AASHTOWare BrDR 7.5.0 Truss Tutorial T3 – Truss Floorbeam Stringer Example



Typical Section



Elevation



Plan View





Force

1 Lane DF = (31.25 + 25.25)/35 = 1.61 wheels

Multi Lane DF = (31.25 + 25.25 + 19.25 + 13.25)/35 = 2.54 wheels

Deflection

1 Lane DF = 2 wheels/2 trusses = 1.0 wheels

Multi Lane DF = 4 wheels/2 trusses = 2.0 wheels



BrDR Tutorial

This tutorial describes entering a text description of the truss in the **BrDR Truss Command Language**, performing rating of the truss, and reviewing truss rating results.

Topics Covered

- Truss description and analysis.
- Truss rating results
- Truss line superstructures

Truss description and analysis

For this example, import the BrDR XML data file -T3-*Truss-Floorbeam-Stringer.xml* and use the North Truss to get started. The partially expanded **Bridge Workspace** tree is shown below.



Trusses are described in BrDR by entering a text description of the truss in the BrDR Truss Command Language. This language contains commands to describe the truss geometry, members, loads, etc. The **Truss Command Language User Manual** can be accessed from the **Help** menu in BrDR as shown below.



Click on the Bridge Workspace ribbon to access the Support menu and click on the Help button as shown below.

In the **Engine Help** column select either **AASHTO Truss LFR** or **AASHTO Truss LRFR** to access the **Truss Input Command Manual** and **Truss Method of Solution** for the selected engine. Double-click on **Truss Input Command Manual** from the **Engine Help Configuration** column to open the truss input command manual for the selected engine as shown below.

\bigcirc	Bridge Workspace - Truss Example 3	- C	×
🖳 Print	Support		
@ Help	 Help Topics Getting help using the software 		
Close	Frequently Asked Questions Find questions that are frequently asked Support Find more information on technical support Engine		
	Engine Help Engine Help Config	guration	
	AASHTO Metal Culvert LFR	nand Manual	
	AASHTO Metal Culvert LRFR Truss Method of S	Solution)
	AASHTO Timber ASR		
	AASHTO Timber LRFR		
	AASHTO Truss LFR		
	AASHTO Truss LRFR		
	Madero ASR		
	Set As Main Engine Help		•

BrDR analyzes and rates trusses using the BrDR Truss analysis engine. The BrDR Truss analysis engine analyzes a finite element model of the truss and computes rating factors using the analysis method type selected (LFR or LRFR). The truss is analyzed for axial force only, bending due to load eccentricity is not considered.

Truss

The floor system was already entered for this example. Only the truss system needs to be defined. Expand the **Trusses** node in the **Bridge Workspace** tree and double click on **North Truss** node in the **Bridge Workspace** tree to open the **Truss** window as shown below.

🕰 Truss			_		×
Name: North Truss	Link with: None	~			
Description Gusset plates Specs Factors					
Default rating method: LFR \sim					
Truss "North Truss" Unit Force kips Length ft Properties in DefaultSysUnitType US DefaultStructSteel "Truss Steel"					Î
DefaultEndConnection Bolted					
MaterialType Steel = "Truss Steel" Steel2 = "Grade 36"					
MemberCrossSection ChannelBox = Section1 Channels "C 15x55" Outward 13.0 Lacing Top					
NonDetailed = Section2 47.51 44.50 Steel 1125.6					
Rolled = Section3 Beam "W 12x79"					
Line number: 1					
View member cross section Verify					
	OK	Арр	ly	Cance	el

The Verify button will read the text description and verify the syntax of the input commands .

The following is a copy of the truss definition described using the BrDR Truss Command Language. A description of the command language and its syntax is available by opening BrDR Help for the truss window. Some of the commands are described in detail below. The name of the command is shown in bold text.

Command	Comments
Truss "North Truss"	
Unit	
Force kips	
Length ft	
Properties in	
DefaultSysUnitType US	
DefaultStructSteel "Truss Steel"	The steel material "Truss Steel" from the BrDR
	BWS will be used as the default steel material if
	steel material is not entered in later commands. The
	double quotations around "Truss Steel" indicate that
	Truss Steel is defined in the BrDR BWS.
DefaultEndConnection	Used to determine the effective length factor K
Bolted	
MaterialType	Wherever 'Steel' appears in later commands, the
Steel = "Truss Steel"	properties from the 'Truss Steel' in the BWS will be
Steel2 = "Grade 36"	used.
	This command is a shortcut way to specify a steel
	material. This is useful for some of the steel
	materials in the BrDR Library whose names are
	lengthy.
MemberCrossSection	
ChannelBox = Section1	
Channels "C 15x55" Outward 13.0	
Lacing Top	
	13
NonDetailed = Section2	
47.51 44.50 Steel 1125.6	₽.45×%*
	CI5 × 50 (THP.)

describing each plate. Only the gross, net area and the moment of inertia of the section must be entered in this command.Rolled = Section3 Beam "W 12x79"Image: ChannelBox = Section4 TopFlangePlate 22.0 0.5 Steel2 Channel*C 15x50" Outward 13.0 Lacing BottomImage: Channel*C 15x50" Channel*C 15x50" The top cover plate uses 'Steel2' instead of the default steel.ChannelBox = Section5 TopFlangePlate 22.0 0.5 LeftWebPlate 12.0 0.375 Channels "C 15x45" Outward 13.0 Lacing BottomImage: Channel*C 15x45" Channel*C 15x45" C 15x45" Channels "C 15x45" Outward 13.0 Connection holes for LFR analysis.ChannelBox = Section5 TopFlangePlate 22.0 0.5 LeftWebPlate 12.0 0.375 Channels "C 15x45" Outward 13.0 Connection holes for LFR analysis.Image: Channel*C 15x45" Loo under the gross area for the connection holes for LFR analysis.Rolled = Section6 Beam "W 12x65"Image: Channel*C 15x45" Outward 13.0 Connection holes for LFR analysis.Rolled = Section6 Beam "W 12x65"Image: Channel*C 15x45" Outward 13.0 Connection holes for LFR analysis.Lo Lower 0.0000 0.0 L1 Lower 18.3333 0.0Image: Channel*C 15x45" Channel*C 15x45"		Entered as a NonDetailed section instead of
the moment of inertia of the section must be entered in this command.Rolled = Section3 Beam "W 12x79"Image: ChannelBox = Section4 TopFlangePlate 22.0 0.5 Steel2 Channels °C 15x50" Outward 13.0 Lacing BottomImage: ChannelBox = Section5 TopFlangePlate 22.0 0.5 The top cover plate uses 'Steel2' instead of the default steel.ChannelBox = Section5 TopFlangePlate 22.0 0.5 LeftWebPlate 12.0 0.375 RightWebPlate 12.0 0.375 Channels °C 15x45" Outward 13.0 Connection Bolted 1.50 Lacing BottomImage: ChannelBox = Section5 TopFlangePlate 22.0 0.5 LeftWebPlate 12.0 0.375 RightWebPlate 12.0 0.375Image: ChannelBox = Section5 TopFlangePlate 22.0 0.5 LeftWebPlate 12.0 0.375 RightWebPlate 12.0 0.375Image: ChannelBox = Section5 TopFlangePlate 22.0 0.5 LeftWebPlate 12.0 0.375Rolled = Section6 Beam "W 12x65"Image: ChannelBox = Section6 Beam "W 12x65"PanelPoint L0 Lower 0.0000 0.0 L1 Lower 18.3333 0.0Image: ChannelBox = Section6 Source ChannelBox = Section6		describing each plate. Only the gross, net area and
In this command.Rolled = Section3Beam "W 12x79"ChannelBox = Section4TopFlangePlate22.0 0.5 Steel2ChannelS "C 15x50" Outward 13.0Lacing BottomLacing BottomChannelBox = Section5TopFlangePlate22.0 0.5LeftWebPlate12.0 0.375RightWebPlate12.0 0.375Channels "C 15x45" Outward 13.0Lacing BottomRolled = Section6Beam "W 12x65"PanelPointL0 Lower 0.0000 0.0L1 Lower 18.3333 0.0		the moment of inertia of the section must be entered
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TopFlangePlate22.0 0.5 Steel2Channels "C 15x50" Outward 13.0Lacing BottomChannelBox = Section5TopFlangePlate22.0 0.5LeftWebPlate12.0 0.375RightWebPlate12.0 0.375Channels "C 15x45" Outward 13.0Connection Bolted 1.50Lacing BottomRolled = Section6Beam "W 12x65"PanelPointL0 Lower 0.0000 0.0L1 Lower 18.3333 0.0	ChannelBox = Section4	₽ 22 ["] × ¹ /2"
The top cover plate uses 'Steel2' instead of the default steel.ChannelBox = Section5 TopFlangePlate 22.0 0.5 	TopFlangePlate 22.0 0.5 Steel2 Channels "C 15x50" Outward 13.0 Lacing Bottom	CI5 x 50
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22.0 0.5LeftWebPlate12.0 0.375RightWebPlate12.0 0.375Channels "C 15x45" Outward 13.0Connection Bolted 1.50Lacing BottomRolled = Section6Beam "W 12x65"PanelPointL0 Lower 0.0000 0.0L1 Lower 18.3333 0.0	TopFlangePlate	\#12'×38'
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Channels C 13x43 Outward 13.01.50 In win be deducted from the gross area for the connection holes for LFR analysis.Connection Bolted 1.50connection holes for LFR analysis.Rolled = Section6 $\swarrow w/2 \times 65$ Beam "W 12x65" $\swarrow w/2 \times 65$ PanelPointL0 Lower 0.0000 0.0L1 Lower 18.3333 0.0	12.0 0.375 Channels "C 15x45" Outward 12.0	1.50 in^2 will be deducted from the gross area for the
Connection Bolted 1.50Connection holes for EFK analysis.Lacing Bottom $Rolled = Section6$ Beam "W 12x65" $\int w/2 \times 65$ PanelPoint $L0$ Lower 0.0000 0.0L1 Lower 18.3333 0.0 $L1$	Connection Delted 1 50	connection holes for LEP analysis
Rolled = Section6Beam "W 12x65"PanelPointL0 Lower $0.0000 0.0$ L1 Lower 18.3333 0.0	Losing Dottom	connection notes for LFR analysis.
Roned - Sections Image: Sections Beam "W 12x65" Image: Sections PanelPoint Image: Sections L0 Lower 0.0000 0.0 Image: Sections L1 Lower 18.3333 0.0 Image: Sections	Pollod – Section6	
PanelPoint L0 L0 L0 L1 L0	Rome "W 12x65"	
PanelPoint L0 Lower 0.0000 0.0 L1 Lower 18.3333 0.0	Beam w 12x03	WIR×65
L0 Lower 0.0000 0.0 L1 Lower 18.3333 0.0	PanelPoint	
L1 Lower 18.3333 0.0	L0 Lower 0.0000 0.0	
	L1 Lower 18.3333 0.0	
L2 Lower 36.6667 0.0	L2 Lower 36.6667 0.0	
L3 Lower 55.0000 0.0	L3 Lower 55.0000 0.0	

L4 Lower 73.3333 0.0	
L5 Lower 91.6667 0.0	
L6 Lower 110.0000 0.0	
U1 Upper 18.3333 12.0	
U2 Upper 36.6667 13.0	
U3 Upper 55.0000 14.0	
U4 Upper 73.3333 13.0	
U5 Upper 91.6667 12.0	
Member	Members are identified by the panel points that they
L0L1 L0 L1 Section1	connect and cross sections are assigned to the
L1L2 L1 L2 Section1	members in this command.
L2L3 L2 L3 Section2	
L3L4 L3 L4 Section2	
L4L5 L4 L5 Section2	
L5L6 L5 L6 Section2	
L0U1 L0 U1 Section4	
U1U2 U1 U2 Section5	
U2U3 U2 U3 Section5	
U3U4 U3 U4 Section5	
U4U5 U4 U5 Section5	
U5L6 U5 L6 Section4	
L1U1 L1 U1 Section3	
U1L2 U1 L2 Section6	
L2U2 L2 U2 Section3	
L2U3 L2 U3 Section6	
L3U3 L3 U3 Section3	
U3L4 U3 L4 Section6	
L4U4 L4 U4 Section3	
L4U5 L4 U5 Section6	
L5U5 L5 U5 Section3	
Support	
L0 Pinned	
L6 Roller	
LLDistribution	Lane distribution factors
OneLane 0.805 0.5	
MultiLane 1.27 1.0	

Schematic - Truss

While the **North Truss** is selected in the **Bridge Workspace** tree, open the schematic for the truss by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **North Truss** in the Bridge Workspace and select **Schematic** from the menu).



Schematic - Framing Plan Detail

While the **Framing Plan Detail** is selected in the **Bridge Workspace** tree, open the schematic for the framing plan by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Framing Plan Detail** in the Bridge Workspace and select **Schematic** from the menu).

Bridge Workspace - Truss Example 3		ANALYSIS	REPORTS	?	_		×
BRIDGE WORKSPACE TOOLS	VIEW	DESIGN/RATE	REPORTING				
Check Out Save & Restore Check In Validate Save & Revert Close	Export 1	Refresh Open	New Copy	Paste Duplicati) Delete	Schemati	ic
Workspace & X Bridge Components	Schen	natic	\$ X	Report		Ŷ	×
Truss Example 3 Components Components Components Clateral Bracing Definitions UPP LREP Multiple Presence Factors Componental Conditions Componental Conditions Components Comp							
- III Structure Typical S						\$2	×
His Superstructure Lo Analyze Gusset Plate Defin Stare Connector Wiew Summa View Detailee Truk Floorbeam Memb Steffener Definition Member Definition Close Bndge Member DeFinitIONS FI Floorbeam Def STRINGER DEFINITIONS I Interior Stringer	ny Report d Report erences Workspac	ce					

The schematic for the framing plan now appears as shown below.

Schematic						– 🗆 ×
Framing plan						$^{\sim} \times$
🖻 📐 🔍 Q, 🕂 🛃	🔂 🗮 125% ∨					÷
Truss Example 3 T3 - Truss Floorbeam Stringe 6/21/2023	r Example - Truss (TFS)					
		North Truss				
		South Truss				
Unit 1 (Stringer Unit)	Unit 2 (Stringer Unit)	Unit 3 (Stringer Unit)	Unit 4 (Stringer Unit)	Unit 5 (Stringer Unit)	Unit 6 (Stringer Unit)	
Notes: * Bolded green (stringer) and	blue (floor beam) lines indicate	they are included in the anal	ysis.			

Schematic – Structure Typical Section

Similarly, while the **Structure Typical Section** is selected in the **Bridge Workspace** tree, open the schematic for the structure typical section by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Structure Typical Section** in the **Bridge Workspace** and select **Schematic** from the menu).

Bridge Wo	orkspace - Truss E WORKSPACE	xample 3 TOOLS	VIEW	ANALYSIS DESIGN/RATE	REPORTS REPORTING	?	-		×
Check Out Check In Validate	E 👶 Res Save 🔏 Rev	store 🔀 vert Close	Export	Refresh Open	New Copy	Paste Duplica	ite Delete	Schema	atic
	Bridge				Ν	lanage			
Workspace		\$ ×	Schen	natic	\$ ×	Report		Ś	×
CEPD Multiple CEPD Multiple CEPD Besign Parame Design Parame De	Conditions ters JRE DEFINITIONS Dynamic Load All se Description Plan Detail a Trairal Section	lowance	Analy	sis				Ŕ	×
TITI SUDUCU	vucture Loads Vlate Definition [Definitions am Member Lo ER GROUP DEF ger Unit R DEFINITIONS DRBEAM DEFINIT	Open Analyze View Sui View De Schemat General Close Br	mmary Ro tailed Rep tic Preferenc idge Wor	eport port :es kspace					

The schematic for the structure typical section now appears as shown below.



LFR Analysis

To perform a rating on the North Truss, select **North Truss** in the **Bridge Workspace** tree and click the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon. The window shown below opens.

Bridge Wor	rkspace - Truss Example	23	ANALYSIS	REPORTS	?	_	×
BRIDGE WORKSPACE	WORKSPACE TOO	LS VIEW	DESIGN/RATE	REPORTING			
🚓 🖙 📰		~~ ≽	2 🖪				
Analysis Analyze Analysis Settings Events	Tabular Specification Results Check Detail	Engine Resu Outputs Gra	ults Save ph Results				
Analysis	F	lesults					

Select the vehicle HS 20-44 under Inventory and Operating as shown below.

Analysis Settings						_		×
Design review	Rating		Rating me	thod:	LFR	~		
Analysis type:	Line Girder	~						
ane / Impact loading type:	As Requested	~	Apply pref	erence setting:	None	~		
Vehicles Output E	ngine Description							
Traffic direction: Both di	irections \lor			Refresh	Temporary vehicles	Advanced		
Vehicle selection			١	/ehicle summary	,			
□ Venices □ Standard - Alternate Mil - EV2 - EV3 - H 15-44 - H 20-44 - HS 15-44 - HS 20 (SI) - HS 20-44 - NRL - SU4 - SU5 - SU6 - SU7 - Type 3- - Type 3-3 - Type 3S2 - Agency - User defined - Temporary	itary Loading		Add to >> Remove from <<	□ - Inventor IHS 2 □ - Operatir IHS 2 Legal op IPermit o	y 0-44 o-44 verating iventory perating			
Reset Clear	Open template	Save t	emplate		ОК	Apply	Cano	el:

Analysis Settings			_		>
Design review O Rating	Rating method:	LFR	~		
nalysis type: Line Girder ~					
ane / Impact loading type: As Requested V	Apply preference setting:	None	~		
Vehicles Output Engine Description					
C Tabular results	AASHTO engine rep	ports			_
Dead load action report	🛱 Miscellaneous r	eports:			
LER critical loads report	Girder prop	oerties			
	🔽 Summary ir	nfluence line loading			
	Detailed inf	fluence line loading			
russ panel point concurrent forces report	Capacity su	mmary			
Iruss panel point maximum forces report	Capacity de	tailed computations			
	FE model fo	or DL analysis			
	E model fr	or LL analysis			
		lines FE medel			
		lines re model			
		e lines FE actions			
	LL distrib. fa	actor computations			
	Regression	data			
	Camber				
Select all Clear all	Select all Cle	ar all			
Reset Clear Open template Save	template	ОК	Apply	Cano	Ce

Navigate to the **Output** tab of this window and apply the following settings.

Click **OK** to apply the analysis settings and close the window.

Select **North Truss** in the **Bridge Workspace** tree and click the **Analyze** button from the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.

Bridge Wor	rkspace - Truss Example 3		ANALYSIS	REPORTS	?	_	×
BRIDGE WORKSPACE	WORKSPACE TOOLS	VIEW	DESIGN/RATE	REPORTING			
a 🚑 🖅 📰		∽ >>́	< 🖪				
Analysis Analyze Analysis Settings Events	Tabular Specification Results Check Detail (Engine Resu Dutputs Grap	ilts Save ph Results				
Analysis	Res	ults					

Truss rating results

Tabular Results

When the rating analysis is completed, results can be reviewed by selecting the North Truss member in the Bridge

Workspace tree and clicking the Tabular Results button on the Results group of the ribbon.



The window shown below will open.

•	Analysis Re	sults - North	n Truss						-	- 0	×
	Print Print										
Repo	ort type:		C Lane	Impact load	ing type	Display	Format				
Rati	ng Results	Summary	× 0	As requeste	ed Detail	ed Single	rating leve	el per row 🗸 🗸			
	Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Element Name	Limit State	Impact	Lane	
	HS 20-44	Axle Load	LFR	Inventory	67.96	1.888	U1L2	AXIAL-TENSION	As Requested	As Requested	-
	HS 20-44	Axle Load	LFR	Operating	113.50	3.153	U1L2	AXIAL-TENSION	As Requested	As Requested	
	HS 20-44	Lane	LFR	Inventory	79.53	2.209	U1L2	AXIAL-TENSION	As Requested	As Requested	1
	HS 20-44	Lane	LFR	Operating	132.81	3.689	U1L2	AXIAL-TENSION	As Requested	As Requested	
AASI	HTO LFR En	gine Versior	n 7.5.0.3001								
Anal	vsis prefere	nce settina:	None								
		2								Clos	e

Engine Outputs

After the analysis is completed, the output files can be viewed by clicking the **Engine Outputs** button on the **Results** group of the ribbon.



A Truss Example 3	_	×
Truss Example 3		

- The Live Load Analysis Summary contains data related to the live loading of the truss influence lines.
- The **Dead Load Analysis Report** and **Dead Load FE Model Report** contain the truss finite element model and dead load analysis.
- The Live Load FE Model Report contains the truss finite element model for live load analysis.
- The **Truss Member Section Property Report** contains data related to the computed and user input truss member section properties.
- The **Rating Results Report** contains the rating results for the truss.
- The **Panel Point Maximum Forces Report** contains the maximum member forces due to dead load and live load for each member at each panel point.
- The **Panel Point Concurrent Forces Report** contains the concurrent member forces for each panel point's member under the critical condition.
- The **Log file** is the analysis log produced when the analysis is run. This file may contain errors and warnings that should be reviewed.

A portion of the **Rating Results Report** is shown below.

Bridge 1D. TrussExample3 Bridge 1D. TrussExample3 Bridge 1D. TrussExample3 Bridge 1D. TrussExample3 Bridge 1D. TrussExample3 Bridge 1D. TrussExample3 Bridge AD: Wember : NorthTruss Wember : NorthTruss Corcal Load Factor Rational Control	Rating Results Repo	ort																	- 🗆	;
Live Load Land Land Live Load Live Load <thl< th=""><th>idge ID :TrussE idge : T3 - Trus ructDef : Truss(ser : bridge ate : Monday, Fr ile : RatingResult nalysis Preferenc Overall Load</th><th>ixample3 is Floorbeam S TFS) 'ebruary 19, 20 is XML ce Setting : No Factor Rati</th><th>Stringer Ex 024 ne ing Sum</th><th>ample mary</th><th></th><th></th><th>n E N</th><th>NBI Structu Bridge Alt : Member : N</th><th>ıre ID :Trus: JorthTruss</th><th>s Example :</th><th>3</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></thl<>	idge ID :TrussE idge : T3 - Trus ructDef : Truss(ser : bridge ate : Monday, Fr ile : RatingResult nalysis Preferenc Overall Load	ixample3 is Floorbeam S TFS) 'ebruary 19, 20 is XML ce Setting : No Factor Rati	Stringer Ex 024 ne i ng Sum	ample mary			n E N	NBI Structu Bridge Alt : Member : N	ıre ID :Trus: JorthTruss	s Example :	3									
HS 20-44 - Lane Design Lane U1L2 2.209 79.53 U1L2 3.689 132.81 HS 20-44 - Lane Design Lane U1L2 2.209 79.53 U1L2 3.689 132.81 HS 20-44 - Lane Design Lane U1L2 2.209 79.53 U1L2 3.689 132.81 HS 20-44 - Truck Design Lane U1L2 1.888 67.96 U1L2 3.153 113.50 HS 20-44 - Truck Design Lane U1L2 1.888 67.96 U1L2 3.153 113.50	Live Load	Live Load Type	Inv Element	Inv RF	Inv Capacity (Ton)	Opr Element	Opr RF	Opr Capacity (Ton)	Legal Opr Element	Legal Opr RF	Legal Opr Capacity (Ton)	Permit Inv Element	Permit Inv RF	Permit Inv Capacity (Ton)	Permit Opr Element	Permit Opr RF	Permit Opr Capacity (Ton)	Impact	Lane	1
HS 20-44 - Lae Design Lane U1L2 2.09 79.53 U1L2 3.689 132.81 HS 20-44 - Truck Design Truck U1L2 1.88 67.96 U1L2 3.153 113.50 HS 20-44 - Truck Design Truck U1L2 1.88 67.96 U1L2 3.153 113.50	HS 20-44 - Lane	Design Lane	U1L2	2.209	79.53	U1L2	3.689	132.81										As Requested	As Requested	: : 1
HS 20-44 - Truck Design Truck U1L2 1.88 67.96 U1L2 3.153 113.50 HS 20-44 - Truck Design Truck U1L2 1.888 67.96 U1L2 3.153 113.50 As As Mith Lane Truck Truck U1L2 1.888 67.96 U1L2 3.153 113.50	HS 20-44 - Lane	Design Lane	U1L2	2.209	79.53	U1L2	3.689	132.81										With Impact	Multi-Lane	•
HS 20-44 - Design Track U1L2 1.888 67.96 U1L2 3.153 113.50 With Impact Multi-Lane	HS 20-44 - Truck	Design Truck	U1L2	1.888	67.96	U1L2	3.153	113.50										As Requested	As Requested	1
HUGK HUGK	HS 20-44 - Truck	Design Truck	U1L2	1.888	67.96	U1L2	3.153	113.50										With Impact	Multi-Lane	

A portion of the **Panel Point Concurrent Forces Report** is shown below.

Panel Point	Primary Member	Corresponding	Critical LL Force (kip)	Concurrent LL Force (kip)	Critical LL Force (kip)	Concurrent LL Force (kip)
(ft)	(Degrees)	Member	Compression	Compression / Tension	Tension	Compression / Tension
	L0L1				82.33	
L0	[0.00]	L0U1			HS 20-44 - Truck (T)	-98.40
[0.00, 0.00]	L0U1		-98.40 HS 20-44 - Truck (T)			
	[33.21]	L0L1		82.33		
	L0U1		-98.40			
	[213.21]	U1U2	HS 20-44 - Truck (T)	-96.35		
		L1U1		39.56		
		U1L2		16.58		
	U1U2		-118.33 HS 20-44 - Truck (T)			
	[3.12]	L0U1		-82.07		
		L1U1		6.11		
U1		U1L2		59.15		
18.33, 12.00]	L1U1				41.45 HS 20-44 - Truck (T)	
	[270.00]	L0U1				-92.82
		U1U2				-85.05
		U1L2				8.67
	U1L2		-15.74 HS 20-44 - Truck (T)		64.72 HS 20-44 - Truck (T)	
	[326.79]	L0U1		-60.20		-76.49
		U1U2		-37.25		-118.33
		L1U1		39.56		
	L0L1				82.33	
L1 [18.33, 0.00]	[180.00]	00] L1L2 HS 20-44 - True	HS 20-44 - Truck (T)	82.33		
				39.56		
	L1L2				82.33 HS 20-44 - Truck (T)	
	[0.00]	L0L1				82.33
		L1U1				39.56
	L1U1				41.45	
	[90.00]	L0L1			HS 20-44 - Truck (T)	77.67

Truss line superstructures

Workspace	– o ×
Bridge Components	
 Truss Example 3 Components Diaphragm Definitions Lateral Bracing Definitions Diaphragm Definitions Lateral Bracing Definitions Design Parameters SUPERSTRUCTURE DEFINITIONS Truss (TFS) Truss (TFS) Truss (TL) Superstructure Load Allowance Superstructure Loads Gusset Plate Definitions Shear Connector Definitions Stiffener Definitions Stiffener Definitions TRUSSES MEMBERS BRIDGE ALTERNATIVES 	

The Bridge Workspace tree for a truss-floorbeam-stringer line superstructure definition is shown below.

In a truss line superstructure definition, the relationship between the truss and floor system is not defined. Therefore, the floor system dead loads that act on the truss need to be entered by the user. These loads are computed as follows.

Deck Dead Load on Truss

Deck DL = 10"/12 * 33.0' * 0.150pcf = 4.125 kip/ft

L0, L6: 18.33'/2 * 4.125 k/ft / 2 trusses = 18.90 kips L1, L2, L3, L4, L5: 18.33' * 4.125 k/ft / 2 trusses = 37.81 kips

Curb Dead Load on Truss

Curb DL = 85 lb/ft L0, L6: 18.33'/2 * 0.085 k/ft * 2 curbs / 2 trusses = 0.78 kips L1, L2, L3, L4, L5: 18.33' * 0.085 k/ft * 2 curbs / 2 trusses = 1.56 kips Floorbeam Dead Load on Truss

Floorbeam DL = 221 lb/ft*35 ft = 7735 lb

L0, L1, L2, L3, L4, L5, L6: 7.735 kips / 2 trusses = 3.87 kips

Stringer Dead Load on Truss

Exterior Stringer DL = 57 lb/ftInterior Stringer DL = 57 lb/ft

L0, L6: 7 stringers * 0.057 kip/ft * 18.33'/2 / 2 trusses = 1.83 kips L1, L2, L3, L4, L5: 7 stringers * 0.057 kip/ft * 18.33' / 2 trusses = 3.66 kips

The truss command language description for the truss line is the same as the description for the truss system with the addition of a command to describe the user computed floor system dead loads. The following is the PanelPointLoad command used to describe the floor system dead load acting on the truss. This command comes after the Support command.

PanelPointLoad L0 DC 0.0 -25.38 L1 DC 0.0 -46.90 L2 DC 0.0 -46.90 L3 DC 0.0 -46.90 L4 DC 0.0 -46.90 L5 DC 0.0 -46.90 L6 DC 0.0 -25.38