1951.5
ACTUAL (LL+I) 808.6

POSTING GROSS TONNAGE 96.5

BARS-PC RELEASE 5.5

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1
INVENTORY AND/OR OPERATING ANALYSIS

D/P STR. I.D.-- 480-030

STRUCTURE 4800303

INPUT CODING --

DATE 4/14/11
BY MDB ARCADIS

INVENTORY
LIVE LOAD RATING

HS20 HS 27.33 HS20 HS 50.64

STRUCTURE DESCRIPTION --

IDENTIFICATION 4800303
TYPE 361
YEAR OF CONSTR. 1931
LENGTH 3215.00 FEET
ROADWAY WIDTH 43.00 FEET
NUMBER OF SPANS 27

LOCATION --

DISTRICT B
COUNTY LUC
CONSTR. RTE.
CONSTR. SEC.
CONSTR. STA.
KEY RTE.
MARKED RTE.

MICROFILM REEL NUMBERS --

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6"+/- CL
C/C BRGS: 85'-4"+/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLDF=0.98; CONSTR.1931

INVENTORY RATING SUMMARY --

MEMBER ID. G 1
SPAN 1
CRITICAL C.P. DIST. 42.8 FEET
LIVE LOAD DESIGNATION HS20

MEMBER ID. G 1
SPAN 1
CRITICAL C.P. DIST. 42.8 FEET
LIVE LOAD DESIGNATION HS20

SHEAR
(KIPS)
8982.7
DL EFFECT 5152.0

SHEAR
(KIPS)
12249.2
DL EFFECT 5152.0

RATE2.LIS

CAPACITY FOR (LL+I) ACTUAL (LL+I)	7097.1 1316.0	CAPACITY FOR (LL+I) ACTUAL (LL+I)	7097.1 1979.3	CAPACITY FOR (LL+I) ACTUAL (LL+I)	7097.1 2257.7
POSTING GROSS TONNAGE	80.9	POSTING GROSS TONNAGE	82.5	POSTING GROSS TONNAGE	84.9

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING --

DATE 4/14/11
BY MDB ARCADIS

STRUCTURE 4800303

D/P STR. I.D.-- 480-030

INVENTORY	OPERATING	SPECIAL LOAD
LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
HS20	HS 27.33 HS20	HS 50.64
		VEH. SPEC 124.95

STRUCTURE DESCRIPTION --

IDENTIFICATION 4800303
TYPE 361
YEAR OF CONSTR. 1931
LENGTH 3215.00 FEET
ROADWAY WIDTH 43.00 FEET
NUMBER OF SPANS 27

MICROFILM REEL NUMBERS --

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

LOCATION --

DISTRICT B
COUNTY LUC
CONSTR. RTE.
CONSTR. SEC.
CONSTR. STA.
KEY RTE.
MARKED RTE.

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6" +/- CL
C/C BRGS: 85'-4" +/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLDf=0.98; CONSTR.1931

TRUCK TYPE VEH.	SPEC
MEMBER ID.	G 1
SPAN	1
CRITICAL C.P. DIST.	.0 FEET

MEMBER CAPACITY	MOMENT
DL EFFECT	(FT. KIPS)
	646.8
	251.4

CAPACITY FOR (LL+I)
ACTUAL (LL+I)

140.5
101.9

CAPACITY FOR (LL+I)
ACTUAL (LL+I)

205.8
101.9

INVENTORY RATING

HS 27.57

OPERATING RATING

HS 40.39

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER POSTING ANALYSIS

S 3 BARS-PC RELEASE 5.5

INPUT CODING --

DATE 4/14/11
BY MDB ARCADIS

STRUCTURE 4800303

D/P STR. I.D.-- 480-030

INVENTORY LIVE LOAD

HS20

OPERATING LIVE LOAD

HS20

RATING

HS 27.57

RATING

HS 40.39

POSTING TRUCK TYPE GROSS TONS

VEH. 2F1 48.47
VEH. 3F1 54.65
VEH. 4F1 56.65

STRUCTURE DESCRIPTION --

IDENTIFICATION 4800303
TYPE 361
YEAR OF CONSTR. 1931
LENGTH 3215.00 FEET
ROADWAY WIDTH 43.00 FEET
NUMBER OF SPANS 27

LOCATION --

DISTRICT B
COUNTY LUC
CONSTR. RTE. 0+
CONSTR. SEC.
CONSTR. STA.
KEY RTE.
MARKED RTE.

MICROFILM REEL NUMBERS --

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6"+/- CL
C/C BRGS: 85'-4"+/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLDF=0.98; CONSTR.1931

TRUCK TYPE VEH. 2F1
MEMBER ID. S 3
SPAN 1
CRITICAL C.P. DIST. 10.0 FEET

TRUCK TYPE VEH. 4F1
MEMBER ID. S 3
SPAN 1
CRITICAL C.P. DIST. 10.0 FEET

SHEAR (KIPS)
244.9
39.1

SHEAR (KIPS)
244.9
39.1

MEMBER CAPACITY DL EFFECT

244.9
39.1

MEMBER CAPACITY DL EFFECT

244.9
39.1

RATE2.LIS

CAPACITY FOR (LL+I) 205.8
ACTUAL (LL+I) 86.6
POSTING GROSS TONNAGE 95.0

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER S 4 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

D/P STR. I.D.-- 480-030

STRUCTURE 4800303

INPUT CODING --

DATE 4/14/11
BY MDB ARCADIS

INVENTORY
LIVE LOAD RATING
HS20 HS 28.83

OPERATING
LIVE LOAD RATING
HS20 HS 42.53

MICROFILM REEL NUMBERS --

STRUCTURE DESCRIPTION --

IDENTIFICATION 4800303
TYPE 361
YEAR OF CONSTR. 1931
LENGTH 3215.00 FEET
ROADWAY WIDTH 43.00 FEET
NUMBER OF SPANS 27

LOCATION --

DISTRICT B
COUNTY LUC
CONSTR. RTE.
CONSTR. SEC.
CONSTR. STA.
KEY RTE.
MARKED RTE.

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6"+/- CL
C/C BRGS: 85'-4"+/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" WMS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLD=0.98; CONSTR.1931

INVENTORY RATING SUMMARY --

MEMBER ID. S 4
SPAN 1
CRITICAL C.P. DIST. 11.4 FEET
LIVE LOAD DESIGNATION HS20

MEMBER CAPACITY
DL EFFECT 219.1
SHEAR (KIPS) 51.4

OPERATING RATING SUMMARY --

MEMBER ID. S 4
SPAN 1
CRITICAL C.P. DIST. 11.4 FEET
LIVE LOAD DESIGNATION HS20

MEMBER CAPACITY
DL EFFECT 298.8
SHEAR (KIPS) 51.4

RATE2.LIS

CAPACITY FOR (LL+I)	247.4	CAPACITY FOR (LL+I)	247.4	CAPACITY FOR (LL+I)	247.4
ACTUAL (LL+I)	77.2	ACTUAL (LL+I)	107.4	ACTUAL (LL+I)	117.0
POSTING GROSS TONNAGE	48.0	POSTING GROSS TONNAGE	53.0	POSTING GROSS TONNAGE	57.1

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER S 4 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING -- STRUCTURE 4800303 D/P STR. I.D.-- 480-030

DATE 4/14/11	INVENTORY	OPERATING	SPECIAL LOAD
BY MDB ARCADIS	LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
HS20	HS 28.83	HS20 HS 42.53	VEH.SPEC 97.05

STRUCTURE DESCRIPTION -- LOCATION -- MICROFILM REEL NUMBERS --

IDENTIFICATION	4800303	DISTRICT	B	DESIGN PLANS
TYPE	361	COUNTY	LUC	COMPUTATIONS
YEAR OF CONSTR.	1931	CONSTR. RTE.		CORRESPONDENCE
LENGTH	3215.00 FEET	CONSTR. SEC.		
ROADWAY WIDTH	43.00 FEET	CONSTR. STA.	0+	
NUMBER OF SPANS	27	KEY RTE.		
		MARKED RTE.		

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6" +/- CL
C/C BRGS: 85'-4" +/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLDf=0.98; CONSTR.1931

TRUCK TYPE VEH.	SPEC
MEMBER ID.	S 4
SPAN	1
CRITICAL C.P. DIST.	11.4 FEET

MEMBER CAPACITY	SHEAR
DL EFFECT	(KIPS)
	298.8
	51.4

ACTUAL (LL+I) 1045.6 RATE2.LIS ACTUAL (LL+I) 1045.6

INVENTORY RATING HS 23.52 OPERATING RATING HS 37.33
*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
POSTING ANALYSIS

INPUT CODING--
DATE 4/14/11
BY MDB ARCADIS
INVENTORY RATING HS 23.52 OPERATING RATING HS 37.33
LIVE LOAD RATING
HS20 HS 23.52 HS20 HS 37.33
TRUCK TYPE GROSS TONS
VEH. 2F1 48.0
VEH. 3F1 53.0
VEH. 4F1 56.7
STRUCTURE 4800303 D/P STR. ID-- 480-030

STRUCTURE DESCRIPTION-- LOCATION-- MICROFILM REEL NUMBERS--
IDENTIFICATION 4800303 DISTRICT B DESIGN PLANS
TYPE 361 COUNTY LUC COMPUTATIONS
YEAR OF CONSTR. 1931 CONSTR. RTE. CORRESPONDENCE
LENGTH 3215.00 FEET CONSTR. SEC. 0+
ROADWAY WIDTH 43.00 FEET CONSTR. STA.
NUMBER OF SPANS 27 KEY RTE.
MARKED RTE.

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 1E
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 83'-6" +/- CL
C/C BRGS: 85'-4" +/- (OUTSIDE BEAMS); STRUCTURAL STEEL BEAMS, 8.5" CONC
DECK INCLUDES 1" MWS; 9 BEAMS @ 5'-4.5"; NO SKEW
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST SHORT INTERIOR
BM; S04=EXIST SHORT INTERIOR BM; LLDf=0.98; CONSTR.1931

POSTING RATING SUMMARY

TRUCK TYPE MEMBER I.D. SPAN CRITICAL C.P. DIST.	VEH. 2F1 S 4 1 11.4 FEET	TRUCK TYPE MEMBER I.D. SPAN CRITICAL C.P. DIST.	VEH. 3F1 S 4 1 11.4 FEET	TRUCK TYPE MEMBER I.D. SPAN CRITICAL C.P. DIST.	VEH. 4F1 S 3 1 10.0 FEET
SHEAR (KIPS) 298.8 51.4		SHEAR (KIPS) 298.8 51.4		SHEAR (KIPS) 244.9 39.1	
CAPACITY FOR (LL+I) ACTUAL (LL+I)		CAPACITY FOR (LL+I) ACTUAL (LL+I)		CAPACITY FOR (LL+I) ACTUAL (LL+I)	
247.4 77.2		247.4 107.4		205.8 98.1	

REPORT . LIS

DETAIL DATA FOR FLEXURAL MEMBER

DATE 04/14/11									
NO. SPANS = 1									
NOT SYMMETRICAL									
D/P STRUCTURE I.D. 480-030									
MEMBER I.D.--B02									
MATERIAL--SS									
LL DIST. FACT. = 22.830									
SUPERIMPOSED CONCENTRATED DL(S)									
DIST. FROM LT SUPPORT****									

SUPERIMPOSED DISTRIBUTED DL(S)									
LENGTH DISTRIBUTED*****									
DIST. FROM LT SUPPORT***									

SPAN W(LT) W(RT) STIFF SPAN P									
NO. LBS/FT LBS/FT FT. FT. TRANS. LONG. NO. KIPS FT.									
1	32.5	32.5	.000	43.000	T	1	16.4	5.375	
						1	16.4	10.750	
						1	16.4	16.125	
						1	16.4	21.500	
						1	16.4	26.875	
						1	16.4	32.250	
						1	16.4	37.625	

CHECK POINTS RATED--

SPAN DIS FRM	FUNC	SPAN DIS FRM	FUNC
NO. LT SPRT	M VL VR	NO. LT SPRT	M VL VR
FT.		FT.	
1	.000	X	
1	20.750	X	
1	43.000	X	

DETAIL DATA FOR FLEXURAL MEMBER

DATE 04/14/11									
NO. SPANS = 1									
NOT SYMMETRICAL									
D/P STRUCTURE I.D. 480-030									
MEMBER I.D.--G01									
MATERIAL--SS									
LL DIST. FACT. = 3.590									
SUPERIMPOSED CONCENTRATED DL(S)									
DIST. FROM LT SUPPORT****									

SUPERIMPOSED DISTRIBUTED DL(S)									
LENGTH DISTRIBUTED*****									
DIST. FROM LT SUPPORT***									

SPAN W(LT) W(RT) STIFF SPAN P									
NO. LBS/FT LBS/FT FT. FT. TRANS. LONG. NO. KIPS FT.									

REPORT.LIS

CHECK POINTS RATED--					
SPAN NO.	DIS LT	FRM SPRT	FUNC M	VR VL	FUNC M VL VR
FT.					
1	.000	X	X	X	
1	10.000	X	X	X	
1	20.000	X	X	X	

DETAIL DATA FOR FLEXURAL MEMBER

DATE 04/14/11		D/P STRUCTURE I.D. 480-030	
NO. SPANS = 1		MEMBER I.D.--S04	
NOT SYMMETRICAL		MATERIAL--SS	
		LL DIST. FACT. = .980	
		SUPERIMPOSED CONCENTRATED DL(S)	
		DIST. FROM LT SUPPORT*****	
		* STIFF SPAN P * FT.	
		TRANS. LONG. NO. KIPS FT.	
		22.833	

DL DUE TO		MEM. WEIGHT	
SPAN NO.	DIS LT	FRM SPRT	FUNC M
FT.			
1	.000	X	X
1	10.000	X	X
1	20.000	X	X

CHECK POINTS RATED--					
SPAN NO.	DIS LT	FRM SPRT	FUNC M	VR VL	FUNC M VL VR
FT.					
1	.000	X	X	X	
1	11.417	X	X	X	
1	22.833	X	X	X	

BARS RELEASE 5.5

DATE 04/14/11

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--B02
C.P. LOCATION 1.48

SECTION PROPERTIES IN RANGE 3 OF SPAN 1

MODULUS	---
BOTTOM	BOTTOM
+ BEND	- BEND
IN**3	IN**3
1443.3	1443.3

INFLUENCE LINE (SIMPLE SPAN)

MOMENT CAPACITY	TOP		BOTTOM	
	+ BEND T-KIPS	- BEND FT-KIPS	+ BEND T-KIPS	- BEND FT-KIPS
1984.5	2706.2	1984.5	2706.2	1984.5
2706.2	2706.2	2706.2	2706.2	2706.2
2706.2	2706.2	2706.2	2706.2	2706.2
2706.2	2706.2	2706.2	2706.2	2706.2
2706.2	2706.2	2706.2	2706.2	2706.2

ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN)

0	1	2	3	4	5	6	7	8	9	0
F	E	N	T	H		P	O	I	N	T

INVENTORY	16500.0
OPERATING	22500.0
POST VEH1	22500.0
POST VEH2	22500.0
POST VEH3	22500.0
POST SPEC	22500.0

*****	AVAIL.,CAPAC.FOR LL+IMPACT			
	TOP	TOP	BOT	BOT
	+BEND	-BEND	+BEND	-BEND
	F-KPS	F-KPS	F-KPS	F-KPS
ANTORY	1229.9	2739.2	1229.9	2739.2
ATING	1951.5	3460.9	1951.5	3460.9
1	1951.5	3460.9	1951.5	3460.9
2	1951.5	3460.9	1951.5	3460.9
3	1951.5	3460.9	1951.5	3460.9
IAL	1951.5	3460.9	1951.5	3460.9

***** LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .298 FOR +BEND AND = .000 FOR -BEND)

LIVE LOAD	TRUCK				LOAD		DIR	LANE				LOC. CONC LOAD 2 FT.	RATING FACT.	SAFE LOAD CAPACITY TONS	RATING VALUE
	LL+IMP	LL	FT-KIPS	FT-KIPS	LOC. NO. 1 WHEEL FT.	AXLE SPACE FT.		LL+IMP	LL	FT-KIPS	FT-KIPS				
INVT	HS20	+BEND -BEND	1045.6 .0	805.8 .0	.000 .000	R	R	.0 .0	.0 .0	.000 .000	1.176	42.3	HS 23.5		
OPER	HS20	+BEND -BEND	1045.6 .0	805.8 .0	.000 .000	R	R	.0 .0	.0 .0	.000 .000	1.866	67.2	HS 37.3		
POST	2F1	+BEND -BEND	564.3 .0	434.9 .0	.000 .000	R	R	.0 .0	.0 .0	.000 .000	3.458	51.9			
POST	3F1	+BEND -BEND	831.8 .0	641.0 .0	.000 .000	R	R	.0 .0	.0 .0	.000 .000	2.346	54.0			
POST	4F1	+BEND -BEND	919.2 .0	708.4 .0	.000 .000	R	R	.0 .0	.0 .0	.000 .000	2.123	57.3			
POST	SPEC	+BEND -BEND	808.6 .0	623.2 .0	.000 .000	R	R	.0 .0	.0 .0	.000 .000	2.413	96.5			

DETAIL DATA AT MOMENT CHECK POINT FOR

BARS RELEASE 5.5

Project Name: LUC-2-18.62 over Maumee River

Designed By: MDB

Date: 4/14/11

Checked By: SKK

Date: 4/28/11

Input for BARS-PC *Span 7W Load Rating*

General Structure Data

Number of Beams & Spacing:	$No_{beams} := 11$	$Beam_{spa} := 5.375ft$
Haunch Depth & Width:	$d_h := 2in$	$w_h := 6in$
Stringer Top Flange Thickness:	$t_{fl.s} := 0.663in$	Beam type: CB24x70
Stringer Top Flange Width:	$w_{fl.s} := 8.5in$	
Girder Top Flange Thickness:	$t_{fl.g} := 1.5in$	Girder G1W (sheet 116)
Girder Top Flange Width:	$w_{fl.g} := 18in$	
Span Lengths:	Girders	$Span_G := 68.17ft$
	Floorbeams	$Span_F := 43.0ft$
	Stringers	$Span_S := 22.75ft$
Deck Slab Thickness:	$t_{slab} := 8.5in$	
Future Wearing Surface:	$P_{FWS} := 0.060 \frac{kip}{ft^2}$	
Materials:	$?_{conc} := 0.150 \frac{kip}{ft^3}$	$?_{steel} := 0.490 \frac{kip}{ft^3}$
Stay in Place Forms:	$P_{sip} := 15psf$	
Median Barrier:	$A_{median} := 32in \cdot 0.5 \cdot (12in + 24in)$	$A_{median} = 4 \cdot ft^2$
Sidewalk Width:	$w_{walk} := 6ft$	
Sidewalk deck thickness:	$t_{walk} := 5.25in$	

Girders

Distributed load is similar to stringers but includes detail factor. Calculate point loads from floorbeam reactions.

$$\text{Deck} := ?_{\text{conc}} \cdot \text{Beam}_{\text{spa}} \cdot t_{\text{slab}}$$

$$\text{Deck} = 571.1 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Haunch} := ?_{\text{conc}} \cdot \left[(d_h \cdot w_{\text{fl.g}}) + \left[2 \cdot 0.5 \cdot w_h \cdot (d_h + t_{\text{fl.g}}) \right] \right]$$

$$\text{Haunch} = 59.4 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Forms} := P_{\text{sip}} \cdot \left[\text{Beam}_{\text{spa}} - w_{\text{fl.g}} - (2 \cdot w_h) \right]$$

$$\text{Forms} = 43.1 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Median} := A_{\text{median}} \cdot ?_{\text{conc}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Median} = 54.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Guardrail} := 43 \cdot \frac{\text{lbf}}{\text{ft}} \cdot \text{No}_{\text{beams}}^{-1}$$

$$\text{Guardrail} = 3.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{FWS} := P_{\text{FWS}} \cdot \text{Beam}_{\text{spa}} \quad (\text{NOT INCLUDED})$$

$$\text{FWS} = 322.5 \cdot \frac{\text{lbf}}{\text{ft}}$$

$$\text{Area of beam:} \quad A_G := 109.35 \text{ in}^2$$

$$\text{Girder detail factor:} \quad \text{detail}_G := 0.22$$

$$W_{\text{girder}} := (A_G \cdot \text{detail}_G \cdot ?_{\text{steel}}) + \text{Deck} + \text{Haunch} + \text{Forms} + \text{Median} + \text{Guardrail}$$

$$W_{\text{girder}} = 813.9 \cdot \frac{\text{lbf}}{\text{ft}}$$

Seven stringers supported by each floorbeam, half of load to each girder:

$$P_{\text{girder.F}} := 0.5 \cdot \left[\text{Span}_F \cdot \left[W_{\text{floorbeam}} + (A_F \cdot ?_{\text{steel}}) \right] \right] + (7 \cdot P_{\text{floorbeam}}) \quad P_{\text{girder.F}} = 62.0 \cdot \text{kip}$$

Sidewalk bracket loads (see previous analysis for additional framing details):

Fascia Stringer:

$$\text{String}_{\text{fas}} := 37.8 \cdot \frac{\text{lbf}}{\text{ft}}$$

Web Plate:

$$\text{Web} := 622 \text{ lbf}$$

Cantilevered Framing:

$$\text{Frame} := 670 \text{ lbf}$$

Exterior Stringer: CB21.125x64

$$\text{String}_{\text{ext}} := 64 \cdot \frac{\text{lbf}}{\text{ft}}$$

R480030_7W.DAT

```

AA      NEW      X
99480030
01      041411MDB ARCADIS      HS20HS20      2F1 3F1 4F1      *77*      POST
02480030MDB ARCADIS      36131 3215      43 27
03      1 2F10210.0      10      20.0
03      1 3F10312.0      10      17.0
03      1 4F10412.0      10      14.0      4      14.0
03      1SPEC0512.0      12      17.0      4      17.0      31      17.0      4
03      2SPEC 17.0
054800304800303 BLUC
064800301LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7W
064800302LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-
064800303C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
0648003041" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
064800305G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM
08480030G01 01      6802      SS30000      3.59      X
08480030B02 01      4300      SS30000      22.83      X
08480030S03 01      2210      SS30000      0.98
10480030G01 01      W813.9      6806
10480030G01 01      00      P 47.5
10480030G01 01      2209      P 95.1
10480030G01 01      4505      P 95.1
10480030G01 01      6802      P 47.5
10480030B02 01      W 32.5      4300
10480030B02 01      50408      P 16.5
10480030B02 01      1009      P 16.5
10480030B02 01      160108      P 16.5
10480030B02 01      2106      P 16.5
10480030B02 01      261008      P 16.5
10480030B02 01      3203      P 16.5
10480030B02 01      370708      P 16.5
10480030S03 01      W718.9      2210
11480030G01 0101      710      0303
11480030G01 0102      602      0202
11480030G01 0103      4002      0101
11480030G01 0104      602      0202
11480030G01 0105      710      0303
11480030B02 0101      604      0303
11480030B02 0102      211      0202
11480030B02 0103      2406      0101
11480030B02 0104      211      0202
11480030B02 0105      604      0303
11480030S03 0101      2210      0101
12480030G01      01      8701      18P      1.5 86.25
12480030G01      01      02      27      .7585.125
12480030G01      01      03      0.44      82.5 43.5
12480030G01      01      04      27      .75 1.875
12480030G01      01      05      18      1.5 .75
12480030G01      02      85.501      18P      .7585.125
12480030G01      02      02      27      .7584.375
12480030G01      02      03      0.44      82.5 42.75
12480030G01      02      04      27      .75 1.125
12480030G01      02      05      18      .75 .375
12480030G01      03      8401      27P      .7583.625
12480030G01      03      02      0.44      82.5 42
12480030G01      03      03      27      .75 .375
12480030B02      01      61.501      14P      .7561.125
12480030B02      01      02      21      .5 60.5
12480030B02      01      03      .375      59 30.75
12480030B02      01      04      21      .5 1
12480030B02      01      05      14      .75 0.375
12480030B02      02      60.7501      14P      .37560.563
12480030B02      02      02      21      .560.125
12480030B02      02      03      .375      5930.375
12480030B02      02      04      21      .5 0.625
12480030B02      02      05      14      .3750.1875
12480030B02      03      6001      21P      .5 59.75
12480030B02      03      02      .375      59 30
12480030B02      03      03      21      .5 .25
12480030S03      01      2401      8.5P      .66 23.65
12480030S03      01      02      .4      22.68 12
12480030S03      01      03      8.5      .66 .35
16480030G01 01T01      003      C
16480030G01 01B01      003      SPSP 1      003      303
16480030G01 01T02      301      C
16480030G01 01B02      301      SPSP 1      301      301
16480030G01 01T03      1902      C
16480030G01 01B03      1902      SPSP 1      1902      310
16480030G01 01T04      2302      C

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LISTA.LIS

BARS-PC R5.5-MOD 3.0

	RECORD	2F1	3F1	4F1	*77*	POST	REC.NO.
01	041411MDB ARCADIS						100
03	1 2F10210.0 10 20.0						200
03	1 3F10312.0 10 17.0	4	17.0				300
03	1 4F10412.0 10 14.0	4	14.0	4	14.0		400
03	1SPEC0512.0 12 17.0	4	17.0	31	17.0	4	500
03	2SPEC 17.0						600
02480030MDB ARCADIS		36131	3215		43	27	100
054800304800303 BLUC							200
064800301LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7W							300
064800302LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-							400
064800303C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES							500
0648003041" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;							600
064800305G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM							700
08480030B02 01 4300		SS30000	22.83			X	800
08480030G01 01 6802		SS30000	3.59			X	900
08480030S03 01 2210		SS30000	0.98				1000
10480030B02 01		4300					1100
10480030B02 01	50408 W 32.5						1200
10480030B02 01	1009 P 16.5						1300
10480030B02 01	160108 P 16.5						1400
10480030B02 01	2106 P 16.5						1500
10480030B02 01	261008 P 16.5						1600
10480030B02 01	3203 P 16.5						1700
10480030B02 01	370708 P 16.5						1800
10480030G01 01	W813.9	6806					1900
10480030G01 01	00 P 47.5						2000
10480030G01 01	2209 P 95.1						2100
10480030G01 01	4505 P 95.1						2200
10480030G01 01	6802 P 47.5						2300
10480030S03 01	W718.9	2210					2400
11480030B02 0101	604 0303						2500
11480030B02 0102	211 0202						2600
11480030B02 0103	2406 0101						2700
11480030B02 0104	211 0202						2800
11480030B02 0105	604 0303						2900
11480030G01 0101	710 0303						3000
11480030G01 0102	602 0202						3100
11480030G01 0103	4002 0101						3200
11480030G01 0104	602 0202						3300
11480030G01 0105	710 0303						3400
11480030S03 0101	2210 0101						3500
12480030B02	01	61.501	14P	.7561.125			3600
12480030B02	01	02	21	.5 60.5			3700
12480030B02	01	03	.375	59 30.75			3800
12480030B02	01	04	21	.5 1			3900
12480030B02	01	05	14	.75 0.375			4000
12480030B02	02	60.7501	14P	.37560.563			4100
12480030B02	02	02	21	.560.125			4200
12480030B02	02	03	.375	5930.375			4300
12480030B02	02	04	21	.5 0.625			4400
12480030B02	02	05	14	.3750.1875			4500

BARS-PC R5.5-MOD 3.0

	RECORD	6001	21P	.5	59.75	REC.NO.
12480030B02	03	02	.375	59	30	4600
12480030B02	03	03	21	.5	.25	4700
12480030B02	03	03	21	.5	.25	4800
12480030G01	01	8701	18P	1.5	86.25	4900
12480030G01	01	02	27	.7585.125		5000
12480030G01	01	03	0.44	82.5	43.5	5100
12480030G01	01	04	27	.75	1.875	5200
12480030G01	01	05	18	1.5	.75	5300
12480030G01	02	85.501	18P	.7585.125		5400
12480030G01	02	02	27	.7584.375		5500
12480030G01	02	03	0.44	82.5	42.75	5600
12480030G01	02	04	27	.75	1.125	5700
12480030G01	02	05	18	.75	.375	5800
12480030G01	03	8401	27P	.7583.625		5900
12480030G01	03	02	0.44	82.5	42	6000
12480030G01	03	03	27	.75	.375	6100
12480030S03	01	2401	8.5P	.66	23.65	6200
12480030S03	01	02	.4	22.68	12	6300
12480030S03	01	03	8.5	.66	.35	6400
16480030B02 01T01	1007 C					6500
16480030B02 01B01	1007 SPSP 1	1007	20808			6600
16480030B02 01T02	2110 C					6700

STRUCTURE I.D. = 480-030

```

100-- 2      MDB ARCADIS      EA/I/O/P =      FILE REQUESTS AND OUTPUT DATA EXCEPTIONS
              TYPE = 361      YEAR = 31      LEN = 3215.00 FT.      WIDTH = 43.00 FT.
              INV.LL.TRK.=      OP.LL.TRK.=
              27 SPANS SP.LOAD =

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0200-- 5	BRIDGE=4800303 MICROFILM REEL NO.	DIST./CO.= B	LUC	CONST.	ROUTE = COMPUTATIONS= CORRESPONDENCE=	CONST. SECT.=	CONST. STA. =
	ROUTE T D =	DESIGN PLANS=	MARKED ROUTE =				0+

1 LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GRDR SPAN 7W
2 LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-
3 C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
4 1" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
5 G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM
6

MEMBER ID	SPANS	STIFF. SYMM CODE	SPAN 1 (SPAN 4)	SPAN 2 (SPAN 5)	SPAN 3 (SPAN 6)	MATL CODE	ALLOWABLE STRESS FY	FB FC* FC**	LL DIST. FACTOR	END FL-BM DECK	THRU MAX INV	IMPACT OP.	POST SPEC
800--	B 2	X	43.000	.000	.000	SS	30000.00	.00	22.830	.00	.00	.00	.00
900--	G 1	X	68.167	.000	.000	SS	30000.00	.00	3.590	.00	.00	.00	.00
1000-	S 3		22.833	.000	.000	SS	30000.00	.00	.980	.00	.00	.00	.00

MEMBER SYMM.	SPAN	DISTANCE FR. LOAD	LOAD	LENGTH
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MICROFILM REEL NUMBERS --

STRUCTURE DESCRIPTION --	LOCATION --	DESIGN PLANS COMPUTATIONS CORRESPONDENCE
IDENTIFICATION 4800303	DISTRICT B	
TYPE OF CONSTR. 361	COUNTY LUC	
YEAR OF CONSTR. 1931	CONSTR. RTE.	
LENGTH 3215.00 FEET	CONSTR. SEC.	
ROADWAY WIDTH 43.00 FEET	CONSTR. STA.	
NUMBER OF SPANS 27	KEY RTE.	
	MARKED RTE.	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7W
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-
C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
1" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM

TRUCK TYPE VEH. 2F1	TRUCK TYPE VEH. 3F1	TRUCK TYPE VEH. 4F1
MEMBER ID. B 2	MEMBER ID. B 2	MEMBER ID. B 2
SPAN 1	SPAN 1	SPAN 1
CRITICAL C.P. DIST. 20.8 FEET	CRITICAL C.P. DIST. 20.8 FEET	CRITICAL C.P. DIST. 20.8 FEET

MEMBER CAPACITY	MEMBER CAPACITY	MEMBER CAPACITY
DL EFFECT	DL EFFECT	DL EFFECT
2706.2	2706.2	2706.2
758.9	758.9	758.9

CAPACITY FOR (LL+I)	CAPACITY FOR (LL+I)	CAPACITY FOR (LL+I)
ACTUAL (LL+I)	ACTUAL (LL+I)	ACTUAL (LL+I)
1947.2	1947.2	1947.2
564.3	831.8	919.2

POSTING GROSS TONNAGE 51.8

POSTING GROSS TONNAGE 53.8

POSTING GROSS TONNAGE 57.2

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER B 2 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING -- STRUCTURE 4800303 D/P STR. I.D.-- 480-030

DATE 4/14/11	INVENTORY	OPERATING	SPECIAL LOAD
BY MDB ARCADIS	LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
HS20	HS 23.44	HS20	HS 37.25
			VEH.SPEC 96.32

TYPE	361	RATE2.LIS	LUC	COMPUTATIONS
YEAR OF CONSTR.	1931	COUNTY		CORRESPONDENCE
LENGTH	3215.00 FEET	CONSTR. RTE.		
ROADWAY WIDTH	43.00 FEET	CONSTR. SEC.	0+	
NUMBER OF SPANS	27	CONSTR. STA.		
		KEY RTE.		
		MARKED RTE.		

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7W
 LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-
 C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
 1" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
 G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM

INVENTORY RATING SUMMARY --

MEMBER ID.	G 1
SPAN	1
CRITICAL C.P. DIST.	.0 FEET
LIVE LOAD DESIGNATION	HS20

MEMBER CAPACITY	MOMENT
DL EFFECT	(FT. KIPS)
	350.9
	183.5

CAPACITY FOR (LL+I)	337.7
ACTUAL (LL+I)	140.4

INVENTORY RATING	HS 23.84
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OPERATING RATING SUMMARY --

MEMBER ID.	G 1
SPAN	1
CRITICAL C.P. DIST.	.0 FEET
LIVE LOAD DESIGNATION	HS20

MEMBER CAPACITY	MOMENT
DL EFFECT	(FT. KIPS)
	478.5
	183.5

CAPACITY FOR (LL+I)	465.3
ACTUAL (LL+I)	140.4

OPERATING RATING	HS 42.01
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SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
 POSTING ANALYSIS

INPUT CODING --

DATE	4/14/11
BY	MDB ARCADIS

INVENTORY	OPERATING	POSTING
LIVE LOAD	LIVE LOAD	TRUCK TYPE
RATING	RATING	GROSS TONS
HS20	HS 23.84	HS 42.01
		VEH. 2F1
		VEH. 3F1
		VEH. 4F1
		68.65
		70.58
		72.87

D/P STR. I.D.-- 480-030

STRUCTURE DESCRIPTION --

IDENTIFICATION	4800303
TYPE	361
YEAR OF CONSTR.	1931
LENGTH	3215.00 FEET
ROADWAY WIDTH	43.00 FEET

LOCATION --

DISTRICT	B
COUNTY	LUC
CONSTR. RTE.	
CONSTR. SEC.	
CONSTR. STA.	0+

MICROFILM REEL NUMBERS --

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

RATE2.LIS

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7w
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-
C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
1" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM

TRUCK TYPE VEH. SPEC
MEMBER ID. G 1
SPAN 1
CRITICAL C.P. DIST. .0 FEET

MOMENT
(FT. KIPS)
MEMBER CAPACITY 478.5
DL EFFECT 183.5

CAPACITY FOR (LL+I) 465.3
ACTUAL (LL+I) 115.6

POSTING GROSS TONNAGE 102.0

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER S 3 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

INPUT CODING --

DATE 4/14/11
BY MDB ARCADIS

STRUCTURE 4800303

D/P STR. I.D.-- 480-030

INVENTORY RATING OPERATING
LIVE LOAD RATING LIVE LOAD RATING
HS20 HS 28.83 HS20 HS 42.53

STRUCTURE DESCRIPTION --

IDENTIFICATION 4800303
TYPE 361
YEAR OF CONSTR. 1931
LENGTH 3215.00 FEET
ROADWAY WIDTH 43.00 FEET
NUMBER OF SPANS 27

LOCATION --

DISTRICT B
COUNTY LUC
CONSTR. RTE.
CONSTR. SEC.
CONSTR. STA.
KEY RTE.
MARKED RTE.

MICROFILM REEL NUMBERS --

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7w
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-

RATE2.LIS

TRUCK TYPE VEH.	2F1	S 3	TRUCK TYPE VEH.	3F1	S 3	TRUCK TYPE VEH.	4F1	S 3
MEMBER ID.		1	MEMBER ID.		1	MEMBER ID.		1
SPAN		11.4 FEET	SPAN		11.4 FEET	SPAN		11.4 FEET
CRITICAL C.P. DIST.			CRITICAL C.P. DIST.			CRITICAL C.P. DIST.		

SHEAR (KIPS)	298.8	51.4	SHEAR (KIPS)	298.8	51.4	SHEAR (KIPS)	298.8	51.4
MEMBER CAPACITY DL EFFECT			MEMBER CAPACITY DL EFFECT			MEMBER CAPACITY DL EFFECT		
CAPACITY FOR (LL+I) ACTUAL (LL+I)	247.4	77.2	CAPACITY FOR (LL+I) ACTUAL (LL+I)	247.4	107.4	CAPACITY FOR (LL+I) ACTUAL (LL+I)	247.4	117.0
POSTING GROSS TONNAGE	48.0		POSTING GROSS TONNAGE	53.0		POSTING GROSS TONNAGE	57.1	

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER S 3 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING --
DATE 4/14/11
BY MDB ARCADIS
STRUCTURE 4800303
D/P STR. I.D.-- 480-030

INVENTORY	LIVE LOAD	RATING	OPERATING	RATING	SPECIAL LOAD
HS20	HS 28.83	HS20	HS 42.53	VEH.SPEC	97.05

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 361	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE.	CORRESPONDENCE
LENGTH 3215.00 FEET	CONSTR. SEC.	
ROADWAY WIDTH 43.00 FEET	CONSTR. STA.	
NUMBER OF SPANS 27	KEY RTE.	
	MARKED RTE.	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7W
LOADING H20; PID NO.80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"/-
C/C BRGS: 68'-2"/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
1" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM

TRUCK TYPE VEH. SPEC S 3
MEMBER ID.

RATE2.LIS

MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 1984.5 758.9	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 2706.2 758.9
CAPACITY FOR (LL+I) ACTUAL (LL+I)	1225.6 1045.6	CAPACITY FOR (LL+I) ACTUAL (LL+I)	1947.2 1045.6

INVENTORY RATING	HS 23.44	OPERATING RATING	HS 37.25
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*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
POSTING ANALYSIS

STRUCTURE 4800303 D/P STR. ID-- 480-030

INPUT CODING--	INVENTORY	OPERATING	POSTING
DATE 4/14/11	LIVE LOAD	LIVE LOAD	TRUCK TYPE GROSS TONS
BY MDB ARCADIS	HS20 HS 23.44	HS20 HS 37.25	VEH. 2F1 48.0
			VEH. 3F1 53.0
			VEH. 4F1 57.1

MICROFILM REEL NUMBERS--

STRUCTURE DESCRIPTION--

LOCATION--

IDENTIFICATION	4800303	DISTRICT	B
TYPE	361	COUNTY	LUC
YEAR OF CONSTR.	1931	CONSTR. RTE.	
LENGTH	3215.00 FEET	CONSTR. SEC.	0+
ROADWAY WIDTH	43.00 FEET	CONSTR. STA.	
NUMBER OF SPANS	27	KEY RTE.	
		MARKED RTE.	

DESIGN PLANS
COMPUTATIONS
CORRESPONDENCE

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303; TWIN GIRDER SPAN 7W
LOADING H20; PID NO: 80551; MAINTAIN & INSP BY ODOT; SPAN: 68'-10"+/-
C/C BRGS: 68'-2"+/-; STRUCTURAL STEEL BEAMS, 8.5" CONC DECK INCLUDES
1" MWS; 11 BEAMS @ 5'-4.5"; NO SKEW;
G01=EXIST INTERIOR BM; B02=EXIST INTERIOR BM; S03=EXIST INTERIOR BM

POSTING RATING SUMMARY

TRUCK TYPE	VEH. 2F1	TRUCK TYPE	VEH. 4F1
MEMBER I.D.	S 3	MEMBER I.D.	S 3
SPAN	1	SPAN	1
CRITICAL C.P. DIST.	11.4 FEET	CRITICAL C.P. DIST.	11.4 FEET

MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 298.8 51.4	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 298.8 51.4
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CAPACITY FOR (LL+I)	247.4	CAPACITY FOR (LL+I)	247.4
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REPORT.LIS

DETAIL DATA FOR FLEXURAL MEMBER

D/P STRUCTURE I.D. 480-030									
MEMBER I.D.--B02									
MATERIAL--SS									
LL DIST. FACT. = 22.830									
SUPERIMPOSED CONCENTRATED DL(S)									
DIST. FROM LT SUPPORT*****									

SUPERIMPOSED DISTRIBUTED DL(S)									
LENGTH DISTRIBUTED*****									
DIST. FROM LT SUPPORT*****									

SPAN NO. STIFF SPAN P									
NO. LBS/FT W(LT) W(RT) FT. TRANS. LONG. NO. KIPS FT.									
1	32.5	32.5	146.7	146.7	182.5	182.5	218.2	218.2	146.7
2	2.917	2.917	2.917	2.917	2.917	2.917	2.917	2.917	2.917
3	24.500	24.500	24.500	24.500	24.500	24.500	24.500	24.500	24.500
4	2.917	2.917	2.917	2.917	2.917	2.917	2.917	2.917	2.917
5	6.333	6.333	6.333	6.333	6.333	6.333	6.333	6.333	6.333

CHECK POINTS RATED--									
SPAN DIS FRM FUNC SPAN DIS FRM FUNC									
NO. LT SPRT M VL VR NO. LT SPRT M VL VR									
FT.									
1	.000								
1	20.750	X							
1	43.000		X						

DETAIL DATA FOR FLEXURAL MEMBER

D/P STRUCTURE I.D. 480-030									
MEMBER I.D.--G01									
MATERIAL--SS									

REPORT.LIS

CHECK POINTS RATED--									
SPAN DIS FRM		FUNC		SPAN DIS FRM		FUNC			
NO.	LT SPRT	M	VL	VR	NO.	LT SPRT	M	VL	VR
FT.									
1	.000	X	X	X					
1	11.417	X	X	X					
1	22.833	X	X	X					

FLEX.LIS

-BEND .0 .0 .000 R

DETAIL DATA AT MOMENT CHECK POINT FOR
STRUCTURAL STEEL FLEXURAL MEMBER

MEMBER I.D.--G01 1.00
C.P. LOCATION

DATE 04/14/11

SECTION PROPERTIES IN RANGE 1 OF SPAN 1
---NET AREA---

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

***** INFLUENCE LINE (SIMPLE SPAN) *****

SECTION	MODULUS	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3	IN**3
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80
84.00	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80	76.80

FLEX.LIS

POST SPEC +BEND 1536.8 1220.8 18.083 L
-BEND .0 .0 .000 L

3.438 137.5

DETAIL DATA AT MOMENT CHECK POINT FOR
STRUCTURAL STEEL FLEXURAL MEMBER

BARS RELEASE 5.5
D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 2.00

DATE 04/14/11

***** SECTION PROPERTIES IN RANGE 5 OF SPAN 1
---NET AREA---

	GROSS AREA	+ BEND SQ.IN.	- BEND SQ.IN.	IX IN**4	IX IN**4	IX IN**4	IX IN**4	IX IN**4
H IN.	84.00	76.80	76.80	76.80	90762.8	90762.8	90762.8	90762.8

***** INFLUENCE LINE (SIMPLE SPAN)

X-DIST (FT.)	Y-ORDINATE	SPAN	SPAN	SPAN	SPAN	POS AREA
0.000	0.000	68.167	0.000	0.000	0.000	0.000

***** ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN)

	INVENTORY	OPERATING	POST VEH1	POST VEH2	POST VEH3	POST SPEC
T 0	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
E 1	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
N 2	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
T 3	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
H 4	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
5	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
P 6	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
O 7	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
I 8	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
N 9	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0
T 0	16500.0	22500.0	22500.0	22500.0	22500.0	22500.0

***** TOTAL DL
MOMENT EFFECT

FT-KIPS

	POS AREA	NEG AREA	AREA	TOTALS
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0

***** LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .259 FOR +BEND AND = .259 FOR -BEND)

LIVE LOAD	TRUCK LOAD		LANE LOAD		LL+IMP	LL+IMP	AXLE SPACE FT.	DIR	LOC.NO. 1 WHEEL FT.	LOC.CONC LOAD FT.	LOC.CONC LOAD 2 FT.	RATING FACT.	SAFE LOAD CAPACITY TONS	RATING VALUE
	LL+IMP	LL	LL+IMP	LL										
INV HS20 +BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	1.278	46.0	HS 25.6
INV HS20 -BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	1.278	46.0	HS 25.6
OPER HS20 +BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	2.218	79.9	HS 44.4
OPER HS20 -BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	2.218	79.9	HS 44.4
POST 2F1 +BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	4.831	72.5	
POST 2F1 -BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	4.831	72.5	
POST 3F1 +BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	3.241	74.5	
POST 3F1 -BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	3.241	74.5	
POST 4F1 +BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	2.850	77.0	
POST 4F1 -BEND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	2.850	77.0	

4.843	130.8
5.203	208.1

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--S03
C.P. LOCATION

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--S03
C.P. LOCATION

MODULI US-----

-----SECTION-----		MODULUS-----	
TOP	BOTTOM	TOP	BOTTOM
+ BEND	- BEND	+ BEND	- BEND
IN**3	IN**3	IN**3	IN**3
159.3	159.3	159.3	159.3

*****	ALLOWABLE	*****	MOMENT CAPACITY
	STRESS		TOP

[illegible][illegible]

*****		AVAIL. CAPAC. FOR LL+IMPACT					
		TOP		BOT		BOT	
		+BEND	-BEND	+BEND	-BEND	+BEND	-BEND
		F-KPS	F-KPS	F-KPS	F-KPS	F-KPS	F-KPS
1	247.4	167.7	270.4	167.7	232.2	247.4	297.0
2	247.4	247.4	350.1	247.4	297.0	247.4	297.0
3	247.4	247.4	350.1	247.4	297.0	247.4	297.0
4	247.4	247.4	350.1	247.4	297.0	247.4	297.0
5	247.4	247.4	350.1	247.4	297.0	247.4	297.0
6	247.4	247.4	350.1	247.4	297.0	247.4	297.0
7	247.4	247.4	350.1	247.4	297.0	247.4	297.0
8	247.4	247.4	350.1	247.4	297.0	247.4	297.0
9	247.4	247.4	350.1	247.4	297.0	247.4	297.0
10	247.4	247.4	350.1	247.4	297.0	247.4	297.0
11	247.4	247.4	350.1	247.4	297.0	247.4	297.0
12	247.4	247.4	350.1	247.4	297.0	247.4	297.0
13	247.4	247.4	350.1	247.4	297.0	247.4	297.0
14	247.4	247.4	350.1	247.4	297.0	247.4	297.0
15	247.4	247.4	350.1	247.4	297.0	247.4	297.0
16	247.4	247.4	350.1	247.4	297.0	247.4	297.0
17	247.4	247.4	350.1	247.4	297.0	247.4	297.0
18	247.4	247.4	350.1	247.4	297.0	247.4	297.0
19	247.4	247.4	350.1	247.4	297.0	247.4	297.0
20	247.4	247.4	350.1	247.4	297.0	247.4	297.0
21	247.4	247.4	350.1	247.4	297.0	247.4	297.0
22	247.4	247.4	350.1	247.4	297.0	247.4	297.0
23	247.4	247.4	350.1	247.4	297.0	247.4	297.0
24	247.4	247.4	350.1	247.4	297.0	247.4	297.0
25	247.4	247.4	350.1	247.4	297.0	247.4	297.0
26	247.4	247.4	350.1	247.4	297.0	247.4	297.0
27	247.4	247.4	350.1	247.4	297.0	247.4	297.0
28	247.4	247.4	350.1	247.4	297.0	247.4	297.0
29	247.4	247.4	350.1	247.4	297.0	247.4	297.0
30	247.4	247.4	350.1	247.4	297.0	247.4	297.0
31	247.4	247.4	350.1	247.4	297.0	247.4	297.0
32	247.4	247.4	350.1	247.4	297.0	247.4	297.0
33	247.4	247.4	350.1	247.4	297.0	247.4	297.0
34	247.4	247.4	350.1	247.4	297.0	247.4	297.0
35	247.4	247.4	350.1	247.4	297.0	247.4	297.0
36	247.4	247.4	350.1	247.4	297.0	247.4	297.0
37	247.4	247.4	350.1	247.4	297.0	247.4	297.0
38	247.4	247.4	350.1	247.4	297.0	247.4	297.0
39	247.4	247.4	350.1	247.4	297.0	247.4	297.0
40	247.4	247.4	350.1	247.4	297.0	247.4	297.0
41	247.4	247.4	350.1	247.4	297.0	247.4	297.0
42	247.4	247.4	350.1	247.4	297.0	247.4	297.0
43	247.						

RATING FACT	SAFE LOAD CAPACITY	RATING VALUE
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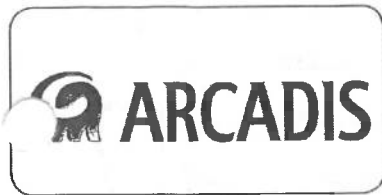
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SUBJECT: LUC-2
BARS-PC SECTION PROPERTIES
JOB NO:

BY:	DATE:
CHKD:	DATE:

PAGE

SHEET

GIRDERS:

$$W1: I_L = 74172 \text{ in}^4 \quad (L8 \times 8 \times 1\frac{1}{8}) \quad \frac{(b/2)(d^3)}{12} + (b/2)d(4y)^2 = \frac{(b/2)(1.125)^3}{12} + (b/2)(1.125)(68.4)^2$$
$$74172 = 0.086 + 2631.7b \rightarrow b \approx 28.18 \quad \text{USE } \underline{28''}$$

$$W2: I_L = 38076 \text{ in}^4 \quad (L8 \times 8 \times 3/4) \quad 0 + (b/2)d(4y)^2 = (b/2)(.75)(59.625)^2$$
$$38076 = 1333b \quad b \approx 28.56 \quad \text{USE } \underline{28''}$$

W3 + W4 ARE SIMILAR TO W1 + W2

$$W5 + W6: I_L = 18073 \quad (L8 \times 8 \times 3/4) \quad 0 + (b/2)(.75)(41.625)^2$$
$$18073 = 649.7b \quad b \approx 27.8 \quad \text{USE } \underline{27''}$$

W7 SIMILAR TO W5 + 6

E1 SIMILAR TO W2

E2-7 SIMILAR TO W2

LUC-2-18.62 Truss Replacement Spans

SFN: 4800303

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River	
SPECIAL ASSUMPTIONS & COMMENTS:	Load rating for replacement span interior beams. No future wearing surface was used in the analysis.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.24	HS-20-44
OPERATING CURRENT DESIGN	2.07	HS-20-44
OHIO LEGAL - 2F1	4.43	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.97	150%
OHIO LEGAL - 4F1	2.58	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.43	OHIO LEGAL - 5C1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	19	2
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River	
SPECIAL ASSUMPTIONS & COMMENTS:	Load rating for replacement span exterior beams. No future wearing surface was used in the analysis.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	1- BARS	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.63	HS-20-44
OPERATING CURRENT DESIGN	2.72	HS-20-44
OHIO LEGAL - 2F1	5.81	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	3.89	150%
OHIO LEGAL - 4F1	3.39	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	3.19	OHIO LEGAL - 5C1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Michael Bucek	Shelly Kendrick, PE.68264	5/2/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
ARCADIS-US	(330) 434 - 1995	Shelly.Kendrick@arcadis-us.com



Project Name: LUC-2 Truss Replacement Spans Int Beams

Designed By: MDB Date: 4/14/11

Checked By: SKK Date: 4/28/11

Input for BARS-PC Steel Beam Design

General Structure Data

Select whether beam is Interior or Exterior Girder:

Beam :=

Interior Girder
Exterior Girder

Beam = "Interior"

Beam Description:

"Enter Text Here"

Number of Beams:

$$No_{beams} := 6$$

Width between Curbs:

$$w_{curbs} := 54\text{ft}$$

Max. Overhang Width:

$$w_{max_oh} := 6.5\text{ft}$$

Min. Overhang Width:

$$w_{min_oh} := 6.5\text{ft}$$

(Edge of Deck to
Centerline of Beam)

$$Avg_{oh} := \frac{w_{max_oh} + w_{min_oh}}{2}$$

$$Avg_{oh} = 6.50\text{ ft}$$

Edge of Slab to Curb:

$$w_b := 7\text{ft}$$

Haunch Depth:

$$d_h := \frac{2.5\text{in} \cdot 134.833 + 2\text{in} \cdot 56}{190.833}$$

$$d_h = 2.35\text{ in}$$

Haunch Width:

$$w_h := 6\text{in}$$

Top Flange Thickness:

$$t_{fl} := \frac{0.875\text{in} \cdot 134.833 + 1.375\text{in} \cdot 56}{190.833}$$

$$t_{fl} = 1.02\text{ in}$$

Top Flange Width:

$$w_{fl} := \frac{12\text{in} \cdot 134.833 + 16\text{in} \cdot 56}{190.833}$$

$$w_{fl} = 13.17\text{ in}$$

Span Lengths:

$$Span_1 := 95.92\text{ft}$$

$$Span_2 := 95.92\text{ft}$$

$$L_{bridge} := Span_1 + Span_2$$

$$L_{bridge} = 191.84\text{ ft}$$

Beam Area:

$$A_{beam1} := 52.5\text{in}^2$$

$$A_{beam2} := 74\text{in}^2$$

Beam Spacing:

$$Beam_{spa} := 11.0\text{ft}$$

Shear Connector Data

Stress Cycles:

(AASHTO Table 10.3.2A)

Average Daily Traffic: ADT := 29640

Design Year: Year := 2030

Truck Traffic, % of ADT: $T_{\%} := 3$

Average Daily Truck Traffic: $ADTT := \frac{T_{\%}}{100} \cdot ADT$ ADTT = 889.2

Stress Cycle Case:

(Formula determines AASHTO Case by comparing ADTT, then selects appropriate number of cycles for fatigue loading.)

Case := $\begin{cases} 1 & \text{if } ADTT \geq 2500 \\ 2 & \text{otherwise} \end{cases}$ Case = 2

$Cycle_{truck} := \begin{cases} 2000000 & \text{if Case} = 1 \\ 500000 & \text{otherwise} \end{cases}$ $Cycle_{truck} = 500000$

$Cycle_{lane} := \begin{cases} 500000 & \text{if Case} = 1 \\ 100000 & \text{otherwise} \end{cases}$ $Cycle_{lane} = 100000$

Shear Studs:

(ODOT 302.4.1.15)

Diameter of Shear Stud: Dia := 0.875in

Area of Shear Stud: $A_{sc} := \frac{\pi}{4} \cdot Dia^2$ $A_{sc} = 0.601 \cdot in^2$

Ultimate Strength of Individual Shear Connector (S_u):

(AASHTO 10.38.5.1.2)

$S_u := \begin{cases} 0.4 \cdot Dia^2 \cdot \sqrt{f_c \cdot E_c} & \text{if } 0.4 \cdot Dia^2 \cdot \sqrt{f_c \cdot E_c} \leq 60000 \cdot psi \cdot A_{sc} \\ 60000 \cdot psi \cdot A_{sc} & \text{otherwise} \end{cases}$ $S_u = 36.08 \cdot kip$

Live Load Distribution Factor (Continued)

Exterior Girder Distribution Factor:

(Formula determines position of Wheel Loads, P, and calculates appropriate Distribution Factor)

Cantilever Scenario Types:

$$\text{Type}_1 := \left(1 - \frac{w_b + 2 \cdot \text{ft} - \text{Avg}_{\text{oh}}}{\text{Beam}_{\text{spa}}} \right)$$

$$\text{Type}_2 := \left(1 - \frac{w_b + 2 \cdot \text{ft} - \text{Avg}_{\text{oh}}}{\text{Beam}_{\text{spa}}} \right) + \left[\frac{(\text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) - (w_b + 2 \cdot \text{ft} + 6 \cdot \text{ft})}{\text{Beam}_{\text{spa}}} \right]$$

$$\text{Type}_3 := \left[1 + \frac{(\text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) - (w_b + 2 \cdot \text{ft} + 6 \cdot \text{ft})}{\text{Beam}_{\text{spa}}} \right]$$

$$\text{DF}_{\text{ext}} := \begin{cases} \text{Type}_1 & \text{if } (w_b + 2 \text{ft} \geq \text{Avg}_{\text{oh}}) \wedge (w_b + 2 \text{ft} + 6 \text{ft} \geq \text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) \\ \text{Type}_2 & \text{if } (w_b + 2 \text{ft} \geq \text{Avg}_{\text{oh}}) \wedge (w_b + 2 \text{ft} + 6 \text{ft} < \text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) \\ \text{Type}_3 & \text{if } (w_b + 2 \text{ft} \leq \text{Avg}_{\text{oh}}) \wedge (w_b + 2 \text{ft} + 6 \text{ft} < \text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) \\ 1.0 & \text{otherwise} \end{cases}$$

$$\text{DF}_{\text{check}} := \begin{cases} \frac{\text{Beam}_{\text{spa}}}{5.5 \cdot (\text{ft})} & \text{if } \text{Beam}_{\text{spa}} \leq 6 \text{ft} \\ \frac{\text{Beam}_{\text{spa}}}{4 \cdot (\text{ft}) + 0.25 \cdot \text{Beam}_{\text{spa}}} & \text{if } 6 \text{ft} < \text{Beam}_{\text{spa}} < 14 \text{ft} \end{cases}$$

Wheel Load Distribution Factor:

(Formula chooses Distribution Factor for either "Interior" or "Exterior" girder selected above and checks the requirements of AASHTO 3.23.2.3.1.5.)

$$\text{DF} := \begin{cases} \text{DF}_{\text{int}} & \text{if } \text{Beam} = \text{"Interior"} \\ \text{DF}_{\text{check}} & \text{if } (\text{DF}_{\text{ext}} < \text{DF}_{\text{check}}) \wedge (\text{Beam} = \text{"Exterior"}) \\ \text{DF}_{\text{ext}} & \text{otherwise} \end{cases}$$

DF = 2.000

Dead Load Calculations

From above, Beam is an Interior or Exterior Girder. Loads calculations follow accordingly.

Beam = "Interior"

Non-Composite Loads:

Determine Contributing Area of Slab per Foot:

$$L_{\text{contribute}} := \begin{cases} \frac{1}{2} \cdot \text{Beam}_{\text{spa}} + \text{Avg}_{\text{oh}} & \text{if Beam = "Exterior"} \\ \text{Beam}_{\text{spa}} & \text{otherwise} \end{cases} \quad L_{\text{contribute}} = 11.00 \text{ ft}$$

$$\text{Haunch} := \begin{cases} d_h \cdot w_{\text{fl}} + 2 \cdot \frac{1}{2} \cdot (d_h + t_{\text{fl}}) \cdot w_h & \text{if Beam = "Interior"} \\ d_h \cdot w_{\text{fl}} + \frac{1}{2} \cdot (d_h + t_{\text{fl}}) \cdot w_h + d_h \cdot \text{Avg}_{\text{oh}} & \text{otherwise} \end{cases} \quad \text{Haunch} = 0.36 \text{ ft}^{2.00}$$

$$\text{Slab Loads: } NC_1 := \begin{cases} (t_{\text{slab}} \cdot L_{\text{contribute}} + \text{Haunch}) \cdot ?_{\text{conc}} & \text{if Beam = "Exterior"} \\ (t_{\text{slab}} \cdot L_{\text{contribute}} + \text{Haunch}) \cdot ?_{\text{conc}} & \text{otherwise} \end{cases}$$

(revised to account for sidewalk slab)

$$NC_1 = 1.325 \cdot \frac{\text{kip}}{\text{ft}}$$

Other_{nc}: **SIP Forms**

$$L_{\text{form}} := \begin{cases} \text{Avg}_{\text{oh}} + \frac{1}{2} \cdot \text{Beam}_{\text{spa}} - w_{\text{fl}} - 2 \cdot w_h & \text{if Beam = "Exterior"} \\ \text{Beam}_{\text{spa}} - w_{\text{fl}} - 2 \cdot w_h & \text{otherwise} \end{cases} \quad L_{\text{form}} = 8.90 \text{ ft}$$

$$\text{Weight of stay-in-place form plus additional concrete: } w_{\text{form}} := 24 \frac{\text{lbf}}{\text{ft}^2}$$

$$NC_2 := L_{\text{form}} \cdot w_{\text{form}}$$

$$NC_2 = 0.214 \cdot \frac{\text{kip}}{\text{ft}}$$

Dead Load Calculations (Continued)

(Enter additional loads here)

Other_{comp}: **Median**

$$A_{\text{other}} := 4\text{ft}^2$$

$$CL_5 := \frac{A_{\text{other}} \cdot \text{conc}}{No_{\text{beams}}}$$

$$CL_5 = 0.100 \cdot \frac{\text{kip}}{\text{ft}}$$

Other_{comp}: **Detail Factor**

$$CL_{6.1} := A_{\text{beam1}} \cdot \text{steel} \cdot 0.11$$

$$CL_{6.1} = 0.020 \cdot \frac{\text{kip}}{\text{ft}}$$

$$CL_{6.2} := A_{\text{beam2}} \cdot \text{steel} \cdot 0.11$$

$$CL_{6.2} = 0.028 \cdot \frac{\text{kip}}{\text{ft}}$$

R480030_WR-ER_I.DAT

```

AA      NEW      X
99480030
01      041411MDB ARCADIS      HS20HS20      2F1 3F1 4F1      *LF*      POST
02480030MDB ARCADIS      32231 3219      54      01 HS20HS20
03      1 2F10210.0      10      20.0
03      1 3F10312.0      10      17.0      4      17.0
03      1 4F10412.0      10      14.0      4      14.0      4      14.0
03      1SPEC0512.0      12      17.0      4      17.0      31      17.0      4
03      2SPEC 17.0
054800304800303 BLUC      SH 2      18.6210421.09      LF      SR2
064800301LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
064800302LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
064800303C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
0648003041" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED INTERIOR BM, LLDF=2.00;
064800305ORIGINAL CONSTR. 1931
08480030G01 02      9511      9511      CSC5000004500 2.00      X
10480030G01 01      W 348.      671100
10480030G01 01      W 356.      280000
10480030G01 02      W 356.      280000
10480030G01 02      W 348.      671100
11480030G01 0101      6711000101
11480030G01 0102      2800000202
11480030G01 0201      2800000202
11480030G01 0202      6711000101
12480030G01      01      61.87501      12P 0.87561.438
12480030G01      01      02      0.5      60      31
12480030G01      01      03      12      1      0.5
12480030G01      02      62.750116.00P 1.375 62.06
12480030G01      02      02      0.50      60.00 31.38
12480030G01      02      0316.00      1.375 0.688
14480030G01 0101      671100C 801      132.09.2512.0 2.5111.09.254.6257.67 5.2160000
14480030G01 0102      280000N 02      132.09.2512.0 2.0
14480030G01 0201      280000N 02      132.09.2512.0 2.0
14480030G01 0202      671100C 801      132.09.2512.0 2.5111.09.254.6257.67 5.2160000
16480030G01 01T01      951100 C
16480030G01 01B01      51100SPSP 1      51100
16480030G01 01B02      600000SPSP 3      200000
16480030G01 01B03      150000SPSP 1      150000
16480030G01 01B04      150000SPNS 1      150000
16480030G01 02T01      951100 C
16480030G01 02B01      150000NSSP 1      150000
16480030G01 02B02      150000SPSP 1      150000
16480030G01 02B03      600000SPSP 3      200000
16480030G01 02B04      51100SPSP 1      51100

```

STRUCTURE I.D. = 480-030

 **
 ** STRUCTURE HEADER AND DESCRIPTION
 **
 **

100-- 2 MDB ARCADIS EA/I/O/P = FILE REQUESTS AND OUTPUT DATA EXCEPTIONS 27 SPANS SP.LOAD =
 TYPE = 322 YEAR = 31 LEN = 3219.00 FT. WIDTH = 54.00 FT.
 INV.LL.TRK.= HS20 OP.LL.TRK.= HS20

 **
 ** STRUCTURE LOCATION AND PERMANENT IDENTIFICATION FACTORS
 **
 **

200-- 5 BRIDGE=4800303 DIST./CO.= B LUC CONST. ROUTE = SH 2 CONST. SECT.= 18.62 CONST. STA.=1042+1..09
 MICROFILM REEL NO. DESIGN PLANS= COMPUTATIONS= CORRESPONDENCE=
 ROUTE I.D.= F MARKED ROUTE = SR2

 **
 ** COMMENTS
 **
 **

300-- 6 1 LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
 400-- 6 2 LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
 500-- 6 3 C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
 600-- 6 4 1" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED INTERIOR BM, LLD=2.00;
 700-- 6 5 ORIGINAL CONSTR. 1931

 **
 ** MEMBER SPECIFICATIONS AND REQUIRED ANALYSIS-GIRDER, STRINGER AND FLOOR BEAM
 **
 **

MEMBER ID	SPANS	STIFF.	SPAN 1 (SPAN 4)	SPAN 2 (SPAN 5)	SPAN 3 (SPAN 6)	MATL CODE	ALLOWABLE STRESS FY	FB	FC	LL DIST. FACTOR	END FL.BM	THRU DECK INV	MAX IMPACT	POST SPEC
800-- 8	G 1	2	X	95.917	95.917	.000	CSC	50000.00	4500.00	2.000	.00	.00	.00	.00

 **
 ** SUPERIMPOSED DEAD LOADS-GIRDERS, STRINGERS AND FLOOR BEAMS
 **
 **

***** RATE2.LIS *****

MEMBER ID	SPAN T/B	RANGE	SUPPORT COND.	SPACES	SPACING DISTANCE	STIFF SPACING
2700--16	G 1	5.917FT. C	SP	0	.000FT.	.000IN.
2800--16	G 1	5.917FT. SP	SP	1	5.917FT.	71.000IN.
2900--16	G 1	60.000FT. C	SP	0	.000FT.	.000IN.
3000--16	G 1	60.000FT. SP	SP	3	20.000FT.	240.000IN.
3100--16	G 1	15.000FT. C	SP	0	.000FT.	.000IN.
3200--16	G 1	15.000FT. SP	SP	1	15.000FT.	180.000IN.
3300--16	G 1	15.000FT. C	NS	0	.000FT.	.000IN.
3400--16	G 1	15.000FT. SP	NS	1	15.000FT.	120.000IN.
3500--16	G 1	15.000FT. C	SP	0	.000FT.	.000IN.
3600--16	G 1	15.000FT. NS	SP	1	15.000FT.	120.000IN.
3700--16	G 1	15.000FT. C	SP	0	.000FT.	.000IN.
3800--16	G 1	15.000FT. SP	SP	1	15.000FT.	180.000IN.
3900--16	G 1	60.000FT. C	SP	0	.000FT.	.000IN.
4000--16	G 1	60.000FT. SP	SP	3	20.000FT.	240.000IN.
4100--16	G 1	5.917FT. C	SP	0	.000FT.	.000IN.
4200--16	G 1	5.917FT. SP	SP	1	5.917FT.	71.000IN.

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

D/P STR. I.D.-- 480-030

STRUCTURE 4800303

INPUT CODING --

DATE 4/14/11
BY MDB ARCADIS

INVENTORY	RATING	OPERATING
LIVE LOAD	LIVE LOAD	RATING
HS20	HS 24.86	HS20 HS 41.43

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 322	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. SH 2	CORRESPONDENCE L
LENGTH 3219.00 FEET	CONSTR. SEC. 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1..09	
NUMBER OF SPANS 27	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

RATE2.LIS
LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
1" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED INTERIOR BM, LLDf=2.00;
ORIGINAL CONSTR. 1931

TRUCK TYPE VEH. 2F1	TRUCK TYPE VEH. 3F1	TRUCK TYPE VEH. 4F1
MEMBER ID. G 1	MEMBER ID. G 1	MEMBER ID. G 1
SPAN 1	SPAN 1	SPAN 1
CRITICAL C.P. DIST. 38.4 FEET	CRITICAL C.P. DIST. 38.4 FEET	CRITICAL C.P. DIST. 38.4 FEET

MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 4589.0 1113.8	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 4589.0 1113.8
CAPACITY FOR (LL+I) ACTUAL (LL+I)	3079.6 695.3	CAPACITY FOR (LL+I) ACTUAL (LL+I)	3079.6 1038.4
POSTING GROSS TONNAGE 66.4		POSTING GROSS TONNAGE 68.2	
		CAPACITY FOR (LL+I) ACTUAL (LL+I)	3079.6 1191.7
		POSTING GROSS TONNAGE 69.8	

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
SPECIAL LOAD ANALYSIS

INPUT CODING -- STRUCTURE 4800303 D/P STR. I.D.-- 480-030

DATE 4/14/11	INVENTORY	OPERATING	SPECIAL LOAD
BY MDB ARCADIS	LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
HS20	HS 24.86	HS20 HS 41.43	VEH. SPEC 97.29

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE OF CONSTR. 322	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. SH 2	CORRESPONDENCE L
LENGTH 3219.00 FEET	CONSTR. SEC. 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1..09	
NUMBER OF SPANS 27	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

INVENTORY RATING SUMMARY	OPERATING RATING SUMMARY
MEMBER I.D. G 1	MEMBER I.D. G 1
SPAN 1	SPAN 1
CRITICAL C.P. DIST. 38.4 FEET	CRITICAL C.P. DIST. 38.4 FEET
LIVE LOAD DESIGNATION HS20	LIVE LOAD DESIGNATION HS20
MEMBER CAPACITY	MEMBER CAPACITY
DL EFFECT	DL EFFECT
CAPACITY FOR (LL+I)	CAPACITY FOR (LL+I)
ACTUAL (LL+I)	ACTUAL (LL+I)

INVENTORY RATING	HS	24.86	OPERATING RATING	HS	41.43
*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5					
POSTING ANALYSIS					

STRUCTURE 4800303					
D/P STR. ID-- 480-030					
INPUT CODING--	INVENTORY	OPERATING	POSTING		
DATE 4/14/11	LIVE LOAD	LIVE LOAD	TRUCK TYPE	GROSS	TONS
BY MDB ARCADIS	HS20	HS	HS20	HS	41.43
VEH. 2F1 66.4					
VEH. 3F1 68.2					
VEH. 4F1 69.8					

STRUCTURE DESCRIPTION--		LOCATION--		MICROFILM REEL NUMBERS--	
IDENTIFICATION	4800303	DISTRICT	B	DESIGN PLANS	
TYPE	322	COUNTY	LUC	COMPUTATIONS	
YEAR OF CONSTR.	1931	CONSTR. RTE.	SH 2	CORRESPONDENCE	L
LENGTH	3219.00 FEET	CONSTR. SEC.	18.62		
ROADWAY WIDTH	54.00 FEET	CONSTR. STA.	1042+1..09		
NUMBER OF SPANS	27	KEY RTE.	F		
		MARKED RTE.	SR2		

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303

LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"

C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES

1" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED INTERIOR BM, LLDF=2.00;

ORIGINAL CONSTR. 1931

SPECIAL LOAD SUMMARY

TRUCK TYPE	RATE2.LIS
MEMBER I.D.	VEH.SPEC
SPAN	G 1
CRITICAL C.P. DIST.	1
	38.4 FEET
SHEAR	
MEMBER CAPACITY	(KIPS)
DL EFFECT	4589.0
	1113.8
CAPACITY FOR (LL+I)	3079.6
ACTUAL (LL+I)	1266.1
POSTING GROSS TONNAGE	97.3

DATE 04/14/11

SECTION PROPERTIES IN COMPOSITE RANGE

1 OF SPAN 1

DETAIL DATA AT MOMENT CHECK POINT FOR
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBER

BARS RELEASE 5.5

D/P STRUCTURE I.D. 480-030

MEMBER I.D.--G01

C.P. LOCATION 1.00

SECTION PROPERTIES IN COMPOSITE RANGE									
---NET AREA---									
	SPAN 1	SPAN 2	SPAN 3	SPAN 4	SPAN 5	SPAN 6	IX	IX	C
	AREA	AREA	AREA	AREA	AREA	AREA	IN**4	IN**4	(BOT) IN
	IN	IN	IN	IN	IN	IN	IN	IN	IN
NON-COM	.00	.00	.00	.00	.00	.00	.00	.00	.00
COM (N=N)	.00	.00	.00	.00	.00	.00	.00	.00	.00
COM (N=3N)	.00	.00	.00	.00	.00	.00	.00	.00	.00
***** INFLUENCE LINE (SIMPLE SPAN)									
(AS)C = .0 SQ. IN. , (DS)C = .0 SQ. IN. BRACE LENGTH = .00 YBAR = .00									
***** ULTIMATE STRENGTH *****									
M1/M2 TOP BOTTOM									
1.0 1.0									
INVENTORY									
OPERATING									
POST VEH1									
POST VEH2									
POST VEH3									
POST SPEC									
***** DL MOMENT *****									
DL EFFECT									
FT-KIPS									
INVENTORY									
OPERATING									
VEH. 1									
VEH. 2									
VEH. 3									
SPECIAL									
***** AVAIL. CAPAC. FOR LL+IMPACT *****									
TOP TOP TOP TOP TOP TOP									
+BEND +BEND +BEND +BEND +BEND +BEND									
F-KIPS F-KIPS F-KIPS F-KIPS F-KIPS F-KIPS									
BOT BOT BOT BOT BOT BOT									
-BEND -BEND -BEND -BEND -BEND -BEND									
F-KIPS F-KIPS F-KIPS F-KIPS F-KIPS F-KIPS									
INVENTORY									
OPERATING									
VEH. 1									
VEH. 2									
VEH. 3									
SPECIAL									

LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .226 FOR +BEND AND = .226 FOR -BEND)									
---TRUCK LOAD---									
	LL+IMP	LL	LOC. NO.	DIR	AXLE SPACE	LL+IMP	LL	LOC. CONC	LOC. CONC
	FT-KIPS	FT-KIPS	1 WHEEL		FT.	FT-KIPS	FT-KIPS	LOAD 2	LOAD 2
	FT.	FT.	FT.		FT.	FT.	FT.	FT.	FT.
INV HS20 +BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
INV HS20 -BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
OPER HS20 +BEND	.0	.0	39.142	L	.0	.0	.0	.000	.000
OPER HS20 -BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
POST 2F1 +BEND	.0	.0	39.142	L	.0	.0	.0	.000	.000
POST 2F1 -BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
POST 3F1 +BEND	.0	.0	47.957	L	.0	.0	.0	.000	.000
POST 3F1 -BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
POST 4F1 +BEND	.0	.0	47.955	L	.0	.0	.0	.000	.000
POST 4F1 -BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
POST SPEC +BEND	.0	.0	47.549	L	.0	.0	.0	.000	.000
POST SPEC -BEND	.0	.0	.000	L	.0	.0	.0	.000	.000
***** RATING FACT. SAFE LOAD CAPACITY TONS *****									
INV	3.556	128.0	HS	71.1					
OPER	5.927	213.4	HS	118.5					
POST 2F1	13.120	196.8							
POST 3F1	8.761	201.5							
POST 4F1	7.666	207.0							
POST SPEC	6.687	267.5							

DATE 04/14/11

SECTION PROPERTIES IN COMPOSITE RANGE

DATE 04/14/11

SECTION PROPERTIES IN COMPOSITE RANGE

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SECTION PROPERTIES IN COMPOSITE RANGE

DATE 04/14/11

FLEX.LIS

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 3.00

***** SECTION PROPERTIES IN COMPOSITE RANGE									
---NET AREA---									
		20F SPAN 2		20F SPAN 2		20F SPAN 2		20F SPAN 2	
		GROSS		BEND		BEND		BEND	
		AREA		SQ.IN.		SQ.IN.		SQ.IN.	
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Project Name: LUC-2 Truss Replacement Spans Ext Beams

Designed By: MDB Date: 4/14/11

Checked By: SKK Date: 4/28/11

Input for BARS-PC Steel Beam Design

General Structure Data

Select whether beam is Interior or Exterior Girder:

Beam :=

Interior Girder
Exterior Girder

Beam = "Exterior"

Beam Description:

"Enter Text Here"

Number of Beams:

$$No_{beams} := 6$$

Width between Curbs:

$$w_{curbs} := 54\text{ft}$$

Max. Overhang Width:

$$w_{max_oh} := 6.5\text{ft}$$

Min. Overhang Width:

$$w_{min_oh} := 6.5\text{ft}$$

(Edge of Deck to
Centerline of Beam)

$$Avg_{oh} := \frac{w_{max_oh} + w_{min_oh}}{2}$$

$$Avg_{oh} = 6.50\text{ ft}$$

Edge of Slab to Curb:

$$w_b := 7\text{ft}$$

Haunch Depth:

$$d_h := \frac{2.5\text{in} \cdot 134.833 + 2\text{in} \cdot 56}{190.833}$$

$$d_h = 2.35\text{ in}$$

Haunch Width:

$$w_h := 6\text{in}$$

Top Flange Thickness:

$$t_{fl} := \frac{0.875\text{in} \cdot 134.833 + 1.375\text{in} \cdot 56}{190.833}$$

$$t_{fl} = 1.02\text{ in}$$

Top Flange Width:

$$w_{fl} := \frac{12\text{in} \cdot 134.833 + 16\text{in} \cdot 56}{190.833}$$

$$w_{fl} = 13.17\text{ in}$$

Span Lengths:

$$Span_1 := 95.92\text{ft}$$

$$Span_2 := 95.92\text{ft}$$

$$L_{bridge} := Span_1 + Span_2$$

$$L_{bridge} = 191.84\text{ ft}$$

Beam Area:

$$A_{beam1} := 52.5\text{in}^2$$

$$A_{beam2} := 74\text{in}^2$$

Beam Spacing:

$$Beam_{spa} := 11.0\text{ft}$$

Shear Connector Data

Stress Cycles:

(AASHTO Table 10.3.2A)

Average Daily Traffic: ADT := 29640

Design Year: Year := 2030

Truck Traffic, % of ADT: $T_{\%} := 3$

Average Daily Truck Traffic: $ADTT := \frac{T_{\%}}{100} \cdot ADT$ ADTT = 889.2

Stress Cycle Case:

(Formula determines AASHTO Case by comparing ADTT, then selects appropriate number of cycles for fatigue loading.)

Case := $\begin{cases} 1 & \text{if } ADTT \geq 2500 \\ 2 & \text{otherwise} \end{cases}$ Case = 2

$Cycle_{truck} := \begin{cases} 2000000 & \text{if Case} = 1 \\ 500000 & \text{otherwise} \end{cases}$ $Cycle_{truck} = 500000$

$Cycle_{lane} := \begin{cases} 500000 & \text{if Case} = 1 \\ 100000 & \text{otherwise} \end{cases}$ $Cycle_{lane} = 100000$

Shear Studs:

(ODOT 302.4.1.15)

Diameter of Shear Stud: Dia := 0.875in

Area of Shear Stud: $A_{sc} := \frac{\pi}{4} \cdot Dia^2$ $A_{sc} = 0.601 \cdot in^2$

Ultimate Strength of Individual Shear Connector (S_u):

(AASHTO 10.38.5.1.2)

$S_u := \begin{cases} 0.4 \cdot Dia^2 \cdot \sqrt{f_c \cdot E_c} & \text{if } 0.4 \cdot Dia^2 \cdot \sqrt{f_c \cdot E_c} \leq 60000 \cdot psi \cdot A_{sc} \\ 60000 \cdot psi \cdot A_{sc} & \text{otherwise} \end{cases}$ $S_u = 36.08 \cdot kip$

Live Load Distribution Factor (Continued)

Exterior Girder Distribution Factor:

(Formula determines position of Wheel Loads, P , and calculates appropriate Distribution Factor)

Cantilever Scenario Types:

$$\begin{aligned} \text{Type}_1 &:= \left(1 - \frac{w_b + 2 \cdot \text{ft} - \text{Avg}_{\text{oh}}}{\text{Beam}_{\text{spa}}} \right) \\ \text{Type}_2 &:= \left(1 - \frac{w_b + 2 \cdot \text{ft} - \text{Avg}_{\text{oh}}}{\text{Beam}_{\text{spa}}} \right) + \left[\frac{(\text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) - (w_b + 2 \cdot \text{ft} + 6 \cdot \text{ft})}{\text{Beam}_{\text{spa}}} \right] \\ \text{Type}_3 &:= \left[1 + \frac{(\text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) - (w_b + 2 \cdot \text{ft} + 6 \cdot \text{ft})}{\text{Beam}_{\text{spa}}} \right] \end{aligned}$$

$$\text{DF}_{\text{ext}} := \begin{cases} \text{Type}_1 & \text{if } (w_b + 2 \text{ft} \geq \text{Avg}_{\text{oh}}) \wedge (w_b + 2 \text{ft} + 6 \text{ft} \geq \text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) \\ \text{Type}_2 & \text{if } (w_b + 2 \text{ft} \geq \text{Avg}_{\text{oh}}) \wedge (w_b + 2 \text{ft} + 6 \text{ft} < \text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) \\ \text{Type}_3 & \text{if } (w_b + 2 \text{ft} \leq \text{Avg}_{\text{oh}}) \wedge (w_b + 2 \text{ft} + 6 \text{ft} < \text{Avg}_{\text{oh}} + \text{Beam}_{\text{spa}}) \\ 1.0 & \text{otherwise} \end{cases}$$

$$\text{DF}_{\text{ext}} = 1.00$$

$$\text{DF}_{\text{check}} := \begin{cases} \frac{\text{Beam}_{\text{spa}}}{5.5 \cdot (\text{ft})} & \text{if } \text{Beam}_{\text{spa}} \leq 6 \text{ft} \\ \frac{\text{Beam}_{\text{spa}}}{4 \cdot (\text{ft}) + 0.25 \cdot \text{Beam}_{\text{spa}}} & \text{if } 6 \text{ft} < \text{Beam}_{\text{spa}} < 14 \text{ft} \end{cases}$$

$$\text{DF}_{\text{check}} = 1.63$$

Wheel Load Distribution Factor:

(Formula chooses Distribution Factor for either "Interior" or "Exterior" girder selected above and checks the requirements of AASHTO 3.23.2.3.1.5.)

$$\text{DF} := \begin{cases} \text{DF}_{\text{int}} & \text{if Beam} = \text{"Interior"} \\ \text{DF}_{\text{check}} & \text{if } (\text{DF}_{\text{ext}} < \text{DF}_{\text{check}}) \wedge (\text{Beam} = \text{"Exterior"}) \\ \text{DF}_{\text{ext}} & \text{otherwise} \end{cases}$$

$$\text{DF} = 1.630$$



Dead Load Calculations

From above, Beam is an Interior or Exterior Girder. Loads calculations follow accordingly.

Beam = "Exterior"

Non-Composite Loads:

Determine Contributing Area of Slab per Foot:

$$L_{\text{contribute}} := \begin{cases} \frac{1}{2} \cdot \text{Beam}_{\text{spa}} + \text{Avg}_{\text{oh}} & \text{if Beam} = \text{"Exterior"} \\ \text{Beam}_{\text{spa}} & \text{otherwise} \end{cases} \quad L_{\text{contribute}} = 12.00 \text{ ft}$$

$$\text{Haunch} := \begin{cases} d_h \cdot w_{\text{fl}} + 2 \cdot \frac{1}{2} \cdot (d_h + t_{\text{fl}}) \cdot w_h & \text{if Beam} = \text{"Interior"} \\ d_h \cdot (w_{\text{fl}} + 4\text{in}) + \frac{1}{2} \cdot (d_h + t_{\text{fl}}) \cdot w_h & \text{otherwise} \end{cases} \quad \text{Haunch} = 0.35 \text{ ft}^{2.00}$$

(4" cover beyond edge of flange before forming sidewalk)

$$\text{Slab Loads: } NC_1 := \begin{cases} (t_{\text{slab}} \cdot L_{\text{contribute}} + \text{Haunch}) \cdot ?_{\text{conc}} & \text{if Beam} = \text{"Exterior"} \\ (t_{\text{slab}} \cdot L_{\text{contribute}} + \text{Haunch}) \cdot ?_{\text{conc}} & \text{otherwise} \end{cases}$$

(revised to account for sidewalk slab)

$$NC_1 = 1.440 \cdot \frac{\text{kip}}{\text{ft}}$$

Other_{nc}: **SIP Forms**

$$L_{\text{form}} := \begin{cases} \text{Avg}_{\text{oh}} + \frac{1}{2} \cdot \text{Beam}_{\text{spa}} - w_{\text{fl}} - 2 \cdot w_h & \text{if Beam} = \text{"Exterior"} \\ \text{Beam}_{\text{spa}} - w_{\text{fl}} - 2 \cdot w_h & \text{otherwise} \end{cases} \quad L_{\text{form}} = 9.90 \text{ ft}$$

$$\text{Weight of stay-in-place form plus additional concrete: } w_{\text{form}} := 24 \frac{\text{lb}}{\text{ft}^2}$$

$$NC_2 := L_{\text{form}} \cdot w_{\text{form}}$$

$$NC_2 = 0.238 \cdot \frac{\text{kip}}{\text{ft}}$$



Dead Load Calculations (Continued)

(Enter additional loads here)

Other_{comp}: **Median**

$$A_{\text{other}} := 4\text{ft}^2$$

$$CL_5 := \frac{A_{\text{other}} \cdot \text{conc}}{N_{\text{beams}}}$$

$$CL_5 = 0.100 \cdot \frac{\text{kip}}{\text{ft}}$$

Other_{comp}: **Cantilever**

$$W_{\text{beam}} := 55 \frac{\text{lbf}}{\text{ft}}$$

W24x55

$$W_{\text{frame}} := \left(58 \frac{\text{lbf}}{\text{ft}} \right) \cdot (6\text{ft} \cdot 11)$$

(MC18x58 members)

$$CL_6 := W_{\text{beam}} + \frac{W_{\text{frame}}}{L_{\text{bridge}}}$$

$$CL_6 = 0.075 \cdot \frac{\text{kip}}{\text{ft}}$$

Other_{comp}: **Detail Factor**

$$CL_{7.1} := A_{\text{beam1}} \cdot \text{steel} \cdot 0.11$$

$$CL_{7.1} = 0.020 \cdot \frac{\text{kip}}{\text{ft}}$$

$$CL_{7.2} := A_{\text{beam2}} \cdot \text{steel} \cdot 0.11$$

$$CL_{7.2} = 0.028 \cdot \frac{\text{kip}}{\text{ft}}$$

R480030_WR-ER_E.DAT

```

AA      NEW      X
99480030
01      041411MDB ARCADIS      HS20HS20      2F1 3F1 4F1      *LF*      POST
02480030MDB ARCADIS      32231 3219      54      01 HS20HS20
03      1 2F10210.0      10      20.0
03      1 3F10312.0      10      17.0      4      17.0
03      1 4F10412.0      10      14.0      4      14.0      4      14.0
03      1SPEC0512.0      12      17.0      4      17.0      31      17.0      4
03      2SPEC 17.0
054800304800303 BLUC      SH 2      18.6210421.09      LF      SR2
064800301LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
064800302LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
064800303C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
0648003041" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED EXTERIOR BM, LLDF=1.63;
064800305ORIGINAL CONSTR. 1931
08480030G01 02      9511      9511      CSC5000004500 1.63      X
10480030G01 01      W 538.      671100
10480030G01 01      W 546.      280000
10480030G01 02      W 546.      280000
10480030G01 02      W 538.      671100
11480030G01 0101      6711000101
11480030G01 0102      2800000202
11480030G01 0201      2800000202
11480030G01 0202      6711000101
12480030G01      01      61.87501      12P 0.87561.438
12480030G01      01      02      0.5      60      31
12480030G01      01      03      12      1      0.5
12480030G01      02      62.750116.00P 1.375 62.06
12480030G01      02      02      0.50      60.00      31.38
12480030G01      02      0316.00      1.375 0.688
14480030G01 0101      671100C 801      74.09.2512.0 2.5 74.09.254.6254.60 5.0860000
14480030G01 0102      280000N 02      74.09.2512.0 2.0
14480030G01 0201      280000N 02      74.09.2512.0 2.0
14480030G01 0202      671100C 801      74.09.2512.0 2.5 74.09.254.6254.60 5.0860000
16480030G01 01T01      951100 C
16480030G01 01B01      51100SPSP 1      51100
16480030G01 01B02      600000SPSP 3      200000
16480030G01 01B03      150000SPSP 1      150000
16480030G01 01B04      150000SPNS 1      150000
16480030G01 02T01      951100 C
16480030G01 02B01      150000Nssp 1      150000
16480030G01 02B02      150000SPSP 1      150000
16480030G01 02B03      600000SPSP 3      200000
16480030G01 02B04      51100SPSP 1      51100

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STRUCTURE I.D. = 480-030

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100--- 2      MDB ARCADIS      EA/I/O/P =      FILE REQUESTS AND OUTPUT DATA EXCEPTIONS
              TYPE = 322 YEAR = 31 LEN = 3219.00 FT. WIDTH = 54.00 FT.
              INV.LL, TRK. = HS20 OP.LL, TRK. = HS20
              27 SPANS SP. LOAD =

```

200--- 5 BRIDGE=4800303 DIST./CO.= B LUC CONST. ROUTE = SH 2 CONST. SECT.= 18.62
MICROFILM REEL NO. DESIGN PLANS= COMPUTATIONS= CORRESPONDENCE=
ROUTE I.D.= F. MARKED ROUTE = SR2

1 LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
2 LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
3 C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
4 1" MWIS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED EXTERIOR BM, LLDF=1.63;
5 ORIGINAL CONSTR. 1931

MEMBER ID	SPANS	STIFF. SYMM	SPAN 1 (SPAN 4)	SPAN 2 (SPAN 5)	SPAN 3 (SPAN 6)	MATL CODE	ALLOWABLE STRESS FY	LL DIST. FC**	END FL. BM	THRU DECK	MAX INV	IMPACT OP.	FACTOR	POST SPEC	
800--	8	G 1	2	X	95.917	95.917	.000	CSC	50000.00	4500.00	1.630	.00	.00	.00	.00

MEMBER ID	SYMM.	SPAN NO.	DISTANCE LEFT SUPP.	FR. TYPE	LOAD P OR W(L)	LOAD W(R)	LENGTH
1		1	0.0	1	1.0	1.0	10.0
2		2	10.0	1	1.0	1.0	10.0
3		3	20.0	1	1.0	1.0	10.0
4		4	30.0	1	1.0	1.0	10.0
5		5	40.0	1	1.0	1.0	10.0
6		6	50.0	1	1.0	1.0	10.0
7		7	60.0	1	1.0	1.0	10.0
8		8	70.0	1	1.0	1.0	10.0
9		9	80.0	1	1.0	1.0	10.0
10		10	90.0	1	1.0	1.0	10.0
11		11	100.0	1	1.0	1.0	10.0
12		12	110.0	1	1.0	1.0	10.0
13		13	120.0	1	1.0	1.0	10.0
14		14	130.0	1	1.0	1.0	10.0
15		15	140.0	1	1.0	1.0	10.0
16		16	150.0	1	1.0	1.0	10.0
17		17	160.0	1	1.0	1.0	10.0
18		18	170.0	1	1.0	1.0	10.0
19		19	180.0	1	1.0	1.0	10.0
20		20	190.0	1	1.0	1.0	10.0
21		21	200.0	1	1.0	1.0	10.0
22		22	210.0	1	1.0	1.0	10.0
23		23	220.0	1	1.0	1.0	10.0
24		24	230.0	1	1.0	1.0	10.0
25		25	240.0	1	1.0	1.0	10.0
26		26	250.0	1	1.0	1.0	10.0
27		27	260.0	1	1.0	1.0	10.0
28		28	270.0	1	1.0	1.0	10.0
29		29	280.0	1	1.0	1.0	10.0
30		30	290.0	1	1.0	1.0	10.0
31		31	300.0	1	1.0	1.0	10.0
32		32	310.0	1	1.0	1.0	10.0
33		33	320.0	1	1.0	1.0	10.0
34		34	330.0	1	1.0	1.0	10.0
35		35	340.0	1	1.0	1.0	10.0
36		36	350.0	1	1.0	1.0	10.0
37		37	360.0	1	1.0	1.0	10.0
38		38	370.0	1	1.0	1.0	10.0
39		39	380.0	1	1.0	1.0	10.0
40		40	390.0	1	1.0	1.0	10.0
41		41	400.0	1	1.0	1.0	10.0
42		42	410.0	1	1.0	1.0	10.0
43		43	420.0	1	1.0	1.0	10.0
44		44	430.0	1	1.0	1.0	10.0
45		45	440.0	1	1.0	1.0	10.0
46		46	450.0	1	1.0	1.0	10.0
47		47	460.0	1	1.0	1.0	10.0
48		48	470.0	1	1.0	1.0	10.0
49		49	480.0	1	1.0	1.0	10.0
50		50	490.0	1	1.0	1.0	10.0
51		51	500.0	1	1.0	1.0	10.0
52		52	510.0	1	1.0	1.0	10.0
53		53	520.0	1	1.0	1.0	10.0
54		54	530.0	1	1.0	1.0	10.0
55		55	540.0				

3000--16	G 1	1	B 2	60.000FT.SP	SP	RATE2.LIS
3100--16	G 1	1	T 3	15.000FT.C		3 20.000FT. 240.000IN.
3200--16	G 1	1	B 3	15.000FT.SP	SP	0 15.000FT. .000IN.
3300--16	G 1	1	T 4	15.000FT.C		0 15.000FT. 180.000IN.
3400--16	G 1	1	B 4	15.000FT.SP	NS	1 15.000FT. 120.000IN.
3500--16	G 1	2	T 1	15.000FT.C		0 15.000FT. .000IN.
3600--16	G 1	2	B 1	15.000FT.NS	SP	1 15.000FT. 120.000IN.
3700--16	G 1	2	T 2	15.000FT.C		0 15.000FT. .000IN.
3800--16	G 1	2	B 2	15.000FT.SP	SP	1 15.000FT. 180.000IN.
3900--16	G 1	2	T 3	60.000FT.C		0 15.000FT. .000IN.
4000--16	G 1	2	B 3	60.000FT.SP	SP	3 20.000FT. 240.000IN.
4100--16	G 1	2	T 4	5.917FT.C		0 15.000FT. .000IN.
4200--16	G 1	2	B 4	5.917FT.SP	SP	1 5.917FT. 71.000IN.

SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER G 1 BARS-PC RELEASE 5.5
INVENTORY AND/OR OPERATING ANALYSIS

INPUT CODING -- STRUCTURE 4800303 D/P STR. I.D.-- 480-030

DATE 4/14/11	INVENTORY	RATING	OPERATING
BY MDB ARCADIS	LIVE LOAD	LIVE LOAD	RATING
	HS20	HS 32.64	HS20 HS 54.40

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 322	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. SH 2	CORRESPONDENCE L
LENGTH 3219.00 FEET	CONSTR. SEC. 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1..09	
NUMBER OF SPANS 27	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
1" MMS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED EXTERIOR BM, LLDf=1.63;
ORIGINAL CONSTR. 1931

INVENTORY RATING SUMMARY --	OPERATING RATING SUMMARY --
MEMBER ID. G 1	MEMBER ID. G 1
SPAN 1	SPAN 1
CRITICAL C.P. DIST. 38.4 FEET	CRITICAL C.P. DIST. 38.4 FEET

MEMBER CAPACITY		RATE2.LIS		SHEAR	
(KIPS)		(KIPS)		(KIPS)	
4475.1		4475.1		4475.1	
942.7		942.7		942.7	
MEMBER CAPACITY		MEMBER CAPACITY		MEMBER CAPACITY	
DL EFFECT		DL EFFECT		DL EFFECT	
3277.2		3277.2		3277.2	
563.8		842.0		966.2	
CAPACITY FOR (LL+I)		CAPACITY FOR (LL+I)		CAPACITY FOR (LL+I)	
ACTUAL (LL+I)		ACTUAL (LL+I)		ACTUAL (LL+I)	
87.2		89.5		91.6	
POSTING GROSS TONNAGE		POSTING GROSS TONNAGE		POSTING GROSS TONNAGE	
87.2		89.5		91.6	

INPUT CODING -- STRUCTURE 4800303 D/P STR. I.D.-- 480-030

DATE 4/14/11	INVENTORY	OPERATING	SPECIAL LOAD
BY MDB ARCADIS	LIVE LOAD	RATING	TRUCK TYPE GROSS TONS
HS20	HS 32.64	HS 54.40	VEH. SPEC 127.73

STRUCTURE DESCRIPTION --	LOCATION --	MICROFILM REEL NUMBERS --
IDENTIFICATION 4800303	DISTRICT B	DESIGN PLANS
TYPE 322	COUNTY LUC	COMPUTATIONS
YEAR OF CONSTR. 1931	CONSTR. RTE. SH 2	CORRESPONDENCE L
LENGTH 3219.00 FEET	CONSTR. SEC. 18.62	
ROADWAY WIDTH 54.00 FEET	CONSTR. STA. 1042+1..09	
NUMBER OF SPANS 27	KEY RTE. F	
	MARKED RTE. SR2	

ANALYST REMARKS --

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
 LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
 C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
 1" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED EXTERIOR BM, LLDF=1.63;
 ORIGINAL CONSTR. 1931

TRUCK TYPE VEH. SPEC	G 1
MEMBER ID.	1
SPAN	38.4 FEET
CRITICAL C.P. DIST.	38.4 FEET

MEMBER CAPACITY	SHEAR
DL EFFECT	(KIPS)
	4475.1
	942.7

RATE2.LIS

INVENTORY RATING HS 32.64 OPERATING RATING HS 54.40
 *** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
 POSTING ANALYSIS

STRUCTURE 4800303 D/P STR. ID-- 480-030

INPUT CODING--
 DATE 4/14/11
 BY MDB ARCADIS
 INVENTORY
 LIVE LOAD RATING
 HS20 HS 32.64 HS20 HS 54.40
 POSTING
 TRUCK TYPE GROSS TONS
 VEH. 2F1 87.2
 VEH. 3F1 89.5
 VEH. 4F1 91.6

STRUCTURE DESCRIPTION-- LOCATION-- MICROFILM REEL NUMBERS--
 IDENTIFICATION 4800303 DISTRICT B DESIGN PLANS
 TYPE 322 COUNTY LUC COMPUTATIONS
 YEAR OF CONSTR. 1931 CONSTR. RTE. SH 2 CORRESPONDENCE L
 LENGTH 3219.00 FEET 18.62
 ROADWAY WIDTH 54.00 FEET 1042+1..09
 NUMBER OF SPANS 27 KEY RTE. F
 MARKED RTE. SR2

ANALYST REMARKS--

LUC-2-18.62 SR 2 OVER MAUMEE RIVER; SFN: 4800303
 LOADING H20; PID NO. 80551; MAINTAIN & INSP BY ODOT; SPAN: 2 X 95'-11"
 C/C BRGS.; BUILT-UP PLATE GIRDERS, 9.25" COMPOSITE CONC DECK INCLUDES
 1" MWS; 6 BEAMS @11'-0"; NO SKEW, G01=PROPOSED EXTERIOR BM, LLDF=1.63;
 ORIGINAL CONSTR. 1931

POSTING RATING SUMMARY

TRUCK TYPE MEMBER I.D. SPAN CRITICAL C.P. DIST.	VEH. 2F1 G 1 1 38.4 FEET	TRUCK TYPE MEMBER I.D. SPAN CRITICAL C.P. DIST.	VEH. 3F1 G 1 1 38.4 FEET	TRUCK TYPE MEMBER I.D. SPAN CRITICAL C.P. DIST.	VEH. 4F1 G 1 1 38.4 FEET
MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 4475.1 942.7	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 4475.1 942.7	MEMBER CAPACITY DL EFFECT	SHEAR (KIPS) 4475.1 942.7
CAPACITY FOR (LL+I) ACTUAL (LL+I)	3277.2 563.8	CAPACITY FOR (LL+I) ACTUAL (LL+I)	3277.2 842.0	CAPACITY FOR (LL+I) ACTUAL (LL+I)	3277.2 966.2

POSTING GROSS TONNAGE 87.2 POSTING GROSS TONNAGE 89.5 POSTING GROSS TONNAGE 91.6

*** FINAL SUMMARY OF RATING RESULTS FOR --- STRUCTURE ID. 480-030 BARS-PC RELEASE 5.5
 SPECIAL LOAD ANALYSIS

STRUCTURE 4800303 D/P STR. ID-- 480-030

REPORT.LIS

DETAIL DATA FOR FLEXURAL MEMBER

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
MATERIAL--CSC

DATE 04/14/11

NO. SPANS = 2
NOT SYMMETRICAL

LL DIST. FACT. = 1.630
SUPERIMPOSED CONCENTRATED DL(S)
DIST. FROM LT SUPPORT*****

SUPERIMPOSED DISTRIBUTED DL(S)
LENGTH DISTRIBUTED*****
DIST. FROM LT SUPPORT*****

VAR CODE
S T T P B
SEC.NO. LT RT
1 01 01
2 02 02
2 02 02
2 01 01

SPAN LENGTH RING. LENGTH
NO. FT. NO. FT.
1 95.917 1 67.917
2 28.000 2 28.000
2 95.917 1 28.000
2 67.917 2 67.917

DL DUE TO MEM. WEIGHT
W(LT) W(RT)
LBS/FT LBS/FT
178.6 178.6
251.8 251.8
178.6 178.6

SPAN NO. LBS/FT W(RT) FT.
1 538.0 538.0 .000
1 546.0 546.0 .000
2 546.0 546.0 95.917
2 538.0 538.0 95.917

STIFF SPAN NO. KIPS FT.
TRANS. LONG. NO. KIPS FT.
67.917 T
28.000
28.000
67.917

CHECK POINTS RATED--
SPAN DIS FRM FUNC SPAN DIS FRM FUNC
NO. LT SPRT M VL VR NO. LT SPRT M VL VR
FT. FT.

1 .000 X X
1 38.367 X X X
2 .000 X X X
2 57.550 X X X
2 95.917 X X

FLEX.LIS

POST SPEC +BEND .0 .0 47.549 L
-BEND .0 .0 .000 L

8.367 334.7

DATE 04/14/11

DETAIL DATA AT MOMENT CHECK POINT FOR
COMPOSITE STEEL AND CONCRETE FLEXURAL MEMBER

BARS RELEASE 5.5

D/P STRUCTURE I.D. 480-030
MEMBER I.D.--G01
C.P. LOCATION 1.40

***** SECTION PROPERTIES IN COMPOSITE RANGE 1 OF SPAN 1

	---NET AREA---				SECTION				MODULUS			
	GROSS	+ BEND	- BEND	IX	TOP	+ BEND	- BEND	TOP	+ BEND	- BEND	TOP	BOTTOM
	AREA	IN.	SQ.IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
NON-COM	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
COM (N=N)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
COM (N=3N)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

***** INFLUENCE LINE (SIMPLE SPAN)
(AS)C = .0 SQ. IN. , (DS)C = .0 SQ. IN. BRACE LENGTH = 20.00 , YBAR = .00

***** ULTIMATE STRENGTH
M1/M2 TOP BOTTOM M1/M2 TOP BOTTOM
TOP BOTTOM .7 .0

***** ORDINATES OF AND AREAS UNDER INFLUENCE LINE (CONTINUOUS SPAN)

	SPAN 1	SPAN 2	SPAN 3	SPAN 4	SPAN 5	SPAN 6
T 0	.000	.000	.000	.000	.000	.000
E 1	4.952	-1.602	.000	.000	.000	.000
N 2	9.949	-2.617	.000	.000	.000	.000
T 3	15.035	-3.111	.000	.000	.000	.000
H 4	20.256	-3.249	.000	.000	.000	.000
5	16.065	-3.119	.000	.000	.000	.000
P 6	12.097	-2.764	.000	.000	.000	.000
O 7	8.399	-2.230	.000	.000	.000	.000
I 8	5.057	-1.561	.000	.000	.000	.000
N 9	2.234	-.803	.000	.000	.000	.000
T 0	.000	.000	.000	.000	.000	.000

POS AREA	902.0	.0	.0	.0	.0	.0
NEG AREA	.0	202.0	.0	.0	.0	.0

***** LIVE LOAD AND RATING CALCULATIONS (IMPACT FACTOR = .226 FOR +BEND AND = .226 FOR -BEND)

	---TRUCK LOAD---				---LANE LOAD---			
	LL+IMP	LL	WHEEL	AXLE	LL+IMP	LL	CONC	CONC
	LL+IMP	LL	1	SPACE	LL+IMP	LL	LOAD	LOAD
INV	HS20 +BEND	1204.8	982.5	24.367	FT.	940.0	766.5	38.367
	-BEND	223.8	182.5	152.691	FT.	189.0	154.1	134.283
OPER	HS20 +BEND	1204.8	982.5	24.367	FT.	940.0	766.5	38.367
	-BEND	223.8	182.5	152.691	FT.	189.0	154.1	134.283
POST	2F1 +BEND	563.8	459.7	48.367	FT.	581.3	487.2	243.874
	-BEND	96.0	78.3	143.874	FT.	96.0	78.3	143.874
POST	3F1 +BEND	842.0	686.6	48.370	FT.	842.0	686.6	48.370
	-BEND	146.7	119.6	144.283	FT.	146.7	119.6	144.283

FLEX.LIS

OPER	HS20	+BEND	.0	.0	154.242	L	.0	.0	.0	.000	7.745	278.8	HS154.9
		-BEND	.0	.0	.000	L	.0	.0	.0	.000			
POST	2F1	+BEND	.0	.0	172.242	L					17.134	257.0	
		-BEND	.0	.0	.000	L							
POST	3F1	+BEND	.0	.0	168.242	L					11.444	263.2	
		-BEND	.0	.0	.000	L							
POST	4F1	+BEND	.0	.0	164.242	L					10.015	270.4	
		-BEND	.0	.0	.000	L							
POST	SPEC	+BEND	.0	.0	131.242	L					8.750	350.0	
		-BEND	.0	.0	.000	L							

SUMMARY OF SHEAR ANALYSIS

DATE 04/14/11

D/P STRUCTURE I.D. 480-030

MEMB. ID	MIDL	SPAN NO.	DIS LT	FRM SPRT	R FT.	DL SHEAR KIPS	SDL SHEAR KIPS	---INVENTORY---			---OPERATING---			--VEH. 1--			--VEH. 2--			--VEH. 3--			--SPECIAL--				
								LL+I	T	LL+I	T	LL+I	T	LL+I	T	LL+I	T	LL+I	T	LL+I	T	LL+I	T	LL+I	T	LL+I	T
								MAX.V	L	MIN.V	L	MAX.V	L	MIN.V	L	MAX.V	L	MIN.V	L	MAX.V	L	MIN.V	L	MAX.V	L	MIN.V	L
								KIPS		KIPS		KIPS		KIPS		KIPS		KIPS		KIPS		KIPS		KIPS			
G01	CSC	1		.000	L	31.3	31.0	63.5	T	5.8	T	63.5	T	5.8	T	28.7	2.5	43.0	3.8	49.1	4.5	56.3	5.6	56.3			
		1	38.367	L	4.1	5.0	32.4	T	27.4	T	32.4	T	27.4	T	15.6	13.7	22.9	20.0	25.6	22.1	23.9	17.0	23.9				
		2	.000	L	59.0	42.3	67.3	T	.0	T	29.4	.0	44.5	.0	51.5	.0	63.9	.0	63.9	.0	63.9	.0	63.9				
		2	57.550	L	4.1	3.9	27.4	T	32.4	T	32.4	T	13.7	15.6	20.0	22.9	22.1	25.6	22.1	25.6	17.0	23.9	23.9				
		2	95.917	L	31.3	9.5	5.8	T	63.5	T	5.8	T	2.5	28.7	3.8	43.0	4.5	49.1	4.5	49.1	5.6	56.3	56.3				

LUC-2-18.62 Suspension Span Floor System

SFN: 4800303

Summary of Contents

- **Pages 1 – 2:** BR-100 Load Rating Forms
 - Page 1: Without future wearing surface
 - Page 2: With 30psf future wearing surface
- **Page 3:** Summary of Ratings
- **Pages 4 – 7:** Dead Load Calculation
- **Pages 8 – 50:** BAR-7 Rating without future wearing surface
- **Pages 51 – 93:** BAR-7 Rating with 30psf future wearing surface

Note: Page numbers refer to those in red (of 93) in the lower right.

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	18.62	02
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3,215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River	
SPECIAL ASSUMPTIONS & COMMENTS:	Rating for the suspended span floor system. Bridge components are being rehabilitated at or exceeding original condition. A lightweight 125psf deck is being utilized. No FWS is considered in this rating. The floorbeam ratings govern.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	8- Other	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.23	HS-20-44
OPERATING CURRENT DESIGN	2.05	HS-20-44
OHIO LEGAL - 2F1	3.53	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.42	150%
OHIO LEGAL - 4F1	2.22	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.51	OHIO LEGAL - 4F1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Eric F Dues, #75309	Daniel E Kent, Jr., #69067	4/28/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
Gannett Fleming Engineers and Architects, P.C.	(614) 794-9424	edues@gfnet.com

BRIDGE LOAD RATING REPORT
OFFICE OF STRUCTURAL ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

SFN	BRIDGE NUMBER	DISTRICT
4800303	18.62	02
ORIGINAL CONSTRUCTION YEAR	REHABILITATION YEAR	OVERALL STRUCTURE LENGTH (FT.)
1931	1960, 1979, 1997, 1999	3,215
FEATURE INTERSECTED:	S.R. 2 over the Maumee River	
SPECIAL ASSUMPTIONS & COMMENTS:	Rating for the suspended span floor system. Bridge components are being rehabilitated at or exceeding original condition. A lightweight 125psf deck is being utilized. A 30psf FWS is assumed in the rating. The floorbeam ratings govern.	
RATING & ANALYSIS OPTION: SELECT FROM LIST ON THE LEFT WHERE APPROPRIATE		
LOAD RATING PURPOSE:	2- Rehabilitation	▲ ▼
RATING SOFTWARE:	8- Other	▲ ▼
BASIS OF ANALYSIS:	1- Plan Information Available	▲ ▼
METHOD OF ANALYSIS:	2- Load Factor (LF)	▲ ▼
DESIGN LOADING (ORIGINAL):	4- H-20	▲ ▼
STRUCTURE RATING SUMMARY		
LOADING TYPE	RATING FACTOR - RF (Number up to 2-Decimals)	RATING LOAD
INVENTORY CURRENT DESIGN	1.15	HS-20-44
OPERATING CURRENT DESIGN	1.92	HS-20-44
OHIO LEGAL - 2F1	3.31	OHIO LEGAL LOADS OVERALL MINIMUM RATING FACTOR
OHIO LEGAL - 3F1	2.27	150%
OHIO LEGAL - 4F1	2.09	OHIO LEGAL LOADS OVERALL CONTROLLING TRUCK
OHIO LEGAL - 5C1	2.35	OHIO LEGAL - 4F1
RATED BY, PE#	REVIEWED BY, PE#	REPORT DATE
Eric F Dues, #75309	Daniel E Kent, Jr., #69067	4/28/2011
AGENCY/FIRM	PHONE NUMBER	EMAIL
Gannett Fleming Engineers and Architects, P.C.	(614) 794-9424	edues@gfnet.com

LUC-2 MEMBER RATING

Des. By: EFD, 4/28/11
 Chk. By: DEK, 4/28/11

Summary of Suspension Span Ratings

Utilizing As-Built Sections (condition after rehabilitation)

MEMBER	No Future Wearing Surface		With 30psf Future Wearing Surface	
	Inventory	Operating	Inventory	Operating
Stringer				
HS20	<u>1.31</u>	2.18	<u>1.27</u>	2.12
2F1	2.06	3.43	2.00	3.33
3F1	1.56	2.59	1.51	2.51
4F1	1.38	2.30	1.34	2.23
5C1	1.56	2.59	1.51	2.51
Floor Beam				
HS20	<u>1.23</u>	2.05	<u>1.15</u>	1.92
2F1	2.12	3.53	1.99	3.31
3F1	1.45	2.42	1.36	2.27
4F1	1.33	2.22	1.25	2.09
5C1	1.50	2.51	1.41	2.35

Note 1: The fatigue analysis of suspension span stringers and floorbeams was completed at stage 1, the fatigue details have an infinite fatigue life.

Note 2: The ratings reported are LFD, and represent the allowable stress / applied stress. A value greater than one is acceptable.

Note 3: The deck is considered to be 125psf lightweight concrete. The FWS is spread across the curb-toe of barrier area for each direction of traffic.



Gannett Fleming

GANNETT FLEMING ENGINEERS AND ARCHITECTS, P.C.

LOADS FOR STEEL BEAM DESIGN USING BAR7 (STAGE 2) BRIDGE NO. LUC-2-1862 OVER MAUMEE RIVER - SUSPENSION SPAN STRINGER LOADS

STAGE 1 - Calculated By: EFD, 4/8/09
Project: LUC-2-18.62
Job No.: 050925.7526RA.17RA

Verified By: DEK, 4/16/09

Calculated By: EFD
Checked By: DEK
Updated By: EFD
Verified By: DEK

Date: 4/27/2011
Date: 4/28/2011
Date: 4/28/2011
Date: 4/28/2011

INITIAL DEAD LOAD (Stringers)

DECK	$= S * t_d * W_c$	=	0.448 kips/ft.
HAUNCH	$= [(btf * th) + (ttf + th) * h] / 144 * W_c$	=	0.025 kips/ft.
SIP FORMS	$= S * (sip) / 1000$	=	0.081 kips/ft.
CROSSFRAMES	$= \{ \text{SQRT}[S^2 + ((d - ttf - tbf - 4) / 12)^2] * 2 + S \} * W_a / M$	=	0.000 kips/ft.
STIFFENERS	$= \{ [bs * ts * (d - ttf - tbf)] / 1728 \} * W_s / N$ (x 2 if on both sides of web)	=	0.000 kips/ft.
BEAM	$= W_b \text{ or } [btf * ttf + bbf * tbf + tw * (d - ttf - tbf)] / 1728 * W_s$	=	0.060 kips/ft.
TOTAL IDL		=	0.614 kips/ft.

INITIAL DEAD LOAD INPUT FOR BAR7 DESIGN PROGRAM (Stringers)

DECK (1/2" THICKNESS for ODOT wearing surface)	$= S * (t_d = 1/2") * W_c$	=	0.028 kips/ft.
HAUNCH		=	0.025 kips/ft.
SIP FORMS		=	0.081 kips/ft.
CROSSFRAMES		=	0.000 kips/ft.
STIFFENERS		=	0.000 kips/ft.
<u>TOTAL DL1 ON STRINGER</u>		=	<u>0.134 kips/ft.</u>

SUPERIMPOSED DEAD LOAD (Added to Girder System in BAR7)

FUTURE WEARING SURFACE	$= (RW - 2) * FWS / 2$ (2 ft is removed due to the barrier width)	=	0.780 kips/ft.
MEDIAN BARRIER	$= A_{brp} / 144 * W_c / 2$	=	0.295 kips/ft.
CURB	$= (A_{curb} / 144 * W_c) * 2 / 2$	=	0.256 kips/ft.
CURB RAILING	$= W_{pr} / 2$	=	0.045 kips/ft.
VANDAL FENCE	$= W_{vpf} / 2$ (x 2 if on both sides of bridge)	=	0.000 kips/ft.
<u>TOTAL DL2 (PER STIFFENING GIRDER) - WITH FUTURE WEARING SURFACE</u>		=	<u>1.376 kips/ft.</u>
<u>TOTAL DL2 (PER STIFFENING GIRDER) - NO FWS</u>			<u>0.596 kips/ft.</u>

LIVE LOAD DISTRIBUTION FACTORS (Stringers)

MOMENT LLDF	$= S / 5.5 / 2$	=	0.489 Axles/Stringer
SHEAR LLDF	$= [1.0 + (S - 6.00) / S + (S - 4.00) / S] / 2$	=	0.570 Axles/Stringer
DEFLECTION LLDF	$= \# \text{ LANES} / \# \text{ BEAMS} = RW / 12 / B$	=	0.364 Axles/Stringer
FATIGUE LLDF	$= S / 7 / 2$ (2004 BDM, 302.4.1.9.a)	=	0.384 Axles/Stringer

NOTE: "RW / 12" IS ROUNDED DOWN
TO NEAREST
WHOLE NUMBER.



Gannett Fleming

GANNETT FLEMING ENGINEERS AND ARCHITECTS, P.C.

LOADS FOR STEEL BEAM DESIGN USING BAR7 (STAGE 2) BRIDGE NO. LUC-2-1862 OVER MAUMEE RIVER - SUSPENSION SPAN FLOORBEAM LOADS (Deck loads are carried from stringers, except transverse haunch over floorbeam)

STAGE 1 - Calculated By: EFD, 4/8/09
Project: LUC-2-18.62
Job No.: 050925.7526RA.17RA

Verified By: DEK, 4/16/09

Calculated By:	EFD	Date:	4/27/2011
Checked By:	DEK	Date:	4/28/2011
Updated By:	EFD	Date:	4/28/2011
Verified By:	DEK	Date:	4/28/2011

INITIAL DEAD LOAD (FloorBeams)

HAUNCH	=	0.0400 k/ft
TOP COVERPLATE (ave. per foot of total floorbeam length)	=	0.0201 k/ft
TOP FLANGE ANGLES	=	0.0514 k/ft
WEB	=	0.0842 k/ft
BOTTOM FLANGE ANGLES	=	0.0514 k/ft
BOTTOM COVERPLATE (ave. per foot of total floorbeam length)	=	0.0201 k/ft
STIFFENERS (ave. per foot of total floorbeam length)	=	0.0307 k/ft
STRINGER CONNECTION WEIGHT (ave. per foot of total floorbeam length)	=	0.0069 k/ft
RIVET WEIGHT (ave. per foot of total floorbeam length)	=	0.0035 k/ft
HANDRAIL WEIGHT (ave. per foot of total floorbeam length)	=	0.0083 k/ft
CATWALK WEIGHT (ave. per foot of total floorbeam length)	=	0.0210 k/ft
TOTAL IDL	=	0.3377 k/ft

INITIAL DEAD LOAD INPUT FOR BAR7 DESIGN PROGRAM (Floorbeams)

HAUNCH	=	0.0400 k/ft
RIVETS	=	0.0035 k/ft
STIFFENERS	=	0.0307 k/ft
STRINGER CONNECTIONS	=	0.0069 k/ft
HANDRAIL	=	0.0083 k/ft
CATWALK	=	0.0210 k/ft
<u>TOTAL IDL</u>	=	<u>0.1104 k/ft</u>

SUPERIMPOSED DEAD LOAD (Floorbeams)

No Superimposed Dead Load is added to the floorbeam. All items are added to the stiffening girder DL2 and will be transferred to the floorbeam within BAR7 analysis (as per BAR7 Manual)

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITHOUT FWS.

BAR7 Filename: LUC2_no.dat

Calculated: EFD, 4/27/11 **Checked:** DEK, 4/28/11 **Updated:** EFD, 4/28/11 **Verified:** DEK, 4/28/11**BRIDGE ANALYSIS AND RATING (BAR7)**

333066

PROGRAM P4353000

VERSION 7.13.0.0

LAST UPDATED 05/07/2010

04/28/2011 12:25

DOCUMENTATION 04/2010

INPUT: LUC2_no.dat

LOAD INPUT: ... _ANA~1\STAGE2~1\BAR7RA~1\Work\Bar7\cusODOT.DAT

FLOORBEAM AND STRINGER ANALYSIS (AS BUILT) NO FWS

CALC: EFD, 4/27/11 CHECK: DEK, 4/28/11

UPDATED: EFD, 4/28/11 VERIFIED: DEK, 4/28/11

STRUCTURE ID - 00000000021862 - LUC-2-1862

PROJECT IDENTIFICATION

BRG SLC	LIVE OUT-	IMP GAGE PASS FAT- CONC	RE-	S OVER END
TYPE LEV LANES LOAD PUT	FACT DIST DIST IGUE DECK SPEC DIST DIR	FACTOR PAN		
GFS	L	5 0	0.00 0.0 0.0	0.00

SKEW

CORR

HYB FACTOR

0.000

BRIDGE CROSS SECTION AND LOADING

OVERHANG	CL OF				
DECK OR	GIRDER OR	ROADWAY	DISTRIBUTION	FACTORS	
WIDTH SPACING TRUSS TO CURB	WIDTH	SHEAR	MOMENT	DEFLECT	
57.58 0.00	2.50	54.00	0.570 0.489	0.364	

SLAB	DEAD LOADS				
THICKNESS	HAUNCH	DL1	DL2	F'C	N SYMMETRY
8.00	0.00	0.000	0.596	4.500	8.

STRINGER	FLOORBEAM	UNIT WEIGHT
DL1	DL1	DECK CONCRETE
0.134	0.111	125.

SPAN LENGTHS (CONTINUOUS)

SPAN #	1	2	3	4
LENGTH	19.48	19.96	19.96	19.96

TRAFFIC LANE LOCATIONS

LANE #	1	2	3	4	5	6
DIST	0.50	12.50	29.50	41.50		
WIDTH	12.00	12.00	12.00	12.00		
% LL	100.	100.	100.	100.		

STRINGER SPAN LENGTHS (SIMPLE)

SPAN #	1	2	3	4
LENGTH	18.75	19.23	19.23	19.23

STRINGER LOCATIONS

STRINGER #	1	2	3	4	5	6	7	8
DISTANCE	2.63	8.00	13.38	18.75	24.13	29.50	34.88	40.25

STRINGER #	9	10	11
DISTANCE	45.63	51.00	56.38

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPECIAL LIVE LOADING 2

LANE LOADING

2F1

NUMBER OF AXLES	UNIFORM 3% LANE INCR	CONC LOAD MOMENT	CONC LOAD SHEAR	GAGE DISTANCE	PASSING DISTANCE	VARY LAST	MAX AXLE DIST
2	0.000	0.000	0.000	6.0	4.0		0.0

TRUCK LOAD

AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST
1	10.00	10.00	2	20.00	0.00						

SPECIAL LIVE LOADING 3

LANE LOADING

3F1

NUMBER OF AXLES	UNIFORM 3% LANE INCR	CONC LOAD MOMENT	CONC LOAD SHEAR	GAGE DISTANCE	PASSING DISTANCE	VARY LAST	MAX AXLE DIST
3	0.000	0.000	0.000	6.0	4.0		0.0

TRUCK LOAD

AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST
1	12.00	10.00	2	17.00	4.00	3	17.00	0.00			

SPECIAL LIVE LOADING 4

LANE LOADING

4F1

NUMBER OF AXLES	UNIFORM 3% LANE INCR	CONC LOAD MOMENT	CONC LOAD SHEAR	GAGE DISTANCE	PASSING DISTANCE	VARY LAST	MAX AXLE DIST
4	0.000	0.000	0.000	6.0	4.0		0.0

TRUCK LOAD

AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST
1	12.00	10.00	2	14.00	4.00	3	14.00	4.00	4	14.00	0.00

SPECIAL LIVE LOADING 5

LANE LOADING

5C1

NUMBER OF AXLES	UNIFORM 3% LANE INCR	CONC LOAD MOMENT	CONC LOAD SHEAR	GAGE DISTANCE	PASSING DISTANCE	VARY LAST	MAX AXLE DIST
5	0.000	0.000	0.000	6.0	4.0		0.0

TRUCK LOAD

AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST
1	12.00	12.00	2	17.00	4.00	3	17.00	31.00	4	17.00	4.00
5	17.00	0.00									

DEFAULT VALUES

SLC LEVEL	LANES	GAGE DISTANCE	PASSING DISTANCE	UNIT WEIGHT DECK
I	---	---	---	---

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 3 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.30

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X	DEAD LOAD		LIVE LOAD + IMPACT				
	DL1	DL2	SP-1	SP-2	SP-3	SP-4	SP-5
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.92	0.016	0.003	0.031	0.022	0.031	0.035	0.031
3.85	0.031	0.005	0.059	0.042	0.059	0.066	0.059
5.77	0.042	0.007	0.081	0.057	0.082	0.092	0.082
7.69	0.049	0.008	0.097	0.066	0.094	0.109	0.094
9.62	0.052	0.009	0.102	0.067	0.097	0.114	0.097
11.54	0.049	0.008	0.097	0.066	0.094	0.109	0.094
13.46	0.042	0.007	0.081	0.057	0.082	0.092	0.082
15.38	0.031	0.005	0.059	0.042	0.059	0.066	0.059
17.31	0.016	0.003	0.031	0.022	0.031	0.035	0.031
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 4 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.30

=====

X	DEAD LOAD		LIVE LOAD + IMPACT				
	DL1	DL2	SP-1	SP-2	SP-3	SP-4	SP-5
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.92	0.016	0.003	0.031	0.022	0.031	0.035	0.031
3.85	0.031	0.005	0.059	0.042	0.059	0.066	0.059
5.77	0.042	0.007	0.081	0.057	0.082	0.092	0.082
7.69	0.049	0.008	0.097	0.066	0.094	0.109	0.094
9.62	0.052	0.009	0.102	0.067	0.097	0.114	0.097
11.54	0.049	0.008	0.097	0.066	0.094	0.109	0.094
13.46	0.042	0.007	0.081	0.057	0.082	0.092	0.082
15.38	0.031	0.005	0.059	0.042	0.059	0.066	0.059
17.31	0.016	0.003	0.031	0.022	0.031	0.035	0.031
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000

 * STRINGER - LIVE LOAD SP-1 *

MAXIMUM REACTIONS

SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	REACTIONS		MOMENTS	
					+I.F.	-I.F.	+I.F.	-I.F.
1	6.0	1.0	28.9	0.0	1.30			
2	12.2	2.1	30.5	0.0	1.30			
3	12.3	2.1	30.6	0.0	1.30			
4	12.3	2.1	30.6	0.0	1.30			
5	6.2	1.0	29.2	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.

BAR7 ANALYSIS of LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM -- WITHOUT FWS.

BAR7 Filename: LUC2_no.dat

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 3 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

=====

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	1.0	29.2	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	1.8	41.9	0.0	4.9	0.8	21.8	-2.0	1.30
	SIMULT	SHEAR	21.8	0.0	SIMULT	MOM	41.9	35.2	
3.85	19.0	3.2	68.2	0.0	3.7	0.6	17.7	-4.1	1.30
	SIMULT	SHEAR	17.7	0.0	SIMULT	MOM	68.2	62.6	
5.77	24.9	4.2	82.1	0.0	2.5	0.4	14.2	-6.1	1.30
	SIMULT	SHEAR	14.2	0.0	SIMULT	MOM	82.1	82.1	
7.69	28.5	4.8	93.9	0.0	1.2	0.2	12.2	-8.1	1.30
	SIMULT	SHEAR	12.2	0.0	SIMULT	MOM	93.9	93.9	
9.62	29.7	5.0	97.8	0.0	0.0	0.0	10.2	-10.2	1.30
	SIMULT	SHEAR	-10.2	0.0	SIMULT	MOM	97.8	97.8	
11.54	28.5	4.8	93.9	0.0	-1.2	-0.2	8.1	-12.2	1.30
	SIMULT	SHEAR	-12.2	0.0	SIMULT	MOM	93.9	93.9	
13.46	24.9	4.2	82.1	0.0	-2.5	-0.4	6.1	-14.2	1.30
	SIMULT	SHEAR	-14.2	0.0	SIMULT	MOM	82.1	82.1	
15.38	19.0	3.2	68.2	0.0	-3.7	-0.6	4.1	-17.7	1.30
	SIMULT	SHEAR	-17.7	0.0	SIMULT	MOM	62.6	68.2	
17.31	10.7	1.8	41.9	0.0	-4.9	-0.8	2.0	-21.8	1.30
	SIMULT	SHEAR	-21.8	0.0	SIMULT	MOM	35.2	41.9	
19.23	0.0	0.0	0.0	0.0	-6.2	-1.0	0.0	-29.2	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

SPAN 4 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

=====

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	1.0	29.2	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	1.8	41.9	0.0	4.9	0.8	21.8	-2.0	1.30
	SIMULT	SHEAR	21.8	0.0	SIMULT	MOM	41.9	35.2	
3.85	19.0	3.2	68.2	0.0	3.7	0.6	17.7	-4.1	1.30
	SIMULT	SHEAR	17.7	0.0	SIMULT	MOM	68.2	62.6	
5.77	24.9	4.2	82.1	0.0	2.5	0.4	14.2	-6.1	1.30
	SIMULT	SHEAR	14.2	0.0	SIMULT	MOM	82.1	82.1	
7.69	28.5	4.8	93.9	0.0	1.2	0.2	12.2	-8.1	1.30
	SIMULT	SHEAR	12.2	0.0	SIMULT	MOM	93.9	93.9	
9.62	29.7	5.0	97.8	0.0	0.0	0.0	10.2	-10.2	1.30
	SIMULT	SHEAR	-10.2	0.0	SIMULT	MOM	97.8	97.8	
11.54	28.5	4.8	93.9	0.0	-1.2	-0.2	8.1	-12.2	1.30
	SIMULT	SHEAR	-12.2	0.0	SIMULT	MOM	93.9	93.9	
13.46	24.9	4.2	82.1	0.0	-2.5	-0.4	6.1	-14.2	1.30
	SIMULT	SHEAR	-14.2	0.0	SIMULT	MOM	82.1	82.1	
15.38	19.0	3.2	68.2	0.0	-3.7	-0.6	4.1	-17.7	1.30
	SIMULT	SHEAR	-17.7	0.0	SIMULT	MOM	62.6	68.2	
17.31	10.7	1.8	41.9	0.0	-4.9	-0.8	2.0	-21.8	1.30
	SIMULT	SHEAR	-21.8	0.0	SIMULT	MOM	35.2	41.9	
19.23	0.0	0.0	0.0	0.0	-6.2	-1.0	0.0	-29.2	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.811	0.137	3.892	0.000	1.000	2.33 V	3.25 V
1.88	0.649	0.110	2.889	-0.274	1.000	3.20 V	4.45 V
3.75	0.487	0.082	2.340	-0.548	1.000	2.30 T	3.25 T
5.62	0.325	0.055	1.920	-0.823	1.000	1.78 T	2.56 T
7.50	0.162	0.027	1.645	-1.097	1.000	1.52 T	2.20 T
9.38	0.000	0.000	1.371	-1.371	1.000	1.44 T	2.09 T
11.25	-0.162	-0.027	1.097	-1.645	1.000	1.52 T	2.20 T
13.12	-0.325	-0.055	0.823	-1.920	1.000	1.78 T	2.56 T
15.00	-0.487	-0.082	0.548	-2.340	1.000	2.30 T	3.25 T
16.88	-0.649	-0.110	0.274	-2.889	1.000	3.20 V	4.45 V
18.75	-0.811	-0.137	0.000	-3.892	1.000	2.33 V	3.25 V

SPAN 2

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.943	0.000	1.000	2.29 V	3.20 V
1.92	0.666	0.112	2.940	-0.274	1.000	3.14 V	4.36 V
3.85	0.499	0.084	2.391	-0.548	1.000	2.18 T	3.09 T
5.77	0.333	0.056	1.920	-0.823	1.000	1.72 T	2.48 T
7.69	0.166	0.028	1.645	-1.097	1.000	1.46 T	2.12 T
9.62	0.000	0.000	1.371	-1.371	1.000	1.39 T	2.02 T
11.54	-0.166	-0.028	1.097	-1.645	1.000	1.46 T	2.12 T
13.46	-0.333	-0.056	0.823	-1.920	1.000	1.72 T	2.48 T
15.38	-0.499	-0.084	0.548	-2.391	1.000	2.18 T	3.09 T
17.31	-0.666	-0.112	0.274	-2.940	1.000	3.14 V	4.36 V
19.23	-0.832	-0.140	0.000	-3.943	1.000	2.29 V	3.20 V

SPAN 3

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.943	0.000	1.000	2.29 V	3.20 V
1.92	0.666	0.112	2.940	-0.274	1.000	3.14 V	4.36 V
3.85	0.499	0.084	2.391	-0.548	1.000	2.18 T	3.09 T
5.77	0.333	0.056	1.920	-0.823	1.000	1.72 T	2.48 T
7.69	0.166	0.028	1.645	-1.097	1.000	1.46 T	2.12 T
9.62	0.000	0.000	1.371	-1.371	1.000	1.39 T	2.02 T
11.54	-0.166	-0.028	1.097	-1.645	1.000	1.46 T	2.12 T
13.46	-0.333	-0.056	0.823	-1.920	1.000	1.72 T	2.48 T
15.38	-0.499	-0.084	0.548	-2.391	1.000	2.18 T	3.09 T
17.31	-0.666	-0.112	0.274	-2.940	1.000	3.14 V	4.36 V
19.23	-0.832	-0.140	0.000	-3.943	1.000	2.29 V	3.20 V

SPAN 4

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.943	0.000	1.000	2.29 V	3.20 V
1.92	0.666	0.112	2.940	-0.274	1.000	3.14 V	4.36 V
3.85	0.499	0.084	2.391	-0.548	1.000	2.18 T	3.09 T
5.77	0.333	0.056	1.920	-0.823	1.000	1.72 T	2.48 T
7.69	0.166	0.028	1.645	-1.097	1.000	1.46 T	2.12 T
9.62	0.000	0.000	1.371	-1.371	1.000	1.39 T	2.02 T
11.54	-0.166	-0.028	1.097	-1.645	1.000	1.46 T	2.12 T
13.46	-0.333	-0.056	0.823	-1.920	1.000	1.72 T	2.48 T
15.38	-0.499	-0.084	0.548	-2.391	1.000	2.18 T	3.09 T
17.31	-0.666	-0.112	0.274	-2.940	1.000	3.14 V	4.36 V
19.23	-0.832	-0.140	0.000	-3.943	1.000	2.29 V	3.20 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.

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

 * STRINGER - LIVE LOAD SP-2 *

MAXIMUM REACTIONS

SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	REACTIONS		MOMENTS	
					+I.F.	-I.F.	+I.F.	-I.F.
1	6.0	1.0	17.8	0.0	1.30			
2	12.2	2.1	17.9	0.0	1.30			
3	12.3	2.1	17.9	0.0	1.30			
4	12.3	2.1	17.9	0.0	1.30			
5	6.2	1.0	17.9	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

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X	DL1		DL2		+(LL+I)		-(LL+I)		DL1		DL2		+(LL+I)		-(LL+I)		I.F.
	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	1.0	17.8	0.0	0.0	1.30			
	SIMULT	SHEAR		0.0	0.0		0.0		SIMULT	MOM		0.0	0.0				
1.88	10.2	1.7	25.8	0.0	0.0	4.8	0.8	13.8	-1.3	1.30							
	SIMULT	SHEAR		13.8	0.0		SIMULT	MOM	25.8	21.5							
3.75	18.1	3.0	44.5	0.0	0.0	3.6	0.6	11.9	-2.5	1.30							
	SIMULT	SHEAR		11.9	0.0		SIMULT	MOM	44.5	38.1							
5.62	23.7	4.0	56.0	0.0	0.0	2.4	0.4	10.0	-3.8	1.30							
	SIMULT	SHEAR		10.0	0.0		SIMULT	MOM	56.0	50.1							
7.50	27.1	4.6	60.4	0.0	0.0	1.2	0.2	8.1	-5.1	1.30							
	SIMULT	SHEAR		8.1	0.0		SIMULT	MOM	60.4	57.2							
9.38	28.2	4.8	59.6	0.0	0.0	0.0	0.0	6.4	-6.4	1.30							
	SIMULT	SHEAR		-6.4	0.0		SIMULT	MOM	59.6	59.6							
11.25	27.1	4.6	60.4	0.0	0.0	-1.2	-0.2	5.1	-8.1	1.30							
	SIMULT	SHEAR		-8.1	0.0		SIMULT	MOM	57.2	60.4							
13.12	23.7	4.0	56.0	0.0	0.0	-2.4	-0.4	3.8	-10.0	1.30							
	SIMULT	SHEAR		-10.0	0.0		SIMULT	MOM	50.1	56.0							
15.00	18.1	3.0	44.5	0.0	0.0	-3.6	-0.6	2.5	-11.9	1.30							
	SIMULT	SHEAR		-11.9	0.0		SIMULT	MOM	38.1	44.5							
16.88	10.2	1.7	25.8	0.0	0.0	-4.8	-0.8	1.3	-13.8	1.30							
	SIMULT	SHEAR		-13.8	0.0		SIMULT	MOM	21.5	25.8							
18.75	0.0	0.0	0.0	0.0	0.0	-6.0	-1.0	0.0	-17.8	1.30							
	SIMULT	SHEAR		0.0	0.0		SIMULT	MOM	0.0	0.0							

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 4 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

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X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	1.0	17.9	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	1.8	26.6	0.0	4.9	0.8	13.9	-1.3	1.30
	SIMULT	SHEAR	13.9	0.0	SIMULT	MOM	26.6	22.0	
3.85	19.0	3.2	46.0	0.0	3.7	0.6	12.0	-2.5	1.30
	SIMULT	SHEAR	12.0	0.0	SIMULT	MOM	46.0	39.1	
5.77	24.9	4.2	57.9	0.0	2.5	0.4	10.0	-3.8	1.30
	SIMULT	SHEAR	10.0	0.0	SIMULT	MOM	57.9	51.3	
7.69	28.5	4.8	62.6	0.0	1.2	0.2	8.1	-5.1	1.30
	SIMULT	SHEAR	8.1	0.0	SIMULT	MOM	62.6	58.7	
9.62	29.7	5.0	61.1	0.0	0.0	0.0	6.4	-6.4	1.30
	SIMULT	SHEAR	-6.4	0.0	SIMULT	MOM	61.1	61.1	
11.54	28.5	4.8	62.6	0.0	-1.2	-0.2	5.1	-8.1	1.30
	SIMULT	SHEAR	-8.1	0.0	SIMULT	MOM	58.7	62.6	
13.46	24.9	4.2	57.9	0.0	-2.5	-0.4	3.8	-10.0	1.30
	SIMULT	SHEAR	-10.0	0.0	SIMULT	MOM	51.3	57.9	
15.38	19.0	3.2	46.0	0.0	-3.7	-0.6	2.5	-12.0	1.30
	SIMULT	SHEAR	-12.0	0.0	SIMULT	MOM	39.1	46.0	
17.31	10.7	1.8	26.6	0.0	-4.9	-0.8	1.3	-13.9	1.30
	SIMULT	SHEAR	-13.9	0.0	SIMULT	MOM	22.0	26.6	
19.23	0.0	0.0	0.0	0.0	-6.2	-1.0	0.0	-17.9	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

FLEXURAL STRESSES - BEAM

SPAN 1

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.88	-0.982	-0.166	-2.497	0.000	0.982	0.166	2.497	0.000
3.75	-1.746	-0.295	-4.303	0.000	1.746	0.295	4.303	0.000
5.62	-2.291	-0.387	-5.417	0.000	2.291	0.387	5.417	0.000
7.50	-2.619	-0.442	-5.840	0.000	2.619	0.442	5.840	0.000
9.38	-2.728	-0.460	-5.763	0.000	2.728	0.460	5.763	0.000
11.25	-2.619	-0.442	-5.840	0.000	2.619	0.442	5.840	0.000
13.12	-2.291	-0.387	-5.417	0.000	2.291	0.387	5.417	0.000
15.00	-1.746	-0.295	-4.303	0.000	1.746	0.295	4.303	0.000
16.88	-0.982	-0.166	-2.497	0.000	0.982	0.166	2.497	0.000
18.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 2

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.174	-2.577	0.000	1.033	0.174	2.577	0.000
3.85	-1.836	-0.310	-4.445	0.000	1.836	0.310	4.445	0.000
5.77	-2.410	-0.407	-5.603	0.000	2.410	0.407	5.603	0.000
7.69	-2.755	-0.465	-6.052	0.000	2.755	0.465	6.052	0.000
9.62	-2.869	-0.484	-5.910	0.000	2.869	0.484	5.910	0.000
11.54	-2.755	-0.465	-6.052	0.000	2.755	0.465	6.052	0.000
13.46	-2.410	-0.407	-5.603	0.000	2.410	0.407	5.603	0.000
15.38	-1.836	-0.310	-4.445	0.000	1.836	0.310	4.445	0.000
17.31	-1.033	-0.174	-2.577	0.000	1.033	0.174	2.577	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM – WITHOUT FWS.

BAR7 Filename: LUC2_no.dat

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 3

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X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	2.409	0.000	1.000	3.75 V	5.24 V
1.92	0.666	0.112	1.868	-0.171	1.000	4.94 V	6.86 V
3.85	0.499	0.084	1.611	-0.343	1.000	3.23 T	4.58 T
5.77	0.333	0.056	1.354	-0.514	1.000	2.44 T	3.51 T
7.69	0.166	0.028	1.097	-0.686	1.000	2.19 T	3.19 T
9.62	0.000	0.000	0.857	-0.857	1.000	2.22 T	3.24 T
11.54	-0.166	-0.028	0.686	-1.097	1.000	2.19 T	3.19 T
13.46	-0.333	-0.056	0.514	-1.354	1.000	2.44 T	3.51 T
15.38	-0.499	-0.084	0.343	-1.611	1.000	3.23 T	4.58 T
17.31	-0.666	-0.112	0.171	-1.868	1.000	4.94 V	6.86 V
19.23	-0.832	-0.140	0.000	-2.409	1.000	3.75 V	5.24 V

SPAN 4

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	2.409	0.000	1.000	3.75 V	5.24 V
1.92	0.666	0.112	1.868	-0.171	1.000	4.94 V	6.86 V
3.85	0.499	0.084	1.611	-0.343	1.000	3.23 T	4.58 T
5.77	0.333	0.056	1.354	-0.514	1.000	2.44 T	3.51 T
7.69	0.166	0.028	1.097	-0.686	1.000	2.19 T	3.19 T
9.62	0.000	0.000	0.857	-0.857	1.000	2.22 T	3.24 T
11.54	-0.166	-0.028	0.686	-1.097	1.000	2.19 T	3.19 T
13.46	-0.333	-0.056	0.514	-1.354	1.000	2.44 T	3.51 T
15.38	-0.499	-0.084	0.343	-1.611	1.000	3.23 T	4.58 T
17.31	-0.666	-0.112	0.171	-1.868	1.000	4.94 V	6.86 V
19.23	-0.832	-0.140	0.000	-2.409	1.000	3.75 V	5.24 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.

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

 * STRINGER - LIVE LOAD SP-3 *

MAXIMUM REACTIONS

SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	REACTIONS		MOMENTS	
					+I.F.	-I.F.	+I.F.	-I.F.
1	6.0	1.0	23.0	0.0	1.30			
2	12.2	2.1	24.8	0.0	1.30			
3	12.3	2.1	24.8	0.0	1.30			
4	12.3	2.1	24.8	0.0	1.30			
5	6.2	1.0	23.2	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

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X	DL1		DL2		+(LL+I)		-(LL+I)		DL1		DL2		+(LL+I)		-(LL+I)		I.F.
	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	MOMENT	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	SHEAR	
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	1.0	23.0	0.0	0.0	1.30			
	SIMULT	SHEAR	0.0	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	0.0	0.0	0.0				
1.88	10.2	1.7	34.3	0.0	0.0	0.0	0.0	0.0	4.8	0.8	18.3	-1.1	1.30				
	SIMULT	SHEAR	18.3	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	34.3	18.2					
3.75	18.1	3.0	57.7	0.0	0.0	0.0	0.0	0.0	3.6	0.6	15.4	-2.2	1.30				
	SIMULT	SHEAR	15.4	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	57.7	32.4					
5.62	23.7	4.0	72.1	0.0	0.0	0.0	0.0	0.0	2.4	0.4	12.8	-4.2	1.30				
	SIMULT	SHEAR	12.8	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	72.1	54.8					
7.50	27.1	4.6	80.0	0.0	0.0	0.0	0.0	0.0	1.2	0.2	10.7	-6.3	1.30				
	SIMULT	SHEAR	10.7	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	80.0	71.3					
9.38	28.2	4.8	79.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	-8.5	1.30				
	SIMULT	SHEAR	-8.5	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	79.7	79.7					
11.25	27.1	4.6	80.0	0.0	0.0	0.0	0.0	0.0	-1.2	-0.2	6.3	-10.7	1.30				
	SIMULT	SHEAR	-10.7	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	71.3	80.0					
13.12	23.7	4.0	72.1	0.0	0.0	0.0	0.0	0.0	-2.4	-0.4	4.2	-12.8	1.30				
	SIMULT	SHEAR	-12.8	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	54.8	72.1					
15.00	18.1	3.0	57.7	0.0	0.0	0.0	0.0	0.0	-3.6	-0.6	2.2	-15.4	1.30				
	SIMULT	SHEAR	-15.4	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	32.4	57.7					
16.88	10.2	1.7	34.3	0.0	0.0	0.0	0.0	0.0	-4.8	-0.8	1.1	-18.3	1.30				
	SIMULT	SHEAR	-18.3	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	18.2	34.3					
18.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-6.0	-1.0	0.0	-23.0	1.30				
	SIMULT	SHEAR	0.0	0.0	0.0	0.0	0.0	0.0	SIMULT	MOM	0.0	0.0					

SPAN 4 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)	I.F.
X	MOMENT	MOMENT	MOMENT	MOMENT	SHEAR	SHEAR	SHEAR	SHEAR	
0.00	0.0	0.0	0.0	0.0	6.2	1.0	23.2	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	1.8	35.6	0.0	4.9	0.8	18.5	-1.1	1.30
	SIMULT	SHEAR	18.5	0.0	SIMULT	MOM	35.6	18.7	
3.85	19.0	3.2	60.0	0.0	3.7	0.6	15.6	-2.2	1.30
	SIMULT	SHEAR	15.6	0.0	SIMULT	MOM	60.0	33.3	
5.77	24.9	4.2	74.3	0.0	2.5	0.4	12.9	-4.2	1.30
	SIMULT	SHEAR	12.9	0.0	SIMULT	MOM	74.3	57.0	
7.69	28.5	4.8	82.5	0.0	1.2	0.2	10.7	-6.4	1.30
	SIMULT	SHEAR	10.7	0.0	SIMULT	MOM	82.5	73.8	
9.62	29.7	5.0	82.3	0.0	0.0	0.0	8.6	-8.6	1.30
	SIMULT	SHEAR	-8.6	0.0	SIMULT	MOM	82.3	82.3	
11.54	28.5	4.8	82.5	0.0	-1.2	-0.2	6.4	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0	SIMULT	MOM	73.8	82.5	
13.46	24.9	4.2	74.3	0.0	-2.5	-0.4	4.2	-12.9	1.30
	SIMULT	SHEAR	-12.9	0.0	SIMULT	MOM	57.0	74.3	
15.38	19.0	3.2	60.0	0.0	-3.7	-0.6	2.2	-15.6	1.30
	SIMULT	SHEAR	-15.6	0.0	SIMULT	MOM	33.3	60.0	
17.31	10.7	1.8	35.6	0.0	-4.9	-0.8	1.1	-18.5	1.30
	SIMULT	SHEAR	-18.5	0.0	SIMULT	MOM	18.7	35.6	
19.23	0.0	0.0	0.0	0.0	-6.2	-1.0	0.0	-23.2	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

FLEXURAL STRESSES - BEAM

SPAN 1

	TOP FIBER STEEL STRESS				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
1.88	-0.982	-0.166	-3.321	0.000	0.982	0.166	3.321	0.000
3.75	-1.746	-0.295	-5.582	0.000	1.746	0.295	5.582	0.000
5.62	-2.291	-0.387	-6.975	0.000	2.291	0.387	6.975	0.000
7.50	-2.619	-0.442	-7.733	0.000	2.619	0.442	7.733	0.000
9.38	-2.728	-0.460	-7.707	0.000	2.728	0.460	7.707	0.000
11.25	-2.619	-0.442	-7.733	0.000	2.619	0.442	7.733	0.000
13.12	-2.291	-0.387	-6.975	0.000	2.291	0.387	6.975	0.000
15.00	-1.746	-0.295	-5.582	0.000	1.746	0.295	5.582	0.000
16.88	-0.982	-0.166	-3.321	0.000	0.982	0.166	3.321	0.000
18.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 2

	TOP FIBER STEEL STRESS				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
1.92	-1.033	-0.174	-3.443	0.000	1.033	0.174	3.443	0.000
3.85	-1.836	-0.310	-5.799	0.000	1.836	0.310	5.799	0.000
5.77	-2.410	-0.407	-7.186	0.000	2.410	0.407	7.186	0.000
7.69	-2.755	-0.465	-7.974	0.000	2.755	0.465	7.974	0.000
9.62	-2.869	-0.484	-7.958	0.000	2.869	0.484	7.958	0.000
11.54	-2.755	-0.465	-7.974	0.000	2.755	0.465	7.974	0.000
13.46	-2.410	-0.407	-7.186	0.000	2.410	0.407	7.186	0.000
15.38	-1.836	-0.310	-5.799	0.000	1.836	0.310	5.799	0.000
17.31	-1.033	-0.174	-3.443	0.000	1.033	0.174	3.443	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 3

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.132	0.000	1.000	2.88 V	4.03 V
1.92	0.666	0.112	2.496	-0.146	1.000	3.69 V	5.14 V
3.85	0.499	0.084	2.102	-0.291	1.000	2.48 T	3.51 T
5.77	0.333	0.056	1.737	-0.571	1.000	1.90 T	2.74 T
7.69	0.166	0.028	1.445	-0.863	1.000	1.67 T	2.42 T
9.62	0.000	0.000	1.154	-1.154	1.000	1.65 T	2.41 T
11.54	-0.166	-0.028	0.863	-1.445	1.000	1.67 T	2.42 T
13.46	-0.333	-0.056	0.571	-1.737	1.000	1.90 T	2.74 T
15.38	-0.499	-0.084	0.291	-2.102	1.000	2.48 T	3.51 T
17.31	-0.666	-0.112	0.146	-2.496	1.000	3.69 V	5.14 V
19.23	-0.832	-0.140	0.000	-3.132	1.000	2.88 V	4.03 V

SPAN 4

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.132	0.000	1.000	2.88 V	4.03 V
1.92	0.666	0.112	2.496	-0.146	1.000	3.69 V	5.14 V
3.85	0.499	0.084	2.102	-0.291	1.000	2.48 T	3.51 T
5.77	0.333	0.056	1.737	-0.571	1.000	1.90 T	2.74 T
7.69	0.166	0.028	1.445	-0.863	1.000	1.67 T	2.42 T
9.62	0.000	0.000	1.154	-1.154	1.000	1.65 T	2.41 T
11.54	-0.166	-0.028	0.863	-1.445	1.000	1.67 T	2.42 T
13.46	-0.333	-0.056	0.571	-1.737	1.000	1.90 T	2.74 T
15.38	-0.499	-0.084	0.291	-2.102	1.000	2.48 T	3.51 T
17.31	-0.666	-0.112	0.146	-2.496	1.000	3.69 V	5.14 V
19.23	-0.832	-0.140	0.000	-3.132	1.000	2.88 V	4.03 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.

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

* STRINGER - LIVE LOAD SP-4 *

MAXIMUM REACTIONS

SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	REACTIONS		MOMENTS	
					+I.F.	-I.F.	+I.F.	-I.F.
1	6.0	1.0	22.8	0.0	1.30			
2	12.2	2.1	26.5	0.0	1.30			
3	12.3	2.1	26.5	0.0	1.30			
4	12.3	2.1	26.5	0.0	1.30			
5	6.2	1.0	23.1	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 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

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X	DL1	DL2	+(LL+I)	-(LL+I)	DL1	DL2	+(LL+I)	-(LL+I)	I.F.
	MOMENT	MOMENT	MOMENT	MOMENT	SHEAR	SHEAR	SHEAR	SHEAR	
0.00	0.0	0.0	0.0	0.0	6.0	1.0	22.8	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.88	10.2	1.7	34.4	0.0	4.8	0.8	18.3	-0.9	1.30
	SIMULT	SHEAR	18.3	0.0	SIMULT	MOM	34.4	15.0	
3.75	18.1	3.0	58.7	0.0	3.6	0.6	15.7	-1.8	1.30
	SIMULT	SHEAR	15.7	0.0	SIMULT	MOM	58.7	26.7	
5.62	23.7	4.0	73.1	0.0	2.4	0.4	13.0	-3.4	1.30
	SIMULT	SHEAR	13.0	0.0	SIMULT	MOM	73.1	45.2	
7.50	27.1	4.6	84.5	0.0	1.2	0.2	10.3	-5.2	1.30
	SIMULT	SHEAR	7.1	0.0	SIMULT	MOM	77.4	58.7	
9.38	28.2	4.8	89.6	0.0	0.0	0.0	7.7	-7.7	1.30
	SIMULT	SHEAR	-4.4	0.0	SIMULT	MOM	71.8	71.8	
11.25	27.1	4.6	84.5	0.0	-1.2	-0.2	5.2	-10.3	1.30
	SIMULT	SHEAR	-7.1	0.0	SIMULT	MOM	58.7	77.4	
13.12	23.7	4.0	73.1	0.0	-2.4	-0.4	3.4	-13.0	1.30
	SIMULT	SHEAR	-13.0	0.0	SIMULT	MOM	45.2	73.1	
15.00	18.1	3.0	58.7	0.0	-3.6	-0.6	1.8	-15.7	1.30
	SIMULT	SHEAR	-15.7	0.0	SIMULT	MOM	26.7	58.7	
16.88	10.2	1.7	34.4	0.0	-4.8	-0.8	0.9	-18.3	1.30
	SIMULT	SHEAR	-18.3	0.0	SIMULT	MOM	15.0	34.4	
18.75	0.0	0.0	0.0	0.0	-6.0	-1.0	0.0	-22.8	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 4 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

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X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	1.0	23.1	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	1.8	35.5	0.0	4.9	0.8	18.5	-0.9	1.30
	SIMULT	SHEAR	18.5	0.0	SIMULT	MOM	35.5	15.4	
3.85	19.0	3.2	60.8	0.0	3.7	0.6	15.8	-1.8	1.30
	SIMULT	SHEAR	15.8	0.0	SIMULT	MOM	60.8	27.4	
5.77	24.9	4.2	75.8	0.0	2.5	0.4	13.1	-3.5	1.30
	SIMULT	SHEAR	13.1	0.0	SIMULT	MOM	75.8	47.0	
7.69	28.5	4.8	87.6	0.0	1.2	0.2	10.5	-5.3	1.30
	SIMULT	SHEAR	7.1	0.0	SIMULT	MOM	80.5	60.8	
9.62	29.7	5.0	92.8	0.0	0.0	0.0	7.8	-7.8	1.30
	SIMULT	SHEAR	4.4	0.0	SIMULT	MOM	75.0	75.0	
11.54	28.5	4.8	87.6	0.0	-1.2	-0.2	5.3	-10.5	1.30
	SIMULT	SHEAR	-7.1	0.0	SIMULT	MOM	60.8	80.5	
13.46	24.9	4.2	75.8	0.0	-2.5	-0.4	3.5	-13.1	1.30
	SIMULT	SHEAR	-13.1	0.0	SIMULT	MOM	47.0	75.8	
15.38	19.0	3.2	60.8	0.0	-3.7	-0.6	1.8	-15.8	1.30
	SIMULT	SHEAR	-15.8	0.0	SIMULT	MOM	27.4	60.8	
17.31	10.7	1.8	35.5	0.0	-4.9	-0.8	0.9	-18.5	1.30
	SIMULT	SHEAR	-18.5	0.0	SIMULT	MOM	15.4	35.5	
19.23	0.0	0.0	0.0	0.0	-6.2	-1.0	0.0	-23.1	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

FLEXURAL STRESSES - BEAM

SPAN 1

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.88	-0.982	-0.166	-3.324	0.000	0.982	0.166	3.324	0.000
3.75	-1.746	-0.295	-5.680	0.000	1.746	0.295	5.680	0.000
5.62	-2.291	-0.387	-7.068	0.000	2.291	0.387	7.068	0.000
7.50	-2.619	-0.442	-8.176	0.000	2.619	0.442	8.176	0.000
9.38	-2.728	-0.460	-8.660	0.000	2.728	0.460	8.660	0.000
11.25	-2.619	-0.442	-8.176	0.000	2.619	0.442	8.176	0.000
13.12	-2.291	-0.387	-7.068	0.000	2.291	0.387	7.068	0.000
15.00	-1.746	-0.295	-5.680	0.000	1.746	0.295	5.680	0.000
16.88	-0.982	-0.166	-3.324	0.000	0.982	0.166	3.324	0.000
18.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 2

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.174	-3.436	0.000	1.033	0.174	3.436	0.000
3.85	-1.836	-0.310	-5.878	0.000	1.836	0.310	5.878	0.000
5.77	-2.410	-0.407	-7.328	0.000	2.410	0.407	7.328	0.000
7.69	-2.755	-0.465	-8.473	0.000	2.755	0.465	8.473	0.000
9.62	-2.869	-0.484	-8.969	0.000	2.869	0.484	8.969	0.000
11.54	-2.755	-0.465	-8.473	0.000	2.755	0.465	8.473	0.000
13.46	-2.410	-0.407	-7.328	0.000	2.410	0.407	7.328	0.000
15.38	-1.836	-0.310	-5.878	0.000	1.836	0.310	5.878	0.000
17.31	-1.033	-0.174	-3.436	0.000	1.033	0.174	3.436	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM – WITHOUT FWS.

BAR7 Filename: LUC2_no.dat

Calculated: EFD, 4/27/11 **Checked:** DEK, 4/28/11 **Updated:** EFD, 4/28/11 **Verified:** DEK, 4/28/11

SPAN 3

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X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.115	0.000	1.000	2.90 V	4.05 V
1.92	0.666	0.112	2.491	-0.120	1.000	3.70 V	5.15 V
3.85	0.499	0.084	2.131	-0.240	1.000	2.44 T	3.46 T
5.77	0.333	0.056	1.771	-0.470	1.000	1.87 T	2.69 T
7.69	0.166	0.028	1.411	-0.710	1.000	1.57 T	2.28 T
9.62	0.000	0.000	1.051	-1.051	1.000	1.47 T	2.13 T
11.54	-0.166	-0.028	0.710	-1.411	1.000	1.57 T	2.28 T
13.46	-0.333	-0.056	0.470	-1.771	1.000	1.87 T	2.69 T
15.38	-0.499	-0.084	0.240	-2.131	1.000	2.44 T	3.46 T
17.31	-0.666	-0.112	0.120	-2.491	1.000	3.70 V	5.15 V
19.23	-0.832	-0.140	0.000	-3.115	1.000	2.90 V	4.05 V

SPAN 4

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.115	0.000	1.000	2.90 V	4.05 V
1.92	0.666	0.112	2.491	-0.120	1.000	3.70 V	5.15 V
3.85	0.499	0.084	2.131	-0.240	1.000	2.44 T	3.46 T
5.77	0.333	0.056	1.771	-0.470	1.000	1.87 T	2.69 T
7.69	0.166	0.028	1.411	-0.710	1.000	1.57 T	2.28 T
9.62	0.000	0.000	1.051	-1.051	1.000	1.47 T	2.13 T
11.54	-0.166	-0.028	0.710	-1.411	1.000	1.57 T	2.28 T
13.46	-0.333	-0.056	0.470	-1.771	1.000	1.87 T	2.69 T
15.38	-0.499	-0.084	0.240	-2.131	1.000	2.44 T	3.46 T
17.31	-0.666	-0.112	0.120	-2.491	1.000	3.70 V	5.15 V
19.23	-0.832	-0.140	0.000	-3.115	1.000	2.90 V	4.05 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.

 * STRINGER - LIVE LOAD SP-5 *

MAXIMUM REACTIONS

SUPPORT	DL1	DL2	+(LL+I)	-(LL+I)	REACTIONS		MOMENTS	
					+I.F.	-I.F.	+I.F.	-I.F.
1	6.0	1.0	22.2	0.0	1.30			
2	12.2	2.1	24.0	0.0	1.30			
3	12.3	2.1	24.0	0.0	1.30			
4	12.3	2.1	24.0	0.0	1.30			
5	6.2	1.0	22.4	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

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X	DL1		DL2		+(LL+I)		-(LL+I)		I.F.
	MOMENT	SHEAR	MOMENT	SHEAR	MOMENT	SHEAR	MOMENT	SHEAR	
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.88	10.2	1.7	32.8	0.0	4.8	0.8	17.5	-1.1	1.30
	SIMULT	SHEAR	17.5	0.0	SIMULT	MOM	32.8	18.2	
3.75	18.1	3.0	56.2	0.0	3.6	0.6	15.0	-2.2	1.30
	SIMULT	SHEAR	15.0	0.0	SIMULT	MOM	56.2	32.4	
5.62	23.7	4.0	72.1	0.0	2.4	0.4	12.8	-4.2	1.30
	SIMULT	SHEAR	12.8	0.0	SIMULT	MOM	72.1	54.8	
7.50	27.1	4.6	80.0	0.0	1.2	0.2	10.7	-6.3	1.30
	SIMULT	SHEAR	10.7	0.0	SIMULT	MOM	80.0	71.3	
9.38	28.2	4.8	79.7	0.0	0.0	0.0	8.5	-8.5	1.30
	SIMULT	SHEAR	-8.5	0.0	SIMULT	MOM	79.7	79.7	
11.25	27.1	4.6	80.0	0.0	-1.2	-0.2	6.3	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0	SIMULT	MOM	71.3	80.0	
13.12	23.7	4.0	72.1	0.0	-2.4	-0.4	4.2	-12.8	1.30
	SIMULT	SHEAR	-12.8	0.0	SIMULT	MOM	54.8	72.1	
15.00	18.1	3.0	56.2	0.0	-3.6	-0.6	2.2	-15.0	1.30
	SIMULT	SHEAR	-15.0	0.0	SIMULT	MOM	32.4	56.2	
16.88	10.2	1.7	32.8	0.0	-4.8	-0.8	1.1	-17.5	1.30
	SIMULT	SHEAR	-17.5	0.0	SIMULT	MOM	18.2	32.8	
18.75	0.0	0.0	0.0	0.0	-6.0	-1.0	0.0	-22.2	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 4 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

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X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	1.0	22.4	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	1.8	34.1	0.0	4.9	0.8	17.7	-1.1	1.30
	SIMULT	SHEAR	17.7	0.0	SIMULT	MOM	34.1	18.7	
3.85	19.0	3.2	57.9	0.0	3.7	0.6	15.0	-2.2	1.30
	SIMULT	SHEAR	15.0	0.0	SIMULT	MOM	57.9	33.3	
5.77	24.9	4.2	74.3	0.0	2.5	0.4	12.9	-4.2	1.30
	SIMULT	SHEAR	12.9	0.0	SIMULT	MOM	74.3	57.0	
7.69	28.5	4.8	82.5	0.0	1.2	0.2	10.7	-6.4	1.30
	SIMULT	SHEAR	10.7	0.0	SIMULT	MOM	82.5	73.8	
9.62	29.7	5.0	82.3	0.0	0.0	0.0	8.6	-8.6	1.30
	SIMULT	SHEAR	-8.6	0.0	SIMULT	MOM	82.3	82.3	
11.54	28.5	4.8	82.5	0.0	-1.2	-0.2	6.4	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0	SIMULT	MOM	73.8	82.5	
13.46	24.9	4.2	74.3	0.0	-2.5	-0.4	4.2	-12.9	1.30
	SIMULT	SHEAR	-12.9	0.0	SIMULT	MOM	57.0	74.3	
15.38	19.0	3.2	57.9	0.0	-3.7	-0.6	2.2	-15.0	1.30
	SIMULT	SHEAR	-15.0	0.0	SIMULT	MOM	33.3	57.9	
17.31	10.7	1.8	34.1	0.0	-4.9	-0.8	1.1	-17.7	1.30
	SIMULT	SHEAR	-17.7	0.0	SIMULT	MOM	18.7	34.1	
19.23	0.0	0.0	0.0	0.0	-6.2	-1.0	0.0	-22.4	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

FLEXURAL STRESSES - BEAM

SPAN 1

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.88	-0.982	-0.166	-3.173	0.000	0.982	0.166	3.173	0.000
3.75	-1.746	-0.295	-5.434	0.000	1.746	0.295	5.434	0.000
5.62	-2.291	-0.387	-6.975	0.000	2.291	0.387	6.975	0.000
7.50	-2.619	-0.442	-7.733	0.000	2.619	0.442	7.733	0.000
9.38	-2.728	-0.460	-7.707	0.000	2.728	0.460	7.707	0.000
11.25	-2.619	-0.442	-7.733	0.000	2.619	0.442	7.733	0.000
13.12	-2.291	-0.387	-6.975	0.000	2.291	0.387	6.975	0.000
15.00	-1.746	-0.295	-5.434	0.000	1.746	0.295	5.434	0.000
16.88	-0.982	-0.166	-3.173	0.000	0.982	0.166	3.173	0.000
18.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 2

=====

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.174	-3.296	0.000	1.033	0.174	3.296	0.000
3.85	-1.836	-0.310	-5.594	0.000	1.836	0.310	5.594	0.000
5.77	-2.410	-0.407	-7.186	0.000	2.410	0.407	7.186	0.000
7.69	-2.755	-0.465	-7.974	0.000	2.755	0.465	7.974	0.000
9.62	-2.869	-0.484	-7.958	0.000	2.869	0.484	7.958	0.000
11.54	-2.755	-0.465	-7.974	0.000	2.755	0.465	7.974	0.000
13.46	-2.410	-0.407	-7.186	0.000	2.410	0.407	7.186	0.000
15.38	-1.836	-0.310	-5.594	0.000	1.836	0.310	5.594	0.000
17.31	-1.033	-0.174	-3.296	0.000	1.033	0.174	3.296	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITHOUT FWS.

BAR7 Filename: LUC2_no.dat

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 3

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X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.025	0.000	1.000	2.98 V	4.17 V
1.92	0.666	0.112	2.389	-0.146	1.000	3.86 V	5.37 V
3.85	0.499	0.084	2.028	-0.291	1.000	2.57 T	3.64 T
5.77	0.333	0.056	1.737	-0.571	1.000	1.90 T	2.74 T
7.69	0.166	0.028	1.445	-0.863	1.000	1.67 T	2.42 T
9.62	0.000	0.000	1.154	-1.154	1.000	1.65 T	2.41 T
11.54	-0.166	-0.028	0.863	-1.445	1.000	1.67 T	2.42 T
13.46	-0.333	-0.056	0.571	-1.737	1.000	1.90 T	2.74 T
15.38	-0.499	-0.084	0.291	-2.028	1.000	2.57 T	3.64 T
17.31	-0.666	-0.112	0.146	-2.389	1.000	3.86 V	5.37 V
19.23	-0.832	-0.140	0.000	-3.025	1.000	2.98 V	4.17 V

SPAN 4

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.140	3.025	0.000	1.000	2.98 V	4.17 V
1.92	0.666	0.112	2.389	-0.146	1.000	3.86 V	5.37 V
3.85	0.499	0.084	2.028	-0.291	1.000	2.57 T	3.64 T
5.77	0.333	0.056	1.737	-0.571	1.000	1.90 T	2.74 T
7.69	0.166	0.028	1.445	-0.863	1.000	1.67 T	2.42 T
9.62	0.000	0.000	1.154	-1.154	1.000	1.65 T	2.41 T
11.54	-0.166	-0.028	0.863	-1.445	1.000	1.67 T	2.42 T
13.46	-0.333	-0.056	0.571	-1.737	1.000	1.90 T	2.74 T
15.38	-0.499	-0.084	0.291	-2.028	1.000	2.57 T	3.64 T
17.31	-0.666	-0.112	0.146	-2.389	1.000	3.86 V	5.37 V
19.23	-0.832	-0.140	0.000	-3.025	1.000	2.98 V	4.17 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.

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

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+ FLOOR BEAM ANALYSIS +
+
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FLOORBEAM SPAN: 59.00 CANTILEVER: 0.00
FLOORBEAM LIVE LOAD MOMENT AND SHEAR FACTORS

X	FACTOR	WHEEL LOAD POSITIONS					
		LANE 1/4/7	LANE 2/5/8		LANE 3/6		
0.00	0.000 M	0.00	0.00				
	2.068 V	5.00	11.00	17.00	23.00	34.00	40.00
		46.00	52.00				
5.90	12.110 M	5.90	11.90	17.00	23.00	34.00	40.00
		46.00	52.00				
	2.053 V	5.90	11.90	17.00	23.00	34.00	40.00
11.80	21.600 M	7.00	13.00	17.00	23.00	34.00	40.00
		46.00	52.00				
	1.554 V	5.80	11.80	17.00	23.00	34.00	40.00
17.70	28.090 M	7.00	13.00	17.70	23.70	34.00	40.00
		46.00	52.00				
	1.192 V	5.00	11.00	17.70	23.70	34.00	40.00
23.60	31.300 M	7.00	13.00	19.00	25.00	34.00	40.00
		46.00	52.00				
	0.693 V	5.00	11.00	17.60	23.60	34.00	40.00
29.50	32.000 M	7.00	13.00	19.00	25.00	34.00	40.00
		46.00	52.00				
	0.542 V	5.00	11.00	17.00	23.00	34.00	40.00
		46.00	52.00				

FACTOR CODES: M - MOMENT, V - SHEAR

<===== >
FLOORBEAM 2
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FLOORBEAM SECTION PROPERTIES (NON-COMPOSITE)

X	DEPTH	AREA	M OF I	C BOT	S TOP	S BOT
0.00	66.00	54.98	37315.7	33.00	1130.78	1130.78
5.90	66.00	54.98	37315.7	33.00	1130.78	1130.78
9.95	66.00	54.98	37315.7	33.00	1130.78	1130.78
11.80	67.25	72.48	56736.4	33.62	1687.33	1687.33
17.70	67.25	72.48	56736.4	33.62	1687.33	1687.33
23.60	67.25	72.48	56736.4	33.62	1687.33	1687.33
29.50	67.25	72.48	56736.4	33.62	1687.33	1687.33

DEAD LOADS ACTING ON FLOORBEAM

UNIFORM LOAD		CONCENTRATED LOADS		
FLOORBEAM	INPUT	DIST	DL1	DL2
WEIGHT	DL1			
0.227	0.111	2.630	10.964	2.058
		8.000	12.190	2.058
		13.380	12.190	2.058
		18.750	12.190	2.058
		24.130	12.190	2.058
		29.500	12.190	2.058
		34.880	12.190	2.058
		40.250	12.190	2.058
		45.630	12.190	2.058
		51.000	12.190	2.058
		56.380	10.964	2.058

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

* FLOORBEAM - LIVE LOAD SP-2 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 24.80
LIVE LOAD IMPACT FACTORS : POS MOM 1.27

UNFACTORED MOMENTS AND SHEARS

X	DL1 MOMENT	DL2 MOMENT	LL+I MOMENT	DL1 SHEAR	DL2 SHEAR	LL+I SHEAR	I.F.
0.00	0.0	0.0	0.0	75.8	11.3	65.2	1.27
5.90	405.3	60.0	381.9	62.8	9.3	65.2	1.28
9.95	633.3	93.6	596.3	53.1	7.8	54.6	1.29
11.80	723.8	106.9	681.2	48.6	7.2	49.7	1.29
17.70	952.2	140.4	885.9	34.5	5.1	38.4	1.30
23.60	1090.4	160.8	987.2	20.3	3.1	22.3	1.30
29.50	1138.7	168.0	1009.2	-6.1	-1.0	17.5	1.30

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
5.90	-4.301	-0.637	-4.053	0.000	4.301	0.637	4.053	0.000
9.95	-6.720	-0.993	-6.328	0.000	6.720	0.993	6.328	0.000
11.80	-5.147	-0.760	-4.845	0.000	5.147	0.760	4.845	0.000
17.70	-6.772	-0.999	-6.301	0.000	6.772	0.999	6.301	0.000
23.60	-7.755	-1.144	-7.021	0.000	7.755	1.144	7.021	0.000
29.50	-8.098	-1.195	-7.178	0.000	8.098	1.195	7.178	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	3.115	0.465	2.681	0.000	1.000	4.04 V	5.92 V
5.90	2.582	0.381	2.680	0.000	1.000	3.75 I	5.52 I
9.95	2.182	0.323	2.244	0.000	1.000	2.42 I	3.72 I
11.80	1.999	0.296	2.044	0.000	1.000	3.26 I	4.85 I
17.70	1.416	0.211	1.579	0.000	1.000	2.69 T	4.12 T
23.60	0.833	0.127	0.919	0.000	1.000	2.26 T	3.54 T
29.50	-0.251	-0.042	0.719	0.000	1.000	2.15 T	3.41 T

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

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	4240.4 B	3392.3	609.8	3.51 V	5.86 V			
5.90	4240.4 U	3392.3	609.8	3.34 I	5.57 I			
9.95	4240.4 U	3392.3	473.3	2.27 I	3.79 I			
11.80	6327.5 B	5062.0	473.3	2.95 I	4.92 I			
17.70	6327.5 B	5062.0	473.3	2.56 T	4.26 T			
23.60	6327.5 B	5062.0	473.3	2.20 T	3.66 T			
29.50	6327.5 B	5062.0	473.3	2.12 T	3.53 T			

Load Factor Rating
Load: 2F1
Inventory: 2.12 - OK
Operating: 3.53 - OK

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

 * FLOORBEAM - LIVE LOAD SP-4 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 39.36
 LIVE LOAD IMPACT FACTORS : POS MOM 1.27

UNFACTORED MOMENTS AND SHEARS

X	DL1 MOMENT	DL2 MOMENT	LL+I MOMENT	DL1 SHEAR	DL2 SHEAR	LL+I SHEAR	I.F.
0.00	0.0	0.0	0.0	75.8	11.3	103.5	1.27
5.90	405.3	60.0	606.2	62.8	9.3	103.5	1.28
9.95	633.3	93.6	946.5	53.1	7.8	86.6	1.29
11.80	723.8	106.9	1081.3	48.6	7.2	78.9	1.29
17.70	952.2	140.4	1406.2	34.5	5.1	61.0	1.30
23.60	1090.4	160.8	1566.9	20.3	3.1	35.5	1.30
29.50	1138.7	168.0	1602.0	-6.1	-1.0	27.8	1.30

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
5.90	-4.301	-0.637	-6.434	0.000	4.301	0.637	6.434	0.000
9.95	-6.720	-0.993	-10.044	0.000	6.720	0.993	10.044	0.000
11.80	-5.147	-0.760	-7.690	0.000	5.147	0.760	7.690	0.000
17.70	-6.772	-0.999	-10.001	0.000	6.772	0.999	10.001	0.000
23.60	-7.755	-1.144	-11.144	0.000	7.755	1.144	11.144	0.000
29.50	-8.098	-1.195	-11.393	0.000	8.098	1.195	11.393	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	3.115	0.465	4.255	0.000	1.000	2.54 V	3.73 V
5.90	2.582	0.381	4.254	0.000	1.000	2.36 I	3.48 I
9.95	2.182	0.323	3.561	0.000	1.000	1.53 I	2.35 I
11.80	1.999	0.296	3.245	0.000	1.000	2.05 I	3.06 I
17.70	1.416	0.211	2.506	0.000	1.000	1.70 T	2.60 T
23.60	0.833	0.127	1.458	0.000	1.000	1.42 T	2.23 T
29.50	-0.251	-0.042	1.141	0.000	1.000	1.36 T	2.15 T

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

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	4240.4 B	3392.3	609.8	2.21 V	3.69 V			
5.90	4240.4 U	3392.3	609.8	2.11 I	3.51 I			
9.95	4240.4 U	3392.3	473.3	1.43 I	2.39 I			
11.80	6327.5 B	5062.0	473.3	1.86 I	3.10 I			
17.70	6327.5 B	5062.0	473.3	1.61 T	2.68 T			
23.60	6327.5 B	5062.0	473.3	1.38 T	2.31 T			
29.50	6327.5 B	5062.0	473.3	1.33 T	2.22 T			

Load Factor Rating
 Load: 4F1
 Inventory: 1.33 - OK
 Operating: 2.22 - OK

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+ **R A T I N G S U M M A R Y** +
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OUTPUT REMOVED: Stiffening Girder Summary

MEMBER: STRINGER AT 8.00

LOAD	ALLOWABLE STRESS RATING				LOAD FACTOR RATING			
	FACTOR	TONS	X	SPAN	FACTOR	TONS	X	SPAN
SP-1 IR (CRITICAL)	1.39 T	50.0	9.62	4	<u>1.31</u> O	47.2	9.62	4
OR (CRITICAL)	2.02 T	72.9	9.62	4	<u>2.18</u> O	78.6	9.62	4
IR (POS MOM)	1.39 T	50.0	9.62	4	1.31 O	47.2	9.62	4
OR (POS MOM)	2.02 T	72.9	9.62	4	2.18 O	78.6	9.62	4
SP-2 IR (CRITICAL)	2.19 T	32.9	11.54	4	<u>2.06</u> O	30.9	11.54	4
OR (CRITICAL)	3.19 T	47.8	11.54	4	<u>3.43</u> O	51.5	11.54	4
IR (POS MOM)	2.19 T	32.9	11.54	4	2.06 O	30.9	11.54	4
OR (POS MOM)	3.19 T	47.8	11.54	4	3.43 O	51.5	11.54	4
SP-3 IR (CRITICAL)	1.65 T	38.0	9.62	4	<u>1.56</u> O	35.8	9.62	4
OR (CRITICAL)	2.41 T	55.3	9.62	4	<u>2.59</u> O	59.7	9.62	4
IR (POS MOM)	1.65 T	38.0	9.62	4	1.56 O	35.8	9.62	4
OR (POS MOM)	2.41 T	55.3	9.62	4	2.59 O	59.7	9.62	4
SP-4 IR (CRITICAL)	1.47 T	39.6	9.62	4	<u>1.38</u> O	37.3	9.62	4
OR (CRITICAL)	2.13 T	57.6	9.62	4	<u>2.30</u> O	62.2	9.62	4
IR (POS MOM)	1.47 T	39.6	9.62	4	1.38 O	37.3	9.62	4
OR (POS MOM)	2.13 T	57.6	9.62	4	2.30 O	62.2	9.62	4
SP-5 IR (CRITICAL)	1.65 T	66.1	9.62	4	<u>1.56</u> O	62.3	9.62	4
OR (CRITICAL)	2.41 T	96.2	9.62	4	<u>2.59</u> O	103.8	9.62	4
IR (POS MOM)	1.65 T	66.1	9.62	4	1.56 O	62.3	9.62	4
OR (POS MOM)	2.41 T	96.2	9.62	4	2.59 O	103.8	9.62	4

HS20

2F1

3F1

4F1

5C1

MEMBER: FLOORBEAM

LOAD	ALLOWABLE STRESS RATING				LOAD FACTOR RATING			
	FACTOR	TONS	X	FLBM	FACTOR	TONS	X	FLBM
SP-1 IR (CRITICAL)	1.25 T	45.0	29.50	2	<u>1.23</u> T	44.2	29.50	2
OR (CRITICAL)	1.98 T	71.2	29.50	2	<u>2.05</u> T	73.7	29.50	2
IR (POS MOM)	1.25 T	45.0	29.50	2	1.23 T	44.2	29.50	2
OR (POS MOM)	1.98 T	71.2	29.50	2	2.05 T	73.7	29.50	2
SP-2 IR (CRITICAL)	2.15 T	32.3	29.50	2	<u>2.12</u> T	31.8	29.50	2
OR (CRITICAL)	3.41 T	51.1	29.50	2	<u>3.53</u> T	52.9	29.50	2
IR (POS MOM)	2.15 T	32.3	29.50	2	2.12 T	31.8	29.50	2
OR (POS MOM)	3.41 T	51.1	29.50	2	3.53 T	52.9	29.50	2
SP-3 IR (CRITICAL)	1.48 T	34.0	29.50	2	<u>1.45</u> T	33.4	29.50	2
OR (CRITICAL)	2.34 T	53.8	29.50	2	<u>2.42</u> T	55.7	29.50	2
IR (POS MOM)	1.48 T	34.0	29.50	2	1.45 T	33.4	29.50	2
OR (POS MOM)	2.34 T	53.8	29.50	2	2.42 T	55.7	29.50	2
SP-4 IR (CRITICAL)	1.36 T	36.6	29.50	2	<u>1.33</u> T	36.0	29.50	2
OR (CRITICAL)	2.15 T	58.0	29.50	2	<u>2.22</u> T	60.0	29.50	2
IR (POS MOM)	1.36 T	36.6	29.50	2	1.33 T	36.0	29.50	2
OR (POS MOM)	2.15 T	58.0	29.50	2	2.22 T	60.0	29.50	2
SP-5 IR (CRITICAL)	1.53 T	61.2	29.50	2	<u>1.50</u> T	60.2	29.50	2
OR (CRITICAL)	2.42 T	96.9	29.50	2	<u>2.51</u> T	100.3	29.50	2
IR (POS MOM)	1.53 T	61.2	29.50	2	1.50 T	60.2	29.50	2
OR (POS MOM)	2.42 T	96.9	29.50	2	2.51 T	100.3	29.50	2

HS20

2F1

3F1

4F1

5C1

*****COPY OF INPUT FILE*****
FLOORDRAW AND SCREENSHOT

*****END INPUT FILE*****

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! Project
! XSection
! SpnLngth
! LaneLoc
! StringLen
! StringLoc
! SteelMem
! SteelMem
! SteelMem
! SteelMem
! SteelMem
! SteelMem
! SteelMem
! LatBrace
! LatBrace
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STEEL MEMBER PROPERTIES

S	T	WF BM	WF BM	FLANGE	WF BM
G P	Y	M OF I	AREA	OR	OR WEB
F A	P	OR VRT	OR HRZ	ANGLE	A
S N	RANGE E	LEG	LEG	THICK	R
				WIDTH	DEPTH
					THICK

OUTPUT REMOVED: Stiffening Girder Properties

RANGE	VT LEG	HZ LEG	THICK	WIDTH	V	DEPTH	THICK
F 2 0.00 B	8.00	6.00	0.5625	0.000		66.00	0.3750
	TPW	TPT	BPW	BPT	COMP	FY	FY TOP
	0.00	0.0000	0.00	0.0000	N	45.0	0.0
							FY BOT
							0.0
							CG TOP
							0.000
							CG BOT
							0.000

Silicone

RANGE	VT LEG	HZ LEG	THICK	WIDTH	V	DEPTH	THICK
F 2 9.95 B	8.00	6.00	0.5625	0.000		66.00	0.3750
	TPW	TPT	BPW	BPT	COMP	FY	FY TOP
	0.00	0.0000	0.00	0.0000	N	45.0	0.0
							FY BOT
							0.0
							CG TOP
							0.000
							CG BOT
							0.000

Silicone

RANGE	VT LEG	HZ LEG	THICK	WIDTH	V	DEPTH	THICK
F 2 29.50 B	8.00	6.00	0.5625	0.000		66.00	0.3750
	TPW	TPT	BPW	BPT	COMP	FY	FY TOP
	14.00	0.6250	14.00	0.6250	N	45.0	0.0
							FY BOT
							0.0
							CG TOP
							0.000
							CG BOT
							0.000

Silicone

RANGE	M OF I	AREA	THICK	WIDTH	V	DEPTH	THICK
S 0.00 W	1304.90	17.64	0.6250	8.015		21.03	0.3750
	TPW	TPT	BPW	BPT	COMP	FY	FY TOP
	0.00	0.0000	0.00	0.0000	N	30.0	0.0
							FY BOT
							0.0
							CG TOP
							0.000
							CG BOT
							0.000

Carbon

LATERAL BRACE POINTS AND STIFFENER SPACINGS

B OR S	C	C	C
G OR F	O NO.	O NO.	O NO.
CODE	D OF	D OF	D OF
SPAN	E SPCS SPACING	E SPCS SPACING	E SPCS SPACING

OUTPUT REMOVED: Stiffening Girder Properties

BF	2	T	1	2.60	T	10	5.38	T	1	2.60	0	0.00
			0	0.00		0	0.00		0	0.00	0	0.00
SF	2	T	3	2.69	T	8	5.38	T	3	2.69	0	0.00
			0	0.00		0	0.00		0	0.00	0	0.00

SPECIAL LIVE LOADING 1

LANE LOADING

NUMBER OF AXLES	3%	UNIFORM LANE LOAD	CONC LOAD MOMENT	CONC LOAD SHEAR	GAGE DISTANCE	PASSING DISTANCE	VARY LAST	MAX AXLE DIST
3	INCR	0.640	18.000	26.000	6.0	4.0	Y	30.0

TRUCK LOAD

AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST	AXLE NO.	LOAD	DIST
1	8.00	14.00	2	32.00	14.00	3	32.00	0.00

HS20

OUTPUT REMOVED: Stiffening Girder Analysis

+++++
 +
 + STRINGER ANALYSIS +
 +
 +
 +++++

THE STRINGER LOCATED AT 8.00 FT. FROM THE CENTER LINE OF GIRDER OR TRUSS IS CRITICAL.

DEAD LOADS ACTING ON STRINGER

STRINGER WEIGHT	SLAB WEIGHT	INPUT DL1	TOTAL DL1	TOTAL DL2
0.060	0.448	0.134	0.642	0.250

STRINGER SECTION PROPERTIES

DEPTH	GROSS AREA	MOMENT OF INERTIA	C BOTTOM	SECTION MODULUS TOP	SECTION MODULUS BOTTOM
21.03	17.64	1304.90	10.52	124.10	124.10

NON-COMPOSITE

DEFLECTIONS

SPAN 1 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.30

X	DEAD LOAD		LIVE LOAD + IMPACT				
	DL1	DL2	SP-1	SP-2	SP-3	SP-4	SP-5
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.88	0.015	0.006	0.029	0.020	0.028	0.032	0.028
3.75	0.028	0.011	0.055	0.038	0.054	0.061	0.054
5.62	0.038	0.015	0.075	0.052	0.075	0.085	0.075
7.50	0.045	0.017	0.090	0.060	0.086	0.100	0.086
9.38	0.047	0.018	0.095	0.061	0.089	0.105	0.089
11.25	0.045	0.017	0.090	0.060	0.086	0.100	0.086
13.12	0.038	0.015	0.075	0.052	0.075	0.085	0.075
15.00	0.028	0.011	0.055	0.038	0.054	0.061	0.054
16.88	0.015	0.006	0.029	0.020	0.028	0.032	0.028
18.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 2 - LIVE LOAD IMPACT FACTOR FOR DEFLECTION: 1.30

X	DEAD LOAD		LIVE LOAD + IMPACT				
	DL1	DL2	SP-1	SP-2	SP-3	SP-4	SP-5
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.92	0.016	0.006	0.031	0.022	0.031	0.035	0.031
3.85	0.031	0.012	0.059	0.042	0.059	0.066	0.059
5.77	0.042	0.016	0.081	0.057	0.082	0.092	0.082
7.69	0.049	0.019	0.097	0.066	0.094	0.109	0.094
9.62	0.052	0.020	0.102	0.067	0.097	0.114	0.097
11.54	0.049	0.019	0.097	0.066	0.094	0.109	0.094
13.46	0.042	0.016	0.081	0.057	0.082	0.092	0.082
15.38	0.031	0.012	0.059	0.042	0.059	0.066	0.059
17.31	0.016	0.006	0.031	0.022	0.031	0.035	0.031
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000

UNFACTORED MOMENTS AND SHEARS

SPAN 1 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

=====									
X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.0	2.3	28.9	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.88	10.2	4.0	40.2	0.0	4.8	1.9	21.4	-2.0	1.30
	SIMULT	SHEAR	21.4	0.0	SIMULT	MOM	40.2	34.3	
3.75	18.1	7.0	65.1	0.0	3.6	1.4	17.4	-4.1	1.30
	SIMULT	SHEAR	17.4	0.0	SIMULT	MOM	65.1	61.0	
5.62	23.7	9.2	80.1	0.0	2.4	0.9	14.2	-6.1	1.30
	SIMULT	SHEAR	14.2	0.0	SIMULT	MOM	80.1	80.1	
7.50	27.1	10.6	91.5	0.0	1.2	0.5	12.2	-8.1	1.30
	SIMULT	SHEAR	12.2	0.0	SIMULT	MOM	91.5	91.5	
9.38	28.2	11.0	95.4	0.0	0.0	0.0	10.2	-10.2	1.30
	SIMULT	SHEAR	-10.2	0.0	SIMULT	MOM	95.4	95.4	
11.25	27.1	10.6	91.5	0.0	-1.2	-0.5	8.1	-12.2	1.30
	SIMULT	SHEAR	-12.2	0.0	SIMULT	MOM	91.5	91.5	
13.12	23.7	9.2	80.1	0.0	-2.4	-0.9	6.1	-14.2	1.30
	SIMULT	SHEAR	-14.2	0.0	SIMULT	MOM	80.1	80.1	
15.00	18.1	7.0	65.1	0.0	-3.6	-1.4	4.1	-17.4	1.30
	SIMULT	SHEAR	-17.4	0.0	SIMULT	MOM	61.0	65.1	
16.88	10.2	4.0	40.2	0.0	-4.8	-1.9	2.0	-21.4	1.30
	SIMULT	SHEAR	-21.4	0.0	SIMULT	MOM	34.3	40.2	
18.75	0.0	0.0	0.0	0.0	-6.0	-2.3	0.0	-28.9	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

SPAN 2 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

=====									
X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	29.2	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	41.9	0.0	4.9	1.9	21.8	-2.0	1.30
	SIMULT	SHEAR	21.8	0.0	SIMULT	MOM	41.9	35.2	
3.85	19.0	7.4	68.2	0.0	3.7	1.4	17.7	-4.1	1.30
	SIMULT	SHEAR	17.7	0.0	SIMULT	MOM	68.2	62.6	
5.77	24.9	9.7	82.1	0.0	2.5	1.0	14.2	-6.1	1.30
	SIMULT	SHEAR	14.2	0.0	SIMULT	MOM	82.1	82.1	
7.69	28.5	11.1	93.9	0.0	1.2	0.5	12.2	-8.1	1.30
	SIMULT	SHEAR	12.2	0.0	SIMULT	MOM	93.9	93.9	
9.62	29.7	11.6	97.8	0.0	0.0	0.0	10.2	-10.2	1.30
	SIMULT	SHEAR	-10.2	0.0	SIMULT	MOM	97.8	97.8	
11.54	28.5	11.1	93.9	0.0	-1.2	-0.5	8.1	-12.2	1.30
	SIMULT	SHEAR	-12.2	0.0	SIMULT	MOM	93.9	93.9	
13.46	24.9	9.7	82.1	0.0	-2.5	-1.0	6.1	-14.2	1.30
	SIMULT	SHEAR	-14.2	0.0	SIMULT	MOM	82.1	82.1	
15.38	19.0	7.4	68.2	0.0	-3.7	-1.4	4.1	-17.7	1.30
	SIMULT	SHEAR	-17.7	0.0	SIMULT	MOM	62.6	68.2	
17.31	10.7	4.2	41.9	0.0	-4.9	-1.9	2.0	-21.8	1.30
	SIMULT	SHEAR	-21.8	0.0	SIMULT	MOM	35.2	41.9	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-29.2	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

Calculated: EFD, 4/27/11

Checked: DEK, 4/28/11

Updated: EFD, 4/28/11

Verified: DEK, 4/28/11

FLEXURAL STRESSES - BEAM

SPAN 1

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.88	-0.982	-0.383	-3.885	0.000	0.982	0.383	3.885	0.000
3.75	-1.746	-0.680	-6.295	0.000	1.746	0.680	6.295	0.000
5.62	-2.291	-0.893	-7.745	0.000	2.291	0.893	7.745	0.000
7.50	-2.619	-1.021	-8.852	0.000	2.619	1.021	8.852	0.000
9.38	-2.728	-1.063	-9.221	0.000	2.728	1.063	9.221	0.000
11.25	-2.619	-1.021	-8.852	0.000	2.619	1.021	8.852	0.000
13.12	-2.291	-0.893	-7.745	0.000	2.291	0.893	7.745	0.000
15.00	-1.746	-0.680	-6.295	0.000	1.746	0.680	6.295	0.000
16.88	-0.982	-0.383	-3.885	0.000	0.982	0.383	3.885	0.000
18.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 2

=====

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-4.055	0.000	1.033	0.403	4.055	0.000
3.85	-1.836	-0.716	-6.597	0.000	1.836	0.716	6.597	0.000
5.77	-2.410	-0.939	-7.944	0.000	2.410	0.939	7.944	0.000
7.69	-2.755	-1.074	-9.078	0.000	2.755	1.074	9.078	0.000
9.62	-2.869	-1.118	-9.457	0.000	2.869	1.118	9.457	0.000
11.54	-2.755	-1.074	-9.078	0.000	2.755	1.074	9.078	0.000
13.46	-2.410	-0.939	-7.944	0.000	2.410	0.939	7.944	0.000
15.38	-1.836	-0.716	-6.597	0.000	1.836	0.716	6.597	0.000
17.31	-1.033	-0.403	-4.055	0.000	1.033	0.403	4.055	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 3

=====

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-4.055	0.000	1.033	0.403	4.055	0.000
3.85	-1.836	-0.716	-6.597	0.000	1.836	0.716	6.597	0.000
5.77	-2.410	-0.939	-7.944	0.000	2.410	0.939	7.944	0.000
7.69	-2.755	-1.074	-9.078	0.000	2.755	1.074	9.078	0.000
9.62	-2.869	-1.118	-9.457	0.000	2.869	1.118	9.457	0.000
11.54	-2.755	-1.074	-9.078	0.000	2.755	1.074	9.078	0.000
13.46	-2.410	-0.939	-7.944	0.000	2.410	0.939	7.944	0.000
15.38	-1.836	-0.716	-6.597	0.000	1.836	0.716	6.597	0.000
17.31	-1.033	-0.403	-4.055	0.000	1.033	0.403	4.055	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 4

=====

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-4.055	0.000	1.033	0.403	4.055	0.000
3.85	-1.836	-0.716	-6.597	0.000	1.836	0.716	6.597	0.000
5.77	-2.410	-0.939	-7.944	0.000	2.410	0.939	7.944	0.000
7.69	-2.755	-1.074	-9.078	0.000	2.755	1.074	9.078	0.000
9.62	-2.869	-1.118	-9.457	0.000	2.869	1.118	9.457	0.000
11.54	-2.755	-1.074	-9.078	0.000	2.755	1.074	9.078	0.000
13.46	-2.410	-0.939	-7.944	0.000	2.410	0.939	7.944	0.000
15.38	-1.836	-0.716	-6.597	0.000	1.836	0.716	6.597	0.000
17.31	-1.033	-0.403	-4.055	0.000	1.033	0.403	4.055	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1
=====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	1.89 V	3.15 V	347.2	1.89 V	3.15 V
1.88	310.2 B	248.2	129.1	2.59 V	4.32 V	347.2	2.59 V	4.32 V
3.75	310.2 B	248.2	129.1	1.97 T	3.28 T	347.2	2.06 O	3.43 O
5.62	310.2 B	248.2	129.1	1.54 T	2.57 T	347.2	1.61 O	2.69 O
7.50	310.2 B	248.2	129.1	1.32 T	2.20 T	347.2	1.38 O	2.30 O
9.38	310.2 B	248.2	129.1	1.25 T	2.09 T	347.2	1.32 O	2.19 O
11.25	310.2 B	248.2	129.1	1.32 T	2.20 T	347.2	1.38 O	2.30 O
13.12	310.2 B	248.2	129.1	1.54 T	2.57 T	347.2	1.61 O	2.69 O
15.00	310.2 B	248.2	129.1	1.97 T	3.28 T	347.2	2.06 O	3.43 O
16.88	310.2 B	248.2	129.1	2.59 V	4.32 V	347.2	2.59 V	4.32 V
18.75	310.2 B	248.2	129.1	1.89 V	3.15 V	347.2	1.89 V	3.15 V

SPAN 2
=====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	1.86 V	3.10 V	347.2	1.86 V	3.10 V
1.92	310.2 B	248.2	129.1	2.54 V	4.24 V	347.2	2.54 V	4.24 V
3.85	310.2 B	248.2	129.1	1.87 T	3.11 T	347.2	1.95 O	3.25 O
5.77	310.2 B	248.2	129.1	1.49 T	2.48 T	347.2	1.56 O	2.60 O
7.69	310.2 B	248.2	129.1	1.27 T	2.12 T	347.2	1.33 O	2.22 O
9.62	310.2 B	248.2	129.1	1.21 T	2.02 T	347.2	1.27 O	2.12 O
11.54	310.2 B	248.2	129.1	1.27 T	2.12 T	347.2	1.33 O	2.22 O
13.46	310.2 B	248.2	129.1	1.49 T	2.48 T	347.2	1.56 O	2.60 O
15.38	310.2 B	248.2	129.1	1.87 T	3.11 T	347.2	1.95 O	3.25 O
17.31	310.2 B	248.2	129.1	2.54 V	4.24 V	347.2	2.54 V	4.24 V
19.23	310.2 B	248.2	129.1	1.86 V	3.10 V	347.2	1.86 V	3.10 V

Load Factor Rating
Load: HS20
Inventory: 1.27 - OK
Operating: 2.12 - OK

SPAN 3
=====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	1.86 V	3.10 V	347.2	1.86 V	3.10 V
1.92	310.2 B	248.2	129.1	2.54 V	4.24 V	347.2	2.54 V	4.24 V
3.85	310.2 B	248.2	129.1	1.87 T	3.11 T	347.2	1.95 O	3.25 O
5.77	310.2 B	248.2	129.1	1.49 T	2.48 T	347.2	1.56 O	2.60 O
7.69	310.2 B	248.2	129.1	1.27 T	2.12 T	347.2	1.33 O	2.22 O
9.62	310.2 B	248.2	129.1	1.21 T	2.02 T	347.2	1.27 O	2.12 O
11.54	310.2 B	248.2	129.1	1.27 T	2.12 T	347.2	1.33 O	2.22 O
13.46	310.2 B	248.2	129.1	1.49 T	2.48 T	347.2	1.56 O	2.60 O
15.38	310.2 B	248.2	129.1	1.87 T	3.11 T	347.2	1.95 O	3.25 O
17.31	310.2 B	248.2	129.1	2.54 V	4.24 V	347.2	2.54 V	4.24 V
19.23	310.2 B	248.2	129.1	1.86 V	3.10 V	347.2	1.86 V	3.10 V

SPAN 4
=====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	1.86 V	3.10 V	347.2	1.86 V	3.10 V
1.92	310.2 B	248.2	129.1	2.54 V	4.24 V	347.2	2.54 V	4.24 V
3.85	310.2 B	248.2	129.1	1.87 T	3.11 T	347.2	1.95 O	3.25 O
5.77	310.2 B	248.2	129.1	1.49 T	2.48 T	347.2	1.56 O	2.60 O
7.69	310.2 B	248.2	129.1	1.27 T	2.12 T	347.2	1.33 O	2.22 O
9.62	310.2 B	248.2	129.1	1.21 T	2.02 T	347.2	1.27 O	2.12 O
11.54	310.2 B	248.2	129.1	1.27 T	2.12 T	347.2	1.33 O	2.22 O
13.46	310.2 B	248.2	129.1	1.49 T	2.48 T	347.2	1.56 O	2.60 O
15.38	310.2 B	248.2	129.1	1.87 T	3.11 T	347.2	1.95 O	3.25 O
17.31	310.2 B	248.2	129.1	2.54 V	4.24 V	347.2	2.54 V	4.24 V
19.23	310.2 B	248.2	129.1	1.86 V	3.10 V	347.2	1.86 V	3.10 V

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11

SPAN 2 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

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X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	17.9	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	26.6	0.0	4.9	1.9	13.9	-1.3	1.30
	SIMULT	SHEAR	13.9	0.0	SIMULT	MOM	26.6	22.0	
3.85	19.0	7.4	46.0	0.0	3.7	1.4	12.0	-2.5	1.30
	SIMULT	SHEAR	12.0	0.0	SIMULT	MOM	46.0	39.1	
5.77	24.9	9.7	57.9	0.0	2.5	1.0	10.0	-3.8	1.30
	SIMULT	SHEAR	10.0	0.0	SIMULT	MOM	57.9	51.3	
7.69	28.5	11.1	62.6	0.0	1.2	0.5	8.1	-5.1	1.30
	SIMULT	SHEAR	8.1	0.0	SIMULT	MOM	62.6	58.7	
9.62	29.7	11.6	61.1	0.0	0.0	0.0	6.4	-6.4	1.30
	SIMULT	SHEAR	-6.4	0.0	SIMULT	MOM	61.1	61.1	
11.54	28.5	11.1	62.6	0.0	-1.2	-0.5	5.1	-8.1	1.30
	SIMULT	SHEAR	-8.1	0.0	SIMULT	MOM	58.7	62.6	
13.46	24.9	9.7	57.9	0.0	-2.5	-1.0	3.8	-10.0	1.30
	SIMULT	SHEAR	-10.0	0.0	SIMULT	MOM	51.3	57.9	
15.38	19.0	7.4	46.0	0.0	-3.7	-1.4	2.5	-12.0	1.30
	SIMULT	SHEAR	-12.0	0.0	SIMULT	MOM	39.1	46.0	
17.31	10.7	4.2	26.6	0.0	-4.9	-1.9	1.3	-13.9	1.30
	SIMULT	SHEAR	-13.9	0.0	SIMULT	MOM	22.0	26.6	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-17.9	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

SPAN 3 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

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X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	17.9	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	26.6	0.0	4.9	1.9	13.9	-1.3	1.30
	SIMULT	SHEAR	13.9	0.0	SIMULT	MOM	26.6	22.0	
3.85	19.0	7.4	46.0	0.0	3.7	1.4	12.0	-2.5	1.30
	SIMULT	SHEAR	12.0	0.0	SIMULT	MOM	46.0	39.1	
5.77	24.9	9.7	57.9	0.0	2.5	1.0	10.0	-3.8	1.30
	SIMULT	SHEAR	10.0	0.0	SIMULT	MOM	57.9	51.3	
7.69	28.5	11.1	62.6	0.0	1.2	0.5	8.1	-5.1	1.30
	SIMULT	SHEAR	8.1	0.0	SIMULT	MOM	62.6	58.7	
9.62	29.7	11.6	61.1	0.0	0.0	0.0	6.4	-6.4	1.30
	SIMULT	SHEAR	-6.4	0.0	SIMULT	MOM	61.1	61.1	
11.54	28.5	11.1	62.6	0.0	-1.2	-0.5	5.1	-8.1	1.30
	SIMULT	SHEAR	-8.1	0.0	SIMULT	MOM	58.7	62.6	
13.46	24.9	9.7	57.9	0.0	-2.5	-1.0	3.8	-10.0	1.30
	SIMULT	SHEAR	-10.0	0.0	SIMULT	MOM	51.3	57.9	
15.38	19.0	7.4	46.0	0.0	-3.7	-1.4	2.5	-12.0	1.30
	SIMULT	SHEAR	-12.0	0.0	SIMULT	MOM	39.1	46.0	
17.31	10.7	4.2	26.6	0.0	-4.9	-1.9	1.3	-13.9	1.30
	SIMULT	SHEAR	-13.9	0.0	SIMULT	MOM	22.0	26.6	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-17.9	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.

Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11 Verified: DEK, 4/28/11 BAR7 Filename: LUC2_FWS.dat

SPAN 3

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-2.577	0.000	1.033	0.403	2.577	0.000
3.85	-1.836	-0.716	-4.445	0.000	1.836	0.716	4.445	0.000
5.77	-2.410	-0.939	-5.603	0.000	2.410	0.939	5.603	0.000
7.69	-2.755	-1.074	-6.052	0.000	2.755	1.074	6.052	0.000
9.62	-2.869	-1.118	-5.910	0.000	2.869	1.118	5.910	0.000
11.54	-2.755	-1.074	-6.052	0.000	2.755	1.074	6.052	0.000
13.46	-2.410	-0.939	-5.603	0.000	2.410	0.939	5.603	0.000
15.38	-1.836	-0.716	-4.445	0.000	1.836	0.716	4.445	0.000
17.31	-1.033	-0.403	-2.577	0.000	1.033	0.403	2.577	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 4

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-2.577	0.000	1.033	0.403	2.577	0.000
3.85	-1.836	-0.716	-4.445	0.000	1.836	0.716	4.445	0.000
5.77	-2.410	-0.939	-5.603	0.000	2.410	0.939	5.603	0.000
7.69	-2.755	-1.074	-6.052	0.000	2.755	1.074	6.052	0.000
9.62	-2.869	-1.118	-5.910	0.000	2.869	1.118	5.910	0.000
11.54	-2.755	-1.074	-6.052	0.000	2.755	1.074	6.052	0.000
13.46	-2.410	-0.939	-5.603	0.000	2.410	0.939	5.603	0.000
15.38	-1.836	-0.716	-4.445	0.000	1.836	0.716	4.445	0.000
17.31	-1.033	-0.403	-2.577	0.000	1.033	0.403	2.577	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1

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X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	3.07 V	5.11 V	347.2	3.07 V	5.11 V
1.88	310.2 B	248.2	129.1	4.03 V	6.72 V	347.2	4.03 V	6.72 V
3.75	310.2 B	248.2	129.1	2.88 T	4.80 T	347.2	3.01 O	5.01 O
5.62	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.31 O	3.84 O
7.50	310.2 B	248.2	129.1	2.00 T	3.33 T	347.2	2.09 O	3.49 O
9.38	310.2 B	248.2	129.1	2.01 T	3.35 T	347.2	2.10 O	3.51 O
11.25	310.2 B	248.2	129.1	2.00 T	3.33 T	347.2	2.09 O	3.49 O
13.12	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.31 O	3.84 O
15.00	310.2 B	248.2	129.1	2.88 T	4.80 T	347.2	3.01 O	5.01 O
16.88	310.2 B	248.2	129.1	4.03 V	6.72 V	347.2	4.03 V	6.72 V
18.75	310.2 B	248.2	129.1	3.07 V	5.11 V	347.2	3.07 V	5.11 V

SPAN 2

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X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	3.05 V	5.08 V	347.2	3.05 V	5.08 V
1.92	310.2 B	248.2	129.1	4.00 V	6.67 V	347.2	4.00 V	6.67 V
3.85	310.2 B	248.2	129.1	2.77 T	4.62 T	347.2	2.90 O	4.83 O
5.77	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.21 O	3.69 O
7.69	310.2 B	248.2	129.1	1.91 T	3.18 T	347.2	2.00 O	3.33 O
9.62	310.2 B	248.2	129.1	1.94 T	3.23 T	347.2	2.03 O	3.39 O
11.54	310.2 B	248.2	129.1	1.91 T	3.18 T	347.2	2.00 O	3.33 O
13.46	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.21 O	3.69 O
15.38	310.2 B	248.2	129.1	2.77 T	4.62 T	347.2	2.90 O	4.83 O
17.31	310.2 B	248.2	129.1	4.00 V	6.67 V	347.2	4.00 V	6.67 V
19.23	310.2 B	248.2	129.1	3.05 V	5.08 V	347.2	3.05 V	5.08 V

Load Factor Rating
Load: 2FI
Inventory: 2.03 - OK
Operating: 3.39 - OK

SPAN 3

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X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	3.05 V	5.08 V	347.2	3.05 V	5.08 V
1.92	310.2 B	248.2	129.1	4.00 V	6.67 V	347.2	4.00 V	6.67 V
3.85	310.2 B	248.2	129.1	2.77 T	4.62 T	347.2	4.00 V	6.67 V
5.77	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.90 O	4.83 O
7.69	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.21 O	3.69 O
9.62	310.2 B	248.2	129.1	1.91 T	3.18 T	347.2	2.00 O	3.33 O
11.54	310.2 B	248.2	129.1	1.94 T	3.23 T	347.2	2.00 O	3.33 O
13.46	310.2 B	248.2	129.1	1.91 T	3.18 T	347.2	2.03 O	3.39 O
15.38	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.00 O	3.33 O
17.31	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.21 O	3.69 O
19.23	310.2 B	248.2	129.1	2.77 T	4.62 T	347.2	2.90 O	4.83 O
				4.00 V	6.67 V	347.2	4.00 V	6.67 V
				3.05 V	5.08 V	347.2	4.00 V	6.67 V
							3.05 V	5.08 V

SPAN 4

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X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING FACTORS		MOMENT	RATING FACTORS	
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	3.05 V	5.08 V	347.2	3.05 V	5.08 V
1.92	310.2 B	248.2	129.1	4.00 V	6.67 V	347.2	4.00 V	6.67 V
3.85	310.2 B	248.2	129.1	2.77 T	4.62 T	347.2	2.90 O	4.83 O
5.77	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.21 O	3.69 O
7.69	310.2 B	248.2	129.1	1.91 T	3.18 T	347.2	2.00 O	3.33 O
9.62	310.2 B	248.2	129.1	1.94 T	3.23 T	347.2	2.03 O	3.39 O
11.54	310.2 B	248.2	129.1	1.91 T	3.18 T	347.2	2.00 O	3.33 O
13.46	310.2 B	248.2	129.1	2.11 T	3.52 T	347.2	2.21 O	3.69 O
15.38	310.2 B	248.2	129.1	2.77 T	4.62 T	347.2	2.90 O	4.83 O
17.31	310.2 B	248.2	129.1	4.00 V	6.67 V	347.2	4.00 V	6.67 V
19.23	310.2 B	248.2	129.1	3.05 V	5.08 V	347.2	3.05 V	5.08 V

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.

Calculated: EFD, 4/27/11 **Checked:** DEK, 4/28/11 **Updated:** EFD, 4/28/11 **Verified:** DEK, 4/28/11 **BAR7 Filename:** LUC2_FWS.dat

SPAN 2 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	23.2	0.0	1.30
	SIMULT	SHEAR	0.0	0.0			0.0	0.0	
1.92	10.7	4.2	35.6	0.0	4.9	1.9	18.5	-1.1	1.30
	SIMULT	SHEAR	18.5	0.0			35.6	18.7	
3.85	19.0	7.4	60.0	0.0	3.7	1.4	15.6	-2.2	1.30
	SIMULT	SHEAR	15.6	0.0			60.0	33.3	
5.77	24.9	9.7	74.3	0.0	2.5	1.0	12.9	-4.2	1.30
	SIMULT	SHEAR	12.9	0.0			74.3	57.0	
7.69	28.5	11.1	82.5	0.0	1.2	0.5	10.7	-6.4	1.30
	SIMULT	SHEAR	10.7	0.0			82.5	73.8	
9.62	29.7	11.6	82.3	0.0	0.0	0.0	8.6	-8.6	1.30
	SIMULT	SHEAR	-8.6	0.0			82.3	82.3	
11.54	28.5	11.1	82.5	0.0	-1.2	-0.5	6.4	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0			73.8	82.5	
13.46	24.9	9.7	74.3	0.0	-2.5	-1.0	4.2	-12.9	1.30
	SIMULT	SHEAR	-12.9	0.0			57.0	74.3	
15.38	19.0	7.4	60.0	0.0	-3.7	-1.4	2.2	-15.6	1.30
	SIMULT	SHEAR	-15.6	0.0			33.3	60.0	
17.31	10.7	4.2	35.6	0.0	-4.9	-1.9	1.1	-18.5	1.30
	SIMULT	SHEAR	-18.5	0.0			18.7	35.6	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-23.2	1.30
	SIMULT	SHEAR	0.0	0.0			0.0	0.0	

SPAN 3 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	23.2	0.0	1.30
	SIMULT	SHEAR	0.0	0.0			0.0	0.0	
1.92	10.7	4.2	35.6	0.0	4.9	1.9	18.5	-1.1	1.30
	SIMULT	SHEAR	18.5	0.0			35.6	18.7	
3.85	19.0	7.4	60.0	0.0	3.7	1.4	15.6	-2.2	1.30
	SIMULT	SHEAR	15.6	0.0			60.0	33.3	
5.77	24.9	9.7	74.3	0.0	2.5	1.0	12.9	-4.2	1.30
	SIMULT	SHEAR	12.9	0.0			74.3	57.0	
7.69	28.5	11.1	82.5	0.0	1.2	0.5	10.7	-6.4	1.30
	SIMULT	SHEAR	10.7	0.0			82.5	73.8	
9.62	29.7	11.6	82.3	0.0	0.0	0.0	8.6	-8.6	1.30
	SIMULT	SHEAR	-8.6	0.0			82.3	82.3	
11.54	28.5	11.1	82.5	0.0	-1.2	-0.5	6.4	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0			73.8	82.5	
13.46	24.9	9.7	74.3	0.0	-2.5	-1.0	4.2	-12.9	1.30
	SIMULT	SHEAR	-12.9	0.0			57.0	74.3	
15.38	19.0	7.4	60.0	0.0	-3.7	-1.4	2.2	-15.6	1.30
	SIMULT	SHEAR	-15.6	0.0			33.3	60.0	
17.31	10.7	4.2	35.6	0.0	-4.9	-1.9	1.1	-18.5	1.30
	SIMULT	SHEAR	-18.5	0.0			18.7	35.6	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-23.2	1.30
	SIMULT	SHEAR	0.0	0.0			0.0	0.0	

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.

Calculated: EFD, 4/27/11

Checked: DEK, 4/28/11

Updated: EFD, 4/28/11

Verified: DEK, 4/28/11

BAR7 Filename: LUC2_FWS.dat

SPAN 3

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-3.443	0.000	1.033	0.403	3.443	0.000
3.85	-1.836	-0.716	-5.799	0.000	1.836	0.716	5.799	0.000
5.77	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
7.69	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
9.62	-2.869	-1.118	-7.958	0.000	2.869	1.118	7.958	0.000
11.54	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
13.46	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
15.38	-1.836	-0.716	-5.799	0.000	1.836	0.716	5.799	0.000
17.31	-1.033	-0.403	-3.443	0.000	1.033	0.403	3.443	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 4

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-3.443	0.000	1.033	0.403	3.443	0.000
3.85	-1.836	-0.716	-5.799	0.000	1.836	0.716	5.799	0.000
5.77	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
7.69	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
9.62	-2.869	-1.118	-7.958	0.000	2.869	1.118	7.958	0.000
11.54	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
13.46	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
15.38	-1.836	-0.716	-5.799	0.000	1.836	0.716	5.799	0.000
17.31	-1.033	-0.403	-3.443	0.000	1.033	0.403	3.443	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.811	0.316	3.105	0.000	1.000	2.86 V	4.02 V
1.88	0.649	0.253	2.469	-0.146	1.000	3.68 V	5.14 V
3.75	0.487	0.190	2.075	-0.291	1.000	2.52 T	3.60 T
5.62	0.325	0.126	1.729	-0.563	1.000	1.91 T	2.77 T
7.50	0.162	0.063	1.438	-0.855	1.000	1.66 T	2.44 T
9.38	0.000	0.000	1.146	-1.146	1.000	1.65 T	2.43 T
11.25	-0.162	-0.063	0.855	-1.438	1.000	1.66 T	2.44 T
13.12	-0.325	-0.126	0.563	-1.729	1.000	1.91 T	2.77 T
15.00	-0.487	-0.190	0.291	-2.075	1.000	2.52 T	3.60 T
16.88	-0.649	-0.253	0.146	-2.469	1.000	3.68 V	5.14 V
18.75	-0.811	-0.316	0.000	-3.105	1.000	2.86 V	4.02 V

SPAN 2

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.324	3.132	0.000	1.000	2.82 V	3.97 V
1.92	0.666	0.259	2.496	-0.146	1.000	3.64 V	5.08 V
3.85	0.499	0.195	2.102	-0.291	1.000	2.41 T	3.44 T
5.77	0.333	0.130	1.737	-0.571	1.000	1.83 T	2.66 T
7.69	0.166	0.065	1.445	-0.863	1.000	1.59 T	2.34 T
9.62	0.000	0.000	1.154	-1.154	1.000	1.57 T	2.33 T
11.54	-0.166	-0.065	0.863	-1.445	1.000	1.59 T	2.34 T
13.46	-0.333	-0.130	0.571	-1.737	1.000	1.83 T	2.66 T
15.38	-0.499	-0.195	0.291	-2.102	1.000	2.41 T	3.44 T
17.31	-0.666	-0.259	0.146	-2.496	1.000	3.64 V	5.08 V
19.23	-0.832	-0.324	0.000	-3.132	1.000	2.82 V	3.97 V

STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	MOMENT	IR	OR
						STRENGTH		
0.00	310.2 B	248.2	129.1	2.37 V	3.95 V	347.2	2.37 V	3.95 V
1.88	310.2 B	248.2	129.1	3.03 V	5.05 V	347.2	3.03 V	5.05 V
3.75	310.2 B	248.2	129.1	2.22 T	3.70 T	347.2	2.32 O	3.87 O
5.62	310.2 B	248.2	129.1	1.71 T	2.85 T	347.2	1.79 O	2.98 O
7.50	310.2 B	248.2	129.1	1.51 T	2.51 T	347.2	1.58 O	2.63 O
9.38	310.2 B	248.2	129.1	1.50 T	2.50 T	347.2	1.57 O	2.62 O
11.25	310.2 B	248.2	129.1	1.51 T	2.51 T	347.2	1.58 O	2.63 O
13.12	310.2 B	248.2	129.1	1.71 T	2.85 T	347.2	1.79 O	2.98 O
15.00	310.2 B	248.2	129.1	2.22 T	3.70 T	347.2	2.32 O	3.87 O
16.88	310.2 B	248.2	129.1	3.03 V	5.05 V	347.2	3.03 V	5.05 V
18.75	310.2 B	248.2	129.1	2.37 V	3.95 V	347.2	2.37 V	3.95 V

SPAN 2
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	MOMENT	IR	OR
						STRENGTH		
0.00	310.2 B	248.2	129.1	2.34 V	3.90 V	347.2	2.34 V	3.90 V
1.92	310.2 B	248.2	129.1	2.99 V	4.99 V	347.2	2.99 V	4.99 V
3.85	310.2 B	248.2	129.1	2.12 T	3.54 T	347.2	2.22 O	3.70 O
5.77	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
7.69	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
9.62	310.2 B	248.2	129.1	1.44 T	2.40 T	347.2	1.51 O	2.51 O
11.54	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
13.46	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
15.38	310.2 B	248.2	129.1	2.12 T	3.54 T	347.2	2.22 O	3.70 O
17.31	310.2 B	248.2	129.1	2.99 V	4.99 V	347.2	2.99 V	4.99 V
19.23	310.2 B	248.2	129.1	2.34 V	3.90 V	347.2	2.34 V	3.90 V

Load Factor Rating
 Load: 3FI
 Inventory: 1.51 - OK
 Operating: 2.51 - OK

SPAN 3
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	MOMENT	IR	OR
						STRENGTH		
0.00	310.2 B	248.2	129.1	2.34 V	3.90 V	347.2	2.34 V	3.90 V
1.92	310.2 B	248.2	129.1	2.99 V	4.99 V	347.2	2.99 V	4.99 V
3.85	310.2 B	248.2	129.1	2.12 T	3.54 T	347.2	2.22 O	3.70 O
5.77	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
7.69	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
9.62	310.2 B	248.2	129.1	1.44 T	2.40 T	347.2	1.51 O	2.51 O
11.54	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
13.46	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
15.38	310.2 B	248.2	129.1	2.12 T	3.54 T	347.2	2.22 O	3.70 O
17.31	310.2 B	248.2	129.1	2.99 V	4.99 V	347.2	2.99 V	4.99 V
19.23	310.2 B	248.2	129.1	2.34 V	3.90 V	347.2	2.34 V	3.90 V

SPAN 4
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	MOMENT	IR	OR
						STRENGTH		
0.00	310.2 B	248.2	129.1	2.34 V	3.90 V	347.2	2.34 V	3.90 V
1.92	310.2 B	248.2	129.1	2.99 V	4.99 V	347.2	2.99 V	4.99 V
3.85	310.2 B	248.2	129.1	2.12 T	3.54 T	347.2	2.22 O	3.70 O
5.77	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
7.69	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
9.62	310.2 B	248.2	129.1	1.44 T	2.40 T	347.2	1.51 O	2.51 O
11.54	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
13.46	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
15.38	310.2 B	248.2	129.1	2.12 T	3.54 T	347.2	2.22 O	3.70 O
17.31	310.2 B	248.2	129.1	2.99 V	4.99 V	347.2	2.99 V	4.99 V
19.23	310.2 B	248.2	129.1	2.34 V	3.90 V	347.2	2.34 V	3.90 V

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.

Calculated: EFD, 4/27/11

Checked: DEK, 4/28/11

Updated: EFD, 4/28/11

BAR7 Filename: LUC2_FWS.dat

Verified: DEK, 4/28/11

SPAN 2 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	23.1	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	35.5	0.0	4.9	1.9	18.5	-0.9	1.30
	SIMULT	SHEAR	18.5	0.0	SIMULT	MOM	35.5	15.4	
3.85	19.0	7.4	60.8	0.0	3.7	1.4	15.8	-1.8	1.30
	SIMULT	SHEAR	15.8	0.0	SIMULT	MOM	60.8	27.4	
5.77	24.9	9.7	75.8	0.0	2.5	1.0	13.1	-3.5	1.30
	SIMULT	SHEAR	13.1	0.0	SIMULT	MOM	75.8	47.0	
7.69	28.5	11.1	87.6	0.0	1.2	0.5	10.5	-5.3	1.30
	SIMULT	SHEAR	7.1	0.0	SIMULT	MOM	80.5	60.8	
9.62	29.7	11.6	92.8	0.0	0.0	0.0	7.8	-7.8	1.30
	SIMULT	SHEAR	-4.4	0.0	SIMULT	MOM	75.0	75.0	
11.54	28.5	11.1	87.6	0.0	-1.2	-0.5	5.3	-10.5	1.30
	SIMULT	SHEAR	-7.1	0.0	SIMULT	MOM	60.8	80.5	
13.46	24.9	9.7	75.8	0.0	-2.5	-1.0	3.5	-13.1	1.30
	SIMULT	SHEAR	-13.1	0.0	SIMULT	MOM	47.0	75.8	
15.38	19.0	7.4	60.8	0.0	-3.7	-1.4	1.8	-15.8	1.30
	SIMULT	SHEAR	-15.8	0.0	SIMULT	MOM	27.4	60.8	
17.31	10.7	4.2	35.5	0.0	-4.9	-1.9	0.9	-18.5	1.30
	SIMULT	SHEAR	-18.5	0.0	SIMULT	MOM	15.4	35.5	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-23.1	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

SPAN 3 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	23.1	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	35.5	0.0	4.9	1.9	18.5	-0.9	1.30
	SIMULT	SHEAR	18.5	0.0	SIMULT	MOM	35.5	15.4	
3.85	19.0	7.4	60.8	0.0	3.7	1.4	15.8	-1.8	1.30
	SIMULT	SHEAR	15.8	0.0	SIMULT	MOM	60.8	27.4	
5.77	24.9	9.7	75.8	0.0	2.5	1.0	13.1	-3.5	1.30
	SIMULT	SHEAR	13.1	0.0	SIMULT	MOM	75.8	47.0	
7.69	28.5	11.1	87.6	0.0	1.2	0.5	10.5	-5.3	1.30
	SIMULT	SHEAR	7.1	0.0	SIMULT	MOM	80.5	60.8	
9.62	29.7	11.6	92.8	0.0	0.0	0.0	7.8	-7.8	1.30
	SIMULT	SHEAR	-4.4	0.0	SIMULT	MOM	75.0	75.0	
11.54	28.5	11.1	87.6	0.0	-1.2	-0.5	5.3	-10.5	1.30
	SIMULT	SHEAR	-7.1	0.0	SIMULT	MOM	60.8	80.5	
13.46	24.9	9.7	75.8	0.0	-2.5	-1.0	3.5	-13.1	1.30
	SIMULT	SHEAR	-13.1	0.0	SIMULT	MOM	47.0	75.8	
15.38	19.0	7.4	60.8	0.0	-3.7	-1.4	1.8	-15.8	1.30
	SIMULT	SHEAR	-15.8	0.0	SIMULT	MOM	27.4	60.8	
17.31	10.7	4.2	35.5	0.0	-4.9	-1.9	0.9	-18.5	1.30
	SIMULT	SHEAR	-18.5	0.0	SIMULT	MOM	15.4	35.5	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-23.1	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

SPAN 3
 =====

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-3.436	0.000	1.033	0.403	3.436	0.000
3.85	-1.836	-0.716	-5.878	0.000	1.836	0.716	5.878	0.000
5.77	-2.410	-0.939	-7.328	0.000	2.410	0.939	7.328	0.000
7.69	-2.755	-1.074	-8.473	0.000	2.755	1.074	8.473	0.000
9.62	-2.869	-1.118	-8.969	0.000	2.869	1.118	8.969	0.000
11.54	-2.755	-1.074	-8.473	0.000	2.755	1.074	8.473	0.000
13.46	-2.410	-0.939	-7.328	0.000	2.410	0.939	7.328	0.000
15.38	-1.836	-0.716	-5.878	0.000	1.836	0.716	5.878	0.000
17.31	-1.033	-0.403	-3.436	0.000	1.033	0.403	3.436	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 4
 =====

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-3.436	0.000	1.033	0.403	3.436	0.000
3.85	-1.836	-0.716	-5.878	0.000	1.836	0.716	5.878	0.000
5.77	-2.410	-0.939	-7.328	0.000	2.410	0.939	7.328	0.000
7.69	-2.755	-1.074	-8.473	0.000	2.755	1.074	8.473	0.000
9.62	-2.869	-1.118	-8.969	0.000	2.869	1.118	8.969	0.000
11.54	-2.755	-1.074	-8.473	0.000	2.755	1.074	8.473	0.000
13.46	-2.410	-0.939	-7.328	0.000	2.410	0.939	7.328	0.000
15.38	-1.836	-0.716	-5.878	0.000	1.836	0.716	5.878	0.000
17.31	-1.033	-0.403	-3.436	0.000	1.033	0.403	3.436	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1
 =====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.811	0.316	3.072	0.000	1.000	2.89 V	4.06 V
1.88	0.649	0.253	2.472	-0.120	1.000	3.68 V	5.14 V
3.75	0.487	0.190	2.112	-0.240	1.000	2.48 T	3.53 T
5.62	0.325	0.126	1.752	-0.464	1.000	1.88 T	2.73 T
7.50	0.162	0.063	1.392	-0.704	1.000	1.57 T	2.31 T
9.38	0.000	0.000	1.032	-1.032	1.000	1.47 T	2.16 T
11.25	-0.162	-0.063	0.704	-1.392	1.000	1.57 T	2.31 T
13.12	-0.325	-0.126	0.464	-1.752	1.000	1.88 T	2.73 T
15.00	-0.487	-0.190	0.240	-2.112	1.000	2.48 T	3.53 T
16.88	-0.649	-0.253	0.120	-2.472	1.000	3.68 V	5.14 V
18.75	-0.811	-0.316	0.000	-3.072	1.000	2.89 V	4.06 V

SPAN 2
 =====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.324	3.115	0.000	1.000	2.84 V	3.99 V
1.92	0.666	0.259	2.491	-0.120	1.000	3.64 V	5.09 V
3.85	0.499	0.195	2.131	-0.240	1.000	2.37 T	3.39 T
5.77	0.333	0.130	1.771	-0.470	1.000	1.79 T	2.61 T
7.69	0.166	0.065	1.411	-0.710	1.000	1.50 T	2.20 T
9.62	0.000	0.000	1.051	-1.051	1.000	1.40 T	2.06 T
11.54	-0.166	-0.065	0.710	-1.411	1.000	1.50 T	2.20 T
13.46	-0.333	-0.130	0.470	-1.771	1.000	1.79 T	2.61 T
15.38	-0.499	-0.195	0.240	-2.131	1.000	2.37 T	3.39 T
17.31	-0.666	-0.259	0.120	-2.491	1.000	3.64 V	5.09 V
19.23	-0.832	-0.324	0.000	-3.115	1.000	2.84 V	3.99 V

STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	310.2 B	248.2	129.1	2.39 V	3.99 V	347.2	2.39 V	3.99 V
1.88	310.2 B	248.2	129.1	3.03 V	5.05 V	347.2	3.03 V	5.05 V
3.75	310.2 B	248.2	129.1	2.18 T	3.64 T	347.2	2.28 O	3.80 O
5.62	310.2 B	248.2	129.1	1.69 T	2.81 T	347.2	1.77 O	2.95 O
7.50	310.2 B	248.2	129.1	1.43 T	2.38 T	347.2	1.49 O	2.49 O
9.38	310.2 B	248.2	129.1	1.34 T	2.23 T	347.2	1.40 O	2.33 O
11.25	310.2 B	248.2	129.1	1.43 T	2.38 T	347.2	1.49 O	2.49 O
13.12	310.2 B	248.2	129.1	1.69 T	2.81 T	347.2	1.77 O	2.95 O
15.00	310.2 B	248.2	129.1	2.18 T	3.64 T	347.2	2.28 O	3.80 O
16.88	310.2 B	248.2	129.1	3.03 V	5.05 V	347.2	3.03 V	5.05 V
18.75	310.2 B	248.2	129.1	2.39 V	3.99 V	347.2	2.39 V	3.99 V

SPAN 2
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	310.2 B	248.2	129.1	2.36 V	3.93 V	347.2	2.36 V	3.93 V
1.92	310.2 B	248.2	129.1	3.00 V	5.00 V	347.2	3.00 V	5.00 V
3.85	310.2 B	248.2	129.1	2.10 T	3.49 T	347.2	2.19 O	3.65 O
5.77	310.2 B	248.2	129.1	1.62 T	2.69 T	347.2	1.69 O	2.82 O
7.69	310.2 B	248.2	129.1	1.36 T	2.27 T	347.2	1.43 O	2.38 O
9.62	310.2 B	248.2	129.1	1.28 T	2.13 T	347.2	1.34 O	2.23 O
11.54	310.2 B	248.2	129.1	1.36 T	2.27 T	347.2	1.43 O	2.38 O
13.46	310.2 B	248.2	129.1	1.62 T	2.69 T	347.2	1.69 O	2.82 O
15.38	310.2 B	248.2	129.1	2.10 T	3.49 T	347.2	2.19 O	3.65 O
17.31	310.2 B	248.2	129.1	3.00 V	5.00 V	347.2	3.00 V	5.00 V
19.23	310.2 B	248.2	129.1	2.36 V	3.93 V	347.2	2.36 V	3.93 V

Load Factor Rating
 Load: 4F1
 Inventory: 1.25 - OK
 Operating: 2.09 - OK

SPAN 3
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	310.2 B	248.2	129.1	2.36 V	3.93 V	347.2	2.36 V	3.93 V
1.92	310.2 B	248.2	129.1	3.00 V	5.00 V	347.2	3.00 V	5.00 V
3.85	310.2 B	248.2	129.1	2.10 T	3.49 T	347.2	2.19 O	3.65 O
5.77	310.2 B	248.2	129.1	1.62 T	2.69 T	347.2	1.69 O	2.82 O
7.69	310.2 B	248.2	129.1	1.36 T	2.27 T	347.2	1.43 O	2.38 O
9.62	310.2 B	248.2	129.1	1.28 T	2.13 T	347.2	1.34 O	2.23 O
11.54	310.2 B	248.2	129.1	1.36 T	2.27 T	347.2	1.43 O	2.38 O
13.46	310.2 B	248.2	129.1	1.62 T	2.69 T	347.2	1.69 O	2.82 O
15.38	310.2 B	248.2	129.1	2.10 T	3.49 T	347.2	2.19 O	3.65 O
17.31	310.2 B	248.2	129.1	3.00 V	5.00 V	347.2	3.00 V	5.00 V
19.23	310.2 B	248.2	129.1	2.36 V	3.93 V	347.2	2.36 V	3.93 V

SPAN 4
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	310.2 B	248.2	129.1	2.36 V	3.93 V	347.2	2.36 V	3.93 V
1.92	310.2 B	248.2	129.1	3.00 V	5.00 V	347.2	3.00 V	5.00 V
3.85	310.2 B	248.2	129.1	2.10 T	3.49 T	347.2	2.19 O	3.65 O
5.77	310.2 B	248.2	129.1	1.62 T	2.69 T	347.2	1.69 O	2.82 O
7.69	310.2 B	248.2	129.1	1.36 T	2.27 T	347.2	1.43 O	2.38 O
9.62	310.2 B	248.2	129.1	1.28 T	2.13 T	347.2	1.34 O	2.23 O
11.54	310.2 B	248.2	129.1	1.36 T	2.27 T	347.2	1.43 O	2.38 O
13.46	310.2 B	248.2	129.1	1.62 T	2.69 T	347.2	1.69 O	2.82 O
15.38	310.2 B	248.2	129.1	2.10 T	3.49 T	347.2	2.19 O	3.65 O
17.31	310.2 B	248.2	129.1	3.00 V	5.00 V	347.2	3.00 V	5.00 V
19.23	310.2 B	248.2	129.1	2.36 V	3.93 V	347.2	2.36 V	3.93 V

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.

Calculated: EFD, 4/27/11

Checked: DEK, 4/28/11

Updated: EFD, 4/28/11

BAR7 Filename: LUC2_FWS.dat

Verified: DEK, 4/28/11

SPAN 2 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	22.4	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	34.1	0.0	4.9	1.9	17.7	-1.1	1.30
	SIMULT	SHEAR	17.7	0.0	SIMULT	MOM	34.1	18.7	
3.85	19.0	7.4	57.9	0.0	3.7	1.4	15.0	-2.2	1.30
	SIMULT	SHEAR	15.0	0.0	SIMULT	MOM	57.9	33.3	
5.77	24.9	9.7	74.3	0.0	2.5	1.0	12.9	-4.2	1.30
	SIMULT	SHEAR	12.9	0.0	SIMULT	MOM	74.3	57.0	
7.69	28.5	11.1	82.5	0.0	1.2	0.5	10.7	-6.4	1.30
	SIMULT	SHEAR	10.7	0.0	SIMULT	MOM	82.5	73.8	
9.62	29.7	11.6	82.3	0.0	0.0	0.0	8.6	-8.6	1.30
	SIMULT	SHEAR	-8.6	0.0	SIMULT	MOM	82.3	82.3	
11.54	28.5	11.1	82.5	0.0	-1.2	-0.5	6.4	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0	SIMULT	MOM	73.8	82.5	
13.46	24.9	9.7	74.3	0.0	-2.5	-1.0	4.2	-12.9	1.30
	SIMULT	SHEAR	-12.9	0.0	SIMULT	MOM	57.0	74.3	
15.38	19.0	7.4	57.9	0.0	-3.7	-1.4	2.2	-15.0	1.30
	SIMULT	SHEAR	-15.0	0.0	SIMULT	MOM	33.3	57.9	
17.31	10.7	4.2	34.1	0.0	-4.9	-1.9	1.1	-17.7	1.30
	SIMULT	SHEAR	-17.7	0.0	SIMULT	MOM	18.7	34.1	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-22.4	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

SPAN 3 - LIVE LOAD IMPACT FACTORS : POS MOM 1.30

X	DL1 MOMENT	DL2 MOMENT	+(LL+I) MOMENT	-(LL+I) MOMENT	DL1 SHEAR	DL2 SHEAR	+(LL+I) SHEAR	-(LL+I) SHEAR	I.F.
0.00	0.0	0.0	0.0	0.0	6.2	2.4	22.4	0.0	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	
1.92	10.7	4.2	34.1	0.0	4.9	1.9	17.7	-1.1	1.30
	SIMULT	SHEAR	17.7	0.0	SIMULT	MOM	34.1	18.7	
3.85	19.0	7.4	57.9	0.0	3.7	1.4	15.0	-2.2	1.30
	SIMULT	SHEAR	15.0	0.0	SIMULT	MOM	57.9	33.3	
5.77	24.9	9.7	74.3	0.0	2.5	1.0	12.9	-4.2	1.30
	SIMULT	SHEAR	12.9	0.0	SIMULT	MOM	74.3	57.0	
7.69	28.5	11.1	82.5	0.0	1.2	0.5	10.7	-6.4	1.30
	SIMULT	SHEAR	10.7	0.0	SIMULT	MOM	82.5	73.8	
9.62	29.7	11.6	82.3	0.0	0.0	0.0	8.6	-8.6	1.30
	SIMULT	SHEAR	-8.6	0.0	SIMULT	MOM	82.3	82.3	
11.54	28.5	11.1	82.5	0.0	-1.2	-0.5	6.4	-10.7	1.30
	SIMULT	SHEAR	-10.7	0.0	SIMULT	MOM	73.8	82.5	
13.46	24.9	9.7	74.3	0.0	-2.5	-1.0	4.2	-12.9	1.30
	SIMULT	SHEAR	-12.9	0.0	SIMULT	MOM	57.0	74.3	
15.38	19.0	7.4	57.9	0.0	-3.7	-1.4	2.2	-15.0	1.30
	SIMULT	SHEAR	-15.0	0.0	SIMULT	MOM	33.3	57.9	
17.31	10.7	4.2	34.1	0.0	-4.9	-1.9	1.1	-17.7	1.30
	SIMULT	SHEAR	-17.7	0.0	SIMULT	MOM	18.7	34.1	
19.23	0.0	0.0	0.0	0.0	-6.2	-2.4	0.0	-22.4	1.30
	SIMULT	SHEAR	0.0	0.0	SIMULT	MOM	0.0	0.0	

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.

Calculated: EFD, 4/27/11

Checked: DEK, 4/28/11

Updated: EFD, 4/28/11

Verified: DEK, 4/28/11

BAR7 Filename: LUC2_FWS.dat

SPAN 3

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-3.296	0.000	1.033	0.403	3.296	0.000
3.85	-1.836	-0.716	-5.594	0.000	1.836	0.716	5.594	0.000
5.77	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
7.69	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
9.62	-2.869	-1.118	-7.958	0.000	2.869	1.118	7.958	0.000
11.54	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
13.46	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
15.38	-1.836	-0.716	-5.594	0.000	1.836	0.716	5.594	0.000
17.31	-1.033	-0.403	-3.296	0.000	1.033	0.403	3.296	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPAN 4

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X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
1.92	-1.033	-0.403	-3.296	0.000	1.033	0.403	3.296	0.000
3.85	-1.836	-0.716	-5.594	0.000	1.836	0.716	5.594	0.000
5.77	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
7.69	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
9.62	-2.869	-1.118	-7.958	0.000	2.869	1.118	7.958	0.000
11.54	-2.755	-1.074	-7.974	0.000	2.755	1.074	7.974	0.000
13.46	-2.410	-0.939	-7.186	0.000	2.410	0.939	7.186	0.000
15.38	-1.836	-0.716	-5.594	0.000	1.836	0.716	5.594	0.000
17.31	-1.033	-0.403	-3.296	0.000	1.033	0.403	3.296	0.000
19.23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

SPAN 1

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.811	0.316	2.995	0.000	1.000	2.96 V	4.16 V
1.88	0.649	0.253	2.360	-0.146	1.000	3.86 V	5.38 V
3.75	0.487	0.190	2.020	-0.291	1.000	2.59 T	3.69 T
5.62	0.325	0.126	1.729	-0.563	1.000	1.91 T	2.77 T
7.50	0.162	0.063	1.438	-0.855	1.000	1.66 T	2.44 T
9.38	0.000	0.000	1.146	-1.146	1.000	1.65 T	2.43 T
11.25	-0.162	-0.063	0.855	-1.438	1.000	1.66 T	2.44 T
13.12	-0.325	-0.126	0.563	-1.729	1.000	1.91 T	2.77 T
15.00	-0.487	-0.190	0.291	-2.020	1.000	2.59 T	3.69 T
16.88	-0.649	-0.253	0.146	-2.360	1.000	3.86 V	5.38 V
18.75	-0.811	-0.316	0.000	-2.995	1.000	2.96 V	4.16 V

SPAN 2

=====

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	0.832	0.324	3.025	0.000	1.000	2.92 V	4.11 V
1.92	0.666	0.259	2.389	-0.146	1.000	3.80 V	5.30 V
3.85	0.499	0.195	2.028	-0.291	1.000	2.49 T	3.57 T
5.77	0.333	0.130	1.737	-0.571	1.000	1.83 T	2.66 T
7.69	0.166	0.065	1.445	-0.863	1.000	1.59 T	2.34 T
9.62	0.000	0.000	1.154	-1.154	1.000	1.57 T	2.33 T
11.54	-0.166	-0.065	0.863	-1.445	1.000	1.59 T	2.34 T
13.46	-0.333	-0.130	0.571	-1.737	1.000	1.83 T	2.66 T
15.38	-0.499	-0.195	0.291	-2.028	1.000	2.49 T	3.57 T
17.31	-0.666	-0.259	0.146	-2.389	1.000	3.80 V	5.30 V
19.23	-0.832	-0.324	0.000	-3.025	1.000	2.92 V	4.11 V

STRENGTHS AND LOAD FACTOR RATINGS

SPAN 1
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	2.46 V	4.09 V	347.2	2.46 V	4.09 V
1.88	310.2 B	248.2	129.1	3.17 V	5.29 V	347.2	3.17 V	5.29 V
3.75	310.2 B	248.2	129.1	2.28 T	3.80 T	347.2	2.38 O	3.97 O
5.62	310.2 B	248.2	129.1	1.71 T	2.85 T	347.2	1.79 O	2.98 O
7.50	310.2 B	248.2	129.1	1.51 T	2.51 T	347.2	1.58 O	2.63 O
9.38	310.2 B	248.2	129.1	1.50 T	2.50 T	347.2	1.57 O	2.62 O
11.25	310.2 B	248.2	129.1	1.51 T	2.51 T	347.2	1.58 O	2.63 O
13.12	310.2 B	248.2	129.1	1.71 T	2.85 T	347.2	1.79 O	2.98 O
15.00	310.2 B	248.2	129.1	2.28 T	3.80 T	347.2	2.38 O	3.97 O
16.88	310.2 B	248.2	129.1	3.17 V	5.29 V	347.2	3.17 V	5.29 V
18.75	310.2 B	248.2	129.1	2.46 V	4.09 V	347.2	2.46 V	4.09 V

SPAN 2
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	2.43 V	4.04 V	347.2	2.43 V	4.04 V
1.92	310.2 B	248.2	129.1	3.13 V	5.21 V	347.2	3.13 V	5.21 V
3.85	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.30 O	3.83 O
5.77	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
7.69	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
9.62	310.2 B	248.2	129.1	1.44 T	2.40 T	347.2	1.51 O	2.51 O
11.54	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
13.46	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
15.38	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.30 O	3.83 O
17.31	310.2 B	248.2	129.1	3.13 V	5.21 V	347.2	3.13 V	5.21 V
19.23	310.2 B	248.2	129.1	2.43 V	4.04 V	347.2	2.43 V	4.04 V

SPAN 3
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	2.43 V	4.04 V	347.2	2.43 V	4.04 V
1.92	310.2 B	248.2	129.1	3.13 V	5.21 V	347.2	3.13 V	5.21 V
3.85	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.30 O	3.83 O
5.77	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
7.69	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
9.62	310.2 B	248.2	129.1	1.44 T	2.40 T	347.2	1.51 O	2.51 O
11.54	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
13.46	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
15.38	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.30 O	3.83 O
17.31	310.2 B	248.2	129.1	3.13 V	5.21 V	347.2	3.13 V	5.21 V
19.23	310.2 B	248.2	129.1	2.43 V	4.04 V	347.2	2.43 V	4.04 V

SPAN 4
 =====

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT	COMPACT	
	MOMENT	MOMENT	SHEAR	RATING	FACTORS		RATING	FACTORS
	STRENGTH	STRENGTH	STRENGTH	IR	OR	STRENGTH	IR	OR
0.00	310.2 B	248.2	129.1	2.43 V	4.04 V	347.2	2.43 V	4.04 V
1.92	310.2 B	248.2	129.1	3.13 V	5.21 V	347.2	3.13 V	5.21 V
3.85	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.30 O	3.83 O
5.77	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
7.69	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
9.62	310.2 B	248.2	129.1	1.44 T	2.40 T	347.2	1.51 O	2.51 O
11.54	310.2 B	248.2	129.1	1.45 T	2.41 T	347.2	1.52 O	2.53 O
13.46	310.2 B	248.2	129.1	1.65 T	2.75 T	347.2	1.72 O	2.87 O
15.38	310.2 B	248.2	129.1	2.20 T	3.67 T	347.2	2.30 O	3.83 O
17.31	310.2 B	248.2	129.1	3.13 V	5.21 V	347.2	3.13 V	5.21 V
19.23	310.2 B	248.2	129.1	2.43 V	4.04 V	347.2	2.43 V	4.04 V

Load Factor Rating

Load: 5CI

Inventory: 1.51 - OK

Operating: 2.51 - OK

 * FLOORBEAM - LIVE LOAD SP-1 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 42.73
 LIVE LOAD IMPACT FACTORS : POS MOM 1.27

UNFACTORED MOMENTS AND SHEARS

X	DL1 MOMENT	DL2 MOMENT	LL+I MOMENT	DL1 SHEAR	DL2 SHEAR	LL+I SHEAR	I.F.
0.00	0.0	0.0	0.0	75.8	26.1	112.4	1.27
5.90	405.3	138.6	658.1	62.8	21.4	112.3	1.28
9.95	633.3	216.1	1027.4	53.1	18.1	94.0	1.29
11.80	723.8	246.7	1173.8	48.6	16.6	85.7	1.29
17.70	952.2	324.3	1526.4	34.5	11.9	66.2	1.30
23.60	1090.4	371.3	1700.9	20.3	7.1	38.5	1.30
29.50	1138.7	387.8	1738.9	-6.1	-2.4	30.1	1.30

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
5.90	-4.301	-1.471	-6.984	0.000	4.301	1.471	6.984	0.000
9.95	-6.720	-2.293	-10.903	0.000	6.720	2.293	10.903	0.000
11.80	-5.147	-1.754	-8.348	0.000	5.147	1.754	8.348	0.000
17.70	-6.772	-2.306	-10.856	0.000	6.772	2.306	10.856	0.000
23.60	-7.755	-2.640	-12.096	0.000	7.755	2.640	12.096	0.000
29.50	-8.098	-2.758	-12.367	0.000	8.098	2.758	12.367	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	3.115	1.074	4.619	0.000	1.000	2.21 V	3.30 V
5.90	2.582	0.879	4.617	0.000	1.000	2.06 I	3.09 I
9.95	2.182	0.745	3.866	0.000	1.000	1.29 I	2.05 I
11.80	1.999	0.683	3.522	0.000	1.000	1.77 I	2.70 I
17.70	1.416	0.488	2.721	0.000	1.000	1.44 T	2.27 T
23.60	0.833	0.293	1.583	0.000	1.000	1.19 T	1.93 T
29.50	-0.251	-0.098	1.238	0.000	1.000	1.12 T	1.85 T

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

X	NON-COMP OVERLOAD		SHEAR STRENGTH	NON-COMPACT RATING FACTORS		COMPACT MOMENT STRENGTH	COMPACT RATING FACTORS	
	MOMENT STRENGTH	MOMENT STRENGTH		IR	OR		IR	OR
0.00	4240.4 B	3392.3	609.8	1.96 V	3.27 V			
5.90	4240.4 U	3392.3	609.8	1.87 I	3.12 I			
9.95	4240.4 U	3392.3	473.3	1.25 I	2.08 I			
11.80	6327.5 B	5062.0	473.3	1.64 I	2.74 I			
17.70	6327.5 B	5062.0	473.3	1.41 T	2.35 T			
23.60	6327.5 B	5062.0	473.3	1.20 T	2.00 T			
29.50	6327.5 B	5062.0	473.3	1.15 T	1.92 T			

Load Factor Rating
 Load: HS20
 Inventory: 1.15 - OK
 Operating: 1.92 - OK

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.
Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11

BAR7 Filename: LUC2_FWS.dat
Verified: DEK, 4/28/11

 * FLOORBEAM - LIVE LOAD SP-3 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 36.13
 LIVE LOAD IMPACT FACTORS : POS MOM 1.27

UNFACTORED MOMENTS AND SHEARS

X	DL1 MOMENT	DL2 MOMENT	LL+I MOMENT	DL1 SHEAR	DL2 SHEAR	LL+I SHEAR	I.F.
0.00	0.0	0.0	0.0	75.8	26.1	95.0	1.27
5.90	405.3	138.6	556.5	62.8	21.4	95.0	1.28
9.95	633.3	216.1	868.8	53.1	18.1	79.5	1.29
11.80	723.8	246.7	992.6	48.6	16.6	72.5	1.29
17.70	952.2	324.3	1290.8	34.5	11.9	56.0	1.30
23.60	1090.4	371.3	1438.3	20.3	7.1	32.6	1.30
29.50	1138.7	387.8	1470.5	-6.1	-2.4	25.5	1.30

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
5.90	-4.301	-1.471	-5.905	0.000	4.301	1.471	5.905	0.000
9.95	-6.720	-2.293	-9.220	0.000	6.720	2.293	9.220	0.000
11.80	-5.147	-1.754	-7.059	0.000	5.147	1.754	7.059	0.000
17.70	-6.772	-2.306	-9.180	0.000	6.772	2.306	9.180	0.000
23.60	-7.755	-2.640	-10.229	0.000	7.755	2.640	10.229	0.000
29.50	-8.098	-2.758	-10.458	0.000	8.098	2.758	10.458	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	3.115	1.074	3.906	0.000	1.000	2.62 V	3.91 V
5.90	2.582	0.879	3.904	0.000	1.000	2.44 I	3.65 I
9.95	2.182	0.745	3.269	0.000	1.000	1.53 I	2.42 I
11.80	1.999	0.683	2.979	0.000	1.000	2.10 I	3.19 I
17.70	1.416	0.488	2.301	0.000	1.000	1.71 T	2.69 T
23.60	0.833	0.293	1.338	0.000	1.000	1.40 T	2.28 T
29.50	-0.251	-0.098	1.047	0.000	1.000	1.33 T	2.19 T

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

X	NON-COMP OVERLOAD		SHEAR STRENGTH	NON-COMPACT RATING FACTORS		COMPACT MOMENT STRENGTH	COMPACT RATING FACTORS	
	MOMENT STRENGTH	MOMENT STRENGTH		IR	OR		IR	OR
0.00	4240.4 B	3392.3	609.8	2.32 V	3.86 V			
5.90	4240.4 U	3392.3	609.8	2.21 I	3.69 I			
9.95	4240.4 U	3392.3	473.3	1.48 I	2.46 I			
11.80	6327.5 B	5062.0	473.3	1.94 I	3.24 I			
17.70	6327.5 B	5062.0	473.3	1.67 T	2.78 T			
23.60	6327.5 B	5062.0	473.3	1.42 T	2.37 T			
29.50	6327.5 B	5062.0	473.3	1.36 T	2.27 T			

Load Factor Rating
 Load: 3FI
 Inventory: 1.36 - OK
 Operating: 2.27 - OK

BAR7 ANALYSIS OF LUC-2-18.62 SUSPENSION FLOORBEAM/STRINGER SYSTEM - WITH 30PSF FWS.
 Calculated: EFD, 4/27/11 Checked: DEK, 4/28/11 Updated: EFD, 4/28/11

BAR7 Filename: LUC2_FWS.dat
 Verified: DEK, 4/28/11

 * FLOORBEAM - LIVE LOAD SP-5 *

LIVE LOAD REACTION FROM DECK (ONE TRUCK) : 34.89
 LIVE LOAD IMPACT FACTORS : POS MOM 1.27

UNFACTORED MOMENTS AND SHEARS

X	DL1 MOMENT	DL2 MOMENT	LL+I MOMENT	DL1 SHEAR	DL2 SHEAR	LL+I SHEAR	I.F.
0.00	0.0	0.0	0.0	75.8	26.1	91.7	1.27
5.90	405.3	138.6	537.3	62.8	21.4	91.7	1.28
9.95	633.3	216.1	838.8	53.1	18.1	76.8	1.29
11.80	723.8	246.7	958.3	48.6	16.6	70.0	1.29
17.70	952.2	324.3	1246.2	34.5	11.9	54.0	1.30
23.60	1090.4	371.3	1388.6	20.3	7.1	31.4	1.30
29.50	1138.7	387.8	1419.7	-6.1	-2.4	24.6	1.30

FLEXURAL STRESSES - BEAM

X	TOP FIBER STEEL STRESS				BOTTOM FIBER STEEL STRESS			
	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
5.90	-4.301	-1.471	-5.701	0.000	4.301	1.471	5.701	0.000
9.95	-6.720	-2.293	-8.901	0.000	6.720	2.293	8.901	0.000
11.80	-5.147	-1.754	-6.815	0.000	5.147	1.754	6.815	0.000
17.70	-6.772	-2.306	-8.863	0.000	6.772	2.306	8.863	0.000
23.60	-7.755	-2.640	-9.876	0.000	7.755	2.640	9.876	0.000
29.50	-8.098	-2.758	-10.096	0.000	8.098	2.758	10.096	0.000

SHEAR STRESSES AND ALLOWABLE STRESS RATINGS

X	SHEAR STRESSES				ALLOW COMPR REDUCTION	RATING FACTORS	
	DL1	DL2	+(LL+I)	-(LL+I)		IR	OR
0.00	3.115	1.074	3.771	0.000	1.000	2.71 V	4.05 V
5.90	2.582	0.879	3.770	0.000	1.000	2.52 I	3.78 I
9.95	2.182	0.745	3.156	0.000	1.000	1.58 I	2.51 I
11.80	1.999	0.683	2.876	0.000	1.000	2.17 I	3.31 I
17.70	1.416	0.488	2.221	0.000	1.000	1.77 T	2.78 T
23.60	0.833	0.293	1.292	0.000	1.000	1.45 T	2.36 T
29.50	-0.251	-0.098	1.011	0.000	1.000	1.38 T	2.27 T

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

X	NON-COMP OVERLOAD			NON-COMPACT		COMPACT MOMENT STRENGTH	COMPACT	
	MOMENT STRENGTH	MOMENT STRENGTH	SHEAR STRENGTH	RATING IR	FACTORS OR		RATING IR	FACTORS OR
0.00	4240.4 B	3392.3	609.8	2.40 V	4.00 V			
5.90	4240.4 U	3392.3	609.8	2.29 I	3.82 I			
9.95	4240.4 U	3392.3	473.3	1.53 I	2.55 I			
11.80	6327.5 B	5062.0	473.3	2.01 I	3.36 I			
17.70	6327.5 B	5062.0	473.3	1.73 T	2.88 T			
23.60	6327.5 B	5062.0	473.3	1.47 T	2.45 T			
29.50	6327.5 B	5062.0	473.3	1.41 T	2.35 T			

Load Factor Rating
 Load: 5CI
 Inventory: 1.37 - OK
 Operating: 2.29 - OK

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

WARNING - THE ANALYSIS INDICATES THAT THERE ARE CERTAIN SECTIONS WHICH DO NOT MEET FLANGE OR WEB BUCKLING CRITERIA OF CURRENT AASHTO SPECIFICATIONS FOR LOAD FACTOR METHOD.

THESE SECTIONS ARE IDENTIFIED WITH A RATING FACTOR OF 88.88 AND A CODE INDICATING WHICH CRITERION IS NOT MET. FOR THESE SECTIONS THE RATINGS BASED ON STRENGTH ONLY ARE PRINTED OUT, BUT THE BRIDGE WITH THESE TYPES OF RATING CODES MAY HAVE FATIGUE PROBLEMS.

THESE SECTIONS MAY NOT MEET SIMILAR CRITERIA FOR ALLOWABLE STRESS METHOD ALSO. PLEASE CHECK THESE FOR CORRECT SECTION PROPERTIES. THESE SECTIONS MAY NEED STRENGTHENING TO AVOID FATIGUE PROBLEMS.

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.

INVENTORY RATING SUMMARY

Member	HS20	2F1	3F1	4F1	5C1
Stringer	1.27	2.00	1.51	1.34	1.51
Floorbeam	1.15	1.99	1.36	1.25	1.41

OPERATING RATING SUMMARY

Member	HS20	2F1	3F1	4F1	5C1
Stringer	2.12	3.33	2.51	2.23	2.51
Floorbeam	1.92	3.31	2.27	2.09	2.35