AASHTOWare BrD/BrR 7.2.0

# Steel Structure Tutorial

STL2 - Two Span Plate Girder Example





Framing Plan



**Elevation of Interior Girder** 



**Composite Section at Pier** 



Parapet Detail

Haunch Detail

#### Material Properties

Structural Steel: AASHTO M270, Grade 50W uncoated weathering steel with Fy = 50 ksi Deck Concrete: f'c = 4.0 ksi, modular ratio n = 8 Slab Reinforcing Steel: AASHTO M31, Grade 60 with Fy = 60 ksi

Cross Frame Connection Plates: 3/4" x 6" Bearing Stiffener Plates: 7/8" x 9"

# AASHTOWare Bridge Design and Rating Training STL2 - Two Span Plate Girder Example

From the Bridge Explorer, click the New button under the BRIDGE tab in the ribbon to create a new bridge. Enter the following description data:

idge ID: 2SpanPlate	GirderTr	NBI structure	ID (8): PLGirderTrBri		Template	te <mark>ly d</mark> efined	Superstructures
Description Desc	ription (cont'd)	Alternatives	Global reference point	Traffic	Custom agency field	ls	
Description:	2 span continue	ous composite ste	el plate girder uses LRFD	 			
Location:					Length:	180	ft
Facility carried (7):					Route number:	-1	
Feat. intersected (6):	-				Mi. post:		

Close the window by clicking Ok. This saves the data to memory and closed the window.

#### STL2 - Two Span Plate Girder Example

The Bridge Workspace tree after the bridge is created is shown below:



To enter the materials to be used by members of the bridge, click on the 🕩 to expand the tree for Materials under the Components tab. The tree with the expanded Materials branch is shown below:

Work	space 🖷 🤅	×
Bridge	Components	
ė. 🖻	Components	
▶.	📁 Appurtenances	
<b>_</b>	📁 Beam Shapes	
<b>_</b>	Connectors	
<b>B</b>	Pactors	
1	📁 LRFD Substructure Design Settings	;
<b>.</b>	🔁 Materials	
	🧭 Concrete	
	🧭 Prestress Bar	
	🧭 Prestress Strand	
	Reinforcing Steel	
	📁 Soil	
	🧭 Structural Steel	
	🗄 🕖 Timber	

To add a new structural steel material, click on Structural Steel in the tree and select File/New from the menu (or right mouse click on Structural Steel and select New). The window shown below will open.

Bridge Materials - Structural Steel			1 <del>7.17</del> .1		X
Name:					
Description:					
Material properties					
Specified minimum yield strength (fy):	ksi				
Specified minimum tensile strength (Fu):	ksi				
Coefficient of thermal expansion:	1/F				
Density:	kcf				
Modulus of elasticity (E):	ksi				
Copy to library	Copy from library	OK	Apply	Canc	el

Add structural steel materials by selecting from the Structural Steel Materials Library by clicking the Copy from Library button.

# STL2 - Two Span Plate Girder Example

Name	Description	Library	Units	Fy	Fu	Coefficient of thermal expansion	Density/ unit load	Modulus of elasticity
905 to 1936	Built 1905 to 1936 - steel unknown	Standard	US Customary	30.0000044	60.000087	0.0000065	0.49	29000.004206
936 to 1963	Built 1936 to 1963 - steel unknown	Standard	US Customary	33.0000048		0.0000065	0.49	29000.004206
AASHTO M 94(1961)	AASHTO M 94(1961) or ASTM A 7(1967)	Standard	US Customary	33.0000048	60.000087	0.0000065	0.49	29000.004206
ASHTO M 95(1961)	AASHTO M 95(1961) or ASTM A 94(1966)	Standard	US Customary	45.0000065	70.0000102	0.0000065	0.49	29000.004206
ASHTO M 96(1961)	AASHTO M 96(1961) or ASTM A 8(1961)	Standard	US Customary	55.000008	90.0000131	0.0000065	0.49	29000.004206
ASHTO M188	AASHTO M 188 or ASTM A 441- >4" to 8"	Standard	US Customary	40.0000058	60.0000087	0.0000065	0.49	29000.00420
fter 1963	Built after 1963 - steel unkown	Standard	US Customary	36.0000052		0.0000065	0.49	29000.00420
STM A242 - <= 3/4"	ASTM A 242 - 3/4" thick and under	Standard	US Customary	50.0000073	70.0000102	0.0000065	0.49	29000.00420
STM A242 - > 1 1/2" to 4" incl.	ASTM A 242 - over 1 1/2" to 4" thick, inclus	Standard	US Customary	42.0000061	63.0000091	0.0000065	0.49	29000.00420
STM A242 - > 3/4" to 1 1/2" incl.	ASTM A 242 - over 3/4" to 1 1/2" thick, incl	Standard	US Customary	46.0000067	67.0000097	0.0000065	0.49	29000.00420
STM A36	ASTM A 36	Standard	US Customary	36.0000052	58.0000084	0.0000065	0.49	29000.00420
STM A440 - <= 3/4"	ASTM A 440 - 3/4" thick and under	Standard	US Customary	50.0000073	70.0000102	0.0000065	0.49	29000.00420
STM A440 - > 1 1/2" to 4" incl.	ASTM A 440 - over 1 1/2" to 4" thick, inclus	Standard	US Customary	42.0000061	63.0000091	0.0000065	0.49	29000.00420
STM A440 - > 3/4" to 1 1/2" incl.	ASTM A 440 - over 3/4" to 1 1/2" thick, incl	Standard	US Customary	46.0000067	67.0000097	0.0000065	0.49	29000.00420
STM A441 - > 3/4" to 1 1/2" incl.	ASTM A 441 - over 3/4" to 1 1/2" thick, incl	Standard	US Customary	46.0000067	67.0000097	0.0000065	0.49	29000.00420
STM A441 - <= 3/4"	ASTM A 441 - 3/4" thick and under	Standard	US Customary	50.0000073	70.0000102	6.5E-06	0.49	29000.00420
STM A441 - > 1 1/2" to 4" incl.	ASTM A 441 - over 1 1/2" to 4" thick, inclus	Standard	US Customary	42.0000061	63.0000091	6.5E-06	0.49	29000.00420
STM A441 - > 4" to 8" incl.	ASTM A 441 - over 4" to 8" thick, inclusive	Standard	US Customary	40.0000058	60.0000087	6.5E-06	0.49	29000.00420
STM A514 - over 2 1/2" to 4" incl.	ASTM A 514 - over 2 1/2" to 4" thick, inclus	Standard	US Customary	90.0000131	105.0000152	6.5E-06	0.49	29000.00420
STM A514 - to 2 1/2" incl.	ASTM A 514 - to 2 1/2" thick, inclusive	Standard	US Customary	100.0000145	115.0000167	6.5E-06	0.49	29000.00420
STM A517	ASTM A 517 all thickness	Standard	US Customary	100.0000145	115.0000167	6.5E-06	0.49	29000.00420
STM A572 - <= 3/4", Fy = 50 ksi	ASTM A572 - 3/4" and under, Fy=50 ksi	Standard	US Customary	50.0000073	70.0000102	6.5E-06	0.49	29000.00420
STM A572 - > 1 1/2" to 4" incl.	ASTM A 572 - over 1 1/2" to 4" thick, inclus	Standard	US Customary	42.0000061	63.0000091	6.5E-06	0.49	29000.00420
STM A572 - 1 1/2" max, Fy = 55 ksi	ASTM A 572 - 1 1/2" thick max, Fy=55 ksi	Standard	US Customary	55.000008	70.0000102	6.5E-06	0.49	29000.00420
STM A572 - 1 1/2" max., Fy = 45 ksi	ASTM A 572 - 1 1/2" thick max, Fy=45 ksi	Standard	US Customary	45.0000065	60.0000087	6.5E-06	0.49	29000.00420
STM A572 - 1" max, Fy = 60 ksi	ASTM A 572 - 1" thick max, Fy=60 ksi	Standard	US Customary	60.0000087	75.0000109	6.5E-06	0.49	29000.00420
STM A572 - 1/2" max, Fy = 65 ksi	ASTM A 572 - 1/2" thick max, Fy=65 ksi	Standard	US Customary	65.0000094	80.0000116	6.5E-06	0.49	29000.00420
STM A588 - <= 4", Fy = 50 ksi	ASTM A588 - 4" and under, Fy=50 ksi	Standard	US Customary	50.0000073	70.0000102	6.5E-06	0.49	29000.00420
STM A588 - > 4" to 5" incl.	ASTM A 588 - over 4" to 5" thick, inclusive	Standard	US Customary	46.0000067	67.0000097	6.5E-06	0.49	29000.00420
CTALACOO - CH. 0011		Q. 1.1	ucc i	42.0000001	C3.0000001	C. 5.5. O.C.	0.40	20000.00120

Select the AASHTO M270 Grade 50W material and click Ok. The selected material properties are copied to the Bridge Materials – Structural Steel window as shown below.

Vame:	Grade 50W				
Description:	AASHTO M270 Grade 50W				
Materia <mark>l</mark> pro	perties				
pecified mi	nimum yield strength (fy):	50.0000073	ksi		
pecified mi	nimum tensile stre <mark>n</mark> gth (Fu):	70.0000102	ksi		
Coefficient o	f thermal expansion:	0.0000065	1/F		
ensity:		0.49	kcf		
lodulus of	elasticity (E):	29000.004206	ksi		

Add concrete and reinforcement materials using the same techniques. The windows will look like these:

• bridge Materials - Concrete			10		~
Vame: Class A (US)					
Description: Class A cement concrete					
Compressive strength at 28 days (f'c):	4.0000006	ksi			
nitial compressive strength (f'ci):		ksi			
Composition of concrete:	Normal 🗸				
ensity (for dead loads):	0.15	kcf			
Density (for modulus of elasticity):	0.145	kcf			
oisson's ratio:	0.2				
Coefficient of therm <mark>al expa</mark> nsion (α):	0.000006	1/F			
plitting tensile strength (fct):		ksi			
Compute					
td modulus of elasticity (Ec):	3644.149254	ksi			
RFD modulus of elasticity (Ec):	3644.149254	ksi			
td initial modulus of elasticity:		ksi			
RFD initial modulus of elasticity:		ksi			
Modulus of rupture:	0.4798574	ksi			
Shear factor:	1				
Copy t	o library Copy f	rom library	pply	Cance	el

5. <b>1</b> 0		5				
Name:	Grade 60					
Description:	60 ksi reinforci	ng steel				
Material pro	perties					
Specified <mark>y</mark> ie	ld stre <mark>ngt</mark> h (fy):	60.000087		ksi		
Modulus of e	elasticity (Es):	29000.0042	06	ksi		
Ultimate stre	ength (Fu):	90.0000131		ksi		
Туре —	1					
Plain						
С Ероху						
Galvar	nized					

To enter the appurtenances to be used within the bridge expand the tree branch labeled Appurtenances. To define a parapet, double click on Parapet in the tree. Enter the parapet as shown below. Click Ok to save the data to memory and close the window.

lame:	Standard Parapet		1		
escrip <mark>tio</mark> n	c				
	All dimensions are in inches				
	Addition	al load:	kip/ft	Parapet unit load:	
	L			0.15 kcf	
		5		Calculated properties	
		3	Roadway	Net centroid (from	
	Line		Surface	reference line):	
		32		0.397 in Total load:	
		7	Ŧ ţ	0.536 kip/ft	
	Back	ront 1 3	1		

Double click on SUPERSTRUCTURE DEFINITIONS (or click on SUPERSTRUCTURE DEFINITIONS and click the New button under the WORKSPACE tab in the ribbon or right mouse click on SUPERSTRUCTURE DEFINITIONS and select New from the popup menu) to create a new structure definition. The dialog shown below will appear.

Girder system superstructure	
Girder line superstructure	Superstructure definition wizard
Floor system superstructure	
Floor line superstructure	
Truss system superstructure	
Truss line superstructure	
Reinforced concrete slab system superstructure	
Concrete multi-cell box superstructure	

Select Girder System and the Structure Definition window will open. Enter the appropriate data as shown below:

Name: 2 Span 4 Girder System Description: Description: Default units: US Customary Sefuel to nits: US Customary Enter span lengths along the reference line: Span Length 1 90 2 90 For PS/PT only Average humidity: Member alt. types Steel P/S R/C Inter P/S R/C Distance from PC to first support line: Ft. Superstructure alignment Start tangent length: Radius: Curved, tangent Distance from Length: Radius: Length t t Distance from Length: Radius: Length t Distance from Length: Curved, tangent Distance from Length: End tangent length: Distance from L		is Specs	Engine		
Pescription:     Default units:   US Customary   Enter span lengths   along the reference   line:     Span   Length   > 1   2   90        Horizontal curvature along reference line:     Superstructure along reference line:        Horizontal curvature   Distance from PC to first support line:   ft   Superstructure alignment   Start tangent length:   ft   Direction:   Left   Direction:   Left   Distance from PC to first support line:   ft   Diagent, curved   End tangent length:   Rt   Distance from last support line:   ft   Design speed:   mph   Superlevation:   Start	lame:	2 Span 4 Girder	System		Modeling
Average humidity: <ul> <li>Concrete Deck</li> <li>Concrete Deck</li> <li>For PS/PT only</li> <li>Average humidity:</li> <li>To po</li> <li>1</li> <li>90</li> <li>1</li> <li>1</li> <li>90</li> <li>1</li> <li>1</li> <li>90</li> <li>1</li> <li>1</li> <li>90</li> <li>1</li> <l< td=""><td></td><td></td><td></td><td></td><td>Multi-girder system O MCB     With frame structure simplified definit</td></l<></ul>					Multi-girder system O MCB     With frame structure simplified definit
efault units: umber of spans: umber of girders:	escription:				Deck type:
efault units: US Customary   umber of spans: 2   2 90     * 1 90   2 90     * 1 90   2 90     Member alt. types   Steel   P/S   R/C   Imber     P/T     Member alt. types     Steel   P/S   R/C   Imber   P/T     Superstructure along reference line:   Superstructure along reference line:   ft   Superstructure along reference line:   ft   Distance from PC to first support line:   ft   Direction:   Left   Inagent, curved, tangent   Start tangent length:   ft   Distance from last support line to PT:   ft   Design speed:   Superelevation:					Concrete Deck 💙
umber of spans: 2   aumber of girders: 4     b 1   90   2 90     b 1   90   2 90     P/S   RC(   Distance from PC to first support line:   ft   Superstructure alignment   Start tangent length:   Radius:   ft   Direction:   Left   Distance from last support line to PT:   ft   Design speed:   superelevation:   %	efault units:	US Customary	Enter span lengths along the reference		For PS/PT only
Span Image: Span   image: span image:	umber of spans:	2 0	line:		Average humidity:
wind wind wind wind wind wind wind wind	L		Span (ft)	-	Member alt. types
Horizontal curvature along reference line         Horizontal curvature         Distance from PC to first support line:         ft         Superstructure alignment         Curved         Tangent, curved, tangent         Curved         Tangent, curved, tangent         End tangent length:         ft         Distance from last support line to PT:         ft         Distance from last support line to PT:         ft         Distance from last support line to PT:         ft         Design speed:         mph         Superelevation:			2 90		Steel
Horizontal curvature along reference line Horizontal curvature Distance from PC to first support line: ft Superstructure alignment Curved Tangent, curved, tangent Tangent, curved, tangent Tangent, curved, tangent Direction: Left End tangent length: ft Distance from last support line to PT: ft Design speed: mph Superelevation: %					P/S
Horizontal curvature along reference line   Horizontal curvature   Distance from PC to first support line:   ft   Superstructure alignment   Curved   Tangent, curved, tangent   Direction:   Left   Distance from last support line to PT:   ft   Distance from last support line to PT:					
Horizontal curvature along reference line   Horizontal curvature   Distance from PC to first support line:   ft   Superstructure alignment   Curved   Tangent, curved, tangent   Direction:   Left   Distance from last support line to PT:   ft					Timber
Horizontal curvature along reference line       Distance from PC to first support line:       ft         Superstructure alignment       Start tangent length:       ft         Curved       Radius:       ft         Tangent, curved, tangent       Direction:       Left         Curved, tangent       End tangent length:       ft         Distance from last support line to PT:       ft         Distance from last support line to PT:       ft         Design speed:       mph         Superelevation:       %					☐ NCC ☐ Timber ☐ P/T
Horizontal curvature       Distance from PC to first support line:       ft         Superstructure alignment       Start tangent length:       ft         Curved       Radius:       ft         Tangent, curved, tangent       Direction:       Left         Curved, tangent       End tangent length:       ft         Distance from Iast support line to PT:       ft         Design speed:       mph         Superelevation:       %					Timber
Superstructure alignment       Start tangent length:       ft         Curved       Radius:       ft         Tangent, curved, tangent       Direction:       Left         Curved, tangent       End tangent length:       ft         Distance from last support line to PT:       ft         Design speed:       mph         Superelevation:       %	Horizontal curvatu	re along referen	ice line	Ψ.	Timber
Curved     Radius:     ft       Tangent, curved, tangent     Direction:     Left       Curved, tangent     End tangent length:     ft       Distance from last support line to PT:     ft       Design speed:     mph       Superelevation:     %	Horizontal curvatu	re along referen ature	ice line	ft	☐ NCC ☐ Timber ☐ P/T
Tangent, curved     Direction:     Left       Curved, tangent     End tangent length:     ft       Distance from last support line to PT:     ft       Design speed:     mph       Superelevation:     %	Horizontal curvatu Horizontal curva Superstructure a	re along referen ature alignment	ice line Distance from PC to first support line: Start tangent length:	ft ft	☐ N/C ☐ Timber ☐ P/T
Curved, tangent     End tangent length:     ft       Distance from last support line to PT:     ft       Design speed:     mph       Superelevation:     %	Horizontal curvatu Horizontal curva Superstructure a © Curved Tangent curv	re along referen ature alignment ved tanoent	ice line Distance from PC to first support line: Start tangent length: Radius:	ft ft ft	Dimber P/T
Distance from last support line to PT:     ft       Design speed:     mph       Superelevation:     %	Horizontal curvatu Horizontal curva Superstructure a Curved Tangent, curv Tangent, curv	re along referen ature alignment ved, tangent ved	nce line Distance from PC to first support line: Start tangent length: Radius: Direction:	ft ft ft Left	☐ Timber ☐ P/T
Design speed: mph Superelevation: %	Horizontal curvatu Horizontal curva Superstructure a O Curved Tangent, curv O Tangent, curv O Curved, tang	re along referen ature alignment ved, tangent ved ent	ce line Distance from PC to first support line: Start tangent length: Radius: Direction: End tangent length:	ft ft ft Left v ft	☐ rimber ☐ P/T
Superelevation: %	Horizontal curvatu Horizontal curva Superstructure a Curved Tangent, curv Curved, tang	re along referen ature alignment ved, tangent ved ent	nce line Distance from PC to first support line: Start tangent length: Radius: Direction: End tangent length: Distance from last support line to PT:	ft ft Left v ft ft	☐ Timber ☐ P/T
	Horizontal curvatu Horizontal curva Superstructure a © Curved Tangent, curv Curved, tang	re along referen ature alignment ved, tangent ved ient	nce line Distance from PC to first support line: Start tangent length: Radius: Direction: End tangent length: Distance from last support line to PT: Design speed:	ft ft ft Left v ft ft ft ft ft ft ft ft	□ Timber □ P/T

## STL2 - Two Span Plate Girder Example

Definition Analysis Specs Engine		
Structural slab thickness Consider structural slab thickness for rating Consider structural slab thickness for design Wearing surface Consider wearing surface for rating	Number of shell elements  In the deck between girders In the web between flanges Slower Faster More accurate Less accurate	
Consider wearing surface for design	10 9 8 7 6 5 4 3 2 1	
Consider striped lanes for rating Default analysis type: Line Girder Longitudinal loading Vehicle increment: 1 ft	Target aspect ratio for shell elements       Slower     Faster       More accurate     Less accurate       1     1.5     2     2.5     3     3.5     4	
Transverse loading Vehicle increment in lane: 2 ft Lane increment: 4 ft	3D bracing member end connection analysis Calculated factored member force effects Maximum of average (stress + strength) and 75% resistance	
3D analysis control options LFD: Model non-composite regions as non-composite LRFD: Model non-composite regions as non-composite	Bracing member LRFR factors Condition factor: Good or Satisfactory	
LRFR: Model non-composite regions as non-composite		

The Analysis tab is shown above with the default selections. Since we are not overriding default selections for this exercise, no changes are required.

Click on Ok to save the data to memory and close the window.

The partially expanded Bridge Workspace tree is shown below:



We now go back to the Bridge Alternatives and create a new Bridge Alternative by double-clicking on Bridge Alternatives in the tree. Enter the following data:

112-112-122-1 <del>7</del> (112-12) (1						
Alternative name:	Bridge Alternati	ive 1				
Description	Substructures					
Description:						
Horizontal c	urvature		- Global po	sitioning		
Reference line l	ength:	ft	Distance:	0	ft	
• Start bearing	g O End I	bearing	Offset:	0	ft	
Starting station	:	ft	Elevation:		ft	
Bearing:	N 90^	0' 0.00" E				
Bridge alignn	nent		Start tangen	t length:		ft
Ourved			Curve lengt	1:		ft
O Tangent, c	urved, tangent		Radius:			ft
○ Tangent, c	urved		Direction:		left V	
C/ Curved, ta	ingent		End tangent	length:		f+
	- 1 F		tha tangent	iengui.		n

Click Ok to save the data to memory and close the window.

# STL2 - Two Span Plate Girder Example

Double-click on Superstructures in the tree and enter the following new superstructure:

Superstructure								>
erstructure name	: Superstru	icture 1						
escription A	Iternatives	Vehicle path E	ingine	Substructures				
Description:								
Reference line			-					
Distance:	0	ft						
Offset:	0	ft						
Angle:	0	Degrees						
Starting station	1:	ft						
								_
					ОК	Apply	Canc	el

Double-click on Superstructure Alternatives and enter the following new Superstructure Alternative. Select the superstructure definition 2 Span, 4 Girder System as the current superstructure definition for this Superstructure Alternative.

<b>M</b> ,	Superst	ructure Alterna	ve		( <del>(,,,)</del> )		×
Alte	ernatīve	name:	Superstructure Alternative 1	1			
Des	s <mark>cript</mark> ior	n:					
Sup	perstruc	ture definition:	2 Span 4 Girder System	~			
Sup	perstruc	ture type:	Girder				
Nu	mber of	f main member	4				
	Span	Length (ft)					
Þ	1	90	-				
	2	90					
			*				
				ОК	Apply	Cano	el

Re-open the Superstructure 1 window and select the Alternatives tab. The Superstructure Alternative 1 will be shown as the existing and current alternative for Superstructure 1.

arstructure n	amer Sun	erstru	ture 1								
escription	Alternati	ives	Vehicle pa	ath En	gine	Substructures	)				
Existing	Current	Sup	erstructure	alternativ	e name	Description	l.				
>	V	Supe	rstructure /	Alternativ	- 1						-
					eı	ł					
					el	2					
						5					
					eı	-					
							1				
					et						
					el		1				
											~

The partially expanded Bridge Workspace tree is shown below:



Enter the impact to be used for the entire bridge by double clicking on Impact/Dynamic Load Allowance in the Bridge tree (or by clicking on Impact/Dynamic Load Allowance in the tree and selecting Open from the ribbon under the WORKSPACE tab, or by right clicking Impact/Dynamic Load Allowance and selecting Open from the popup menu). The Structure Definition Impact/Dynamic Load Allowance window shown below will open. Enter the appropriate values as shown and click Ok to save the data to memory and close the window. The values shown below are default values.

For structural components whe	ere impact	s to be included per
AASHTO 3.8.1, choose the impa	act factor t	o be used:
Standard AASHTO impact: I =	L + 125	
O Modified impact:		times AASHTO impact
O Constant impact override:		%
LRFD dynamic load allowance		
Fatigue and fracture limit states:	15	%
All other limit states:	33	%

For this example problem we are not going to override the standard LRFD or LRFR factors.

Click Load Case Description to define the dead load cases. The completed Load Case Description window is shown below. Click the "Add Default Load Case Descriptions" generate the table below.

	Load case name	Description	Stage		Туре		Time* (days)	
ř.	DC1	DC acting on non-composite section	Non-composite (Stage 1)	*	D,DC			
	DC2	DC acting on long-term composite sec	Composite (long term) (Stage 2)	*	D,DC	*		
	DW	DW acting on long-term composite se	Composite (long term) (Stage 2)	Ŧ	D,DW	+		
	SIP Forms	Weight due to stay-in-place forms	Non-composite (Stage 1)	•	D,DC			1

# STL2 - Two Span Plate Girder Example

Double-click on Framing Plan Detail to describe the framing plan. Enter the appropriate data as shown below.

	iragms Lateral f	G	rder spa	cing orient	ation			
Support	Skew (degrees)		Perpend Along s	dicular to <u>c</u> upport	girder			
1 2 3	0	-	Girder	Girder s (fi	pacing t)			
5	0		bay	Start of girder	End of girder			
		*	1	10	10			
			2	10	10			

Switch to the Diaphragms tab to enter diaphragm spacing. Enter the following diaphragms for Girder Bay 1 as shown below:

d	er bay:	1	~	Copy bay t	o	Diap wiz	hragm :ard				
	Support	s dis	tart tance (ft)	Diaphragm spacing	Number of spaces	Length (ft)	E dist (	nd ance ft)	Load (kip)	Diaphragm	
		Left girder	Right girder	(ft)		1.1	Left girder	Right girder	9-14 A		
	1 .	0	0	0	1	0	0	0		Not Assigned *	
	1 7	- 0	0	37	2	74	74	74		Not Assigned *	
	2 -	• 0	0	0	1	0	0	0		Not Assigned *	
	2 .	0	0	16	1	16	16	16		Not Assigned *	
	2 7	16	16	37	2	74	90	90		Not Assigned *	
											214

Click the Copy Bay To button to copy the diaphragms entered for Bay to the other bays. The following dialog will appear. Click Apply to copy the diaphragms to girder bay 2.

Select the new bay(s):		Bay 2		
		buy o	e new bay(s):	Select the

Click the Copy Bay To button again, this time selecting 3 as the new bay. Click Apply to copy the diaphragms to girder bay 3.

Select Ok to close Structure Framing Plan Details window.

While Framing Plan Detail is selected in the Bridge tree, open the schematic for the framing plan by selecting the Schematic button under the WORKSPACE tab in the ribbon (or by right clicking Framing Plan Detail and selecting Schematic from the popup menu). The following schematic will be displayed.



Next define the structure typical section by double-clicking on Structure Typical Section in the Bridge Workspace tree. Input the data describing the typical section as shown below.

uperstructure definition reference line is     within     withe bridge deck.       Vistance from left edge of deck to uperstructure definition reference line:     18.5     ft       Vistance from right edge of deck to uperstructure definition reference line:     18.5     ft       Vistance from right edge of deck to uperstructure definition reference line:     18.5     ft       Vistance from right edge of deck to uperstructure definition reference line:     18.5     ft       Vistance from right edge of deck to uperstructure definition reference line:     18.5     ft       Vistance from right edge of deck to uperstructure definition reference line:     18.5     ft	
Start     End       istance from left edge of deck to uperstructure definition reference line:     18.5     ft       istance from right edge of deck to uperstructure definition reference line:     18.5     ft       eft overhang:     3.5     ft     3.5	
Istance from right edge of deck to uperstructure definition reference line: istance from right edge of deck to uperstructure definition reference line: eft overhang: IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	
istance from right edge of deck to uperstructure definition reference line: 18.5 ft 18.5 ft eft overhang: 3.5 ft 3.5 ft	
tf overhang: 3.5 ft 3.5 ft	
omputed right overhang: 3.5 ft 3.5 ft	

The Deck (cont'd) tab is used to enter information about the deck concrete and thickness. The material to be used for the deck concrete is selected from the list of bridge materials described above.

overhang	ieck k nickness	Superstructu Reference L	re Definition		overhang			
eck Deck (cont'd) Para	ipet Media	an Railing	Generic	Sidewalk	Lane position	Striped lanes	Wearing surface	
Deck concrete:	Class A (US	5)		~				
otal deck thickness:	8.5	în		2.5				
.oad case:	Engine Ass	igned	1					
Deck crack control parameter:		kip/in						
iustained modular ratio facto	r: 3	Ti						
Deck exposure factor:								

#### Parapets:

The two parapets are described using the Parapet tab. Click New to add a row to the table. The name of the parapet defaults to the only barrier described for the bridge. Change the "Load Case" to "DC2" and "Measure To" to "Back" (we are locating the parapet on the deck by referencing the back of the parapet to the left edge of the deck). Enter 0.0 for the "Distance at Start" and "Distance at End". Change the "Front Face Orientation" to "Right". The completed tab is shown below.

-	Deck (cont'd) Paranet	Mer	lian	Railing	Gen	eric Sidewalk	Lane positic	on Strined	lanes	Wearing	surface	
	Name	Lo	ad case	Meas	ure to	Edge of deck dist. measured from	Distance at start (ft)	Distance at end (ft)	Front	face		
1	Standard Parapet	DC	2 -	Back	-	Left Edge *	0	0	Right	-		

#### Lane Positions:

Select the Lane Position tab.

Structure Typical	Section				10 <del>111</del>		>
	(A)	ure Definition Reference Line					
Deck Deck (cc	ont'd) Parapet Median	Railing Generic Sidewa	alk Lane position Striped	d lanes Wearing surface			
Travelway number	Distance from left edge of travelway to superstructure definition reference line at start (A) (ft)	Distance from right edge of travelway to superstructure definition reference line at start (B) (ft)	Distance from left edge of travelway to superstructure definition reference line at end (A) (ft)	Distance from right edge of travelway to superstructure definition reference line at end (B) (ft)			
number	at start (A) (ft)	at start (B) (ft)	at end (A) (ft)	at end (B) (ft)			
LRFD fatigue	ailable to trucks:						
🗌 Override	Truck fraction:	Compute		New Dup	licate	Delete	]
				ОК	Apply	Cance	el

Click the Compute... button to automatically compute the lane positions. A dialog showing the results of the computation opens. Click Apply to apply the computed values. The Lane Position tab is populated as shown below.

Struc	ture Typical :	Section								) <del></del>		×
	Travelø			ire Definitior ravelway 2								
Deck	Deck (co	nt'd) Parapet	Median	Railing	Generic Sidew	alk Lane position	Striped	lanes	Wearing surface			
	Travelway number	Distance from lef travelway to supe definition refer at start ( (ft)	ft edge of erstructure ence line A)	Distance travelwa definiti	from right edge of y to superstructure on reference line at start (B) (ft)	Distance from left travelway to supers definition referen at end (A) (ft)	edge of structure ce line	Distanc travelv defir	te from right edge of vay to superstructure lition reference line at end (B) (ft)			
÷.	1		-17		17		-17		17		1	
	RFD fatigue Lanes ava Override	ilable to trucks:		C	ompute				New Du	plicate	Delete	
									ОК	Apply	Cano	el:

## Wearing Surface:

Enter the data shown below.

Distance from left superstructure def	edge of deck to j Distance from right edge of deck to nition ref. line			
overhang	Deck A Suberstuccule Denniuon			
Deck Deck (cont'd) P	arapet Median Railing Generic Sidewalk Lane position Striped lanes Wearing surface			
Wearing surface material:	Asphalt			
Description:	Asphalt - 25 psf			
Wearing surface thickness:	2.78 in Thickness field measured (DW = 1.25 if checked)			
Wearing surface density:	108 pcf			
Load case:	DW Copy from library			
	OK A	oply	Canc	el

Click Ok to save the data to memory and close the window.

While Structure Typical Section is selected in the Bridge tree, open the schematic for the framing plan by selecting the Schematic button under the WORKSPACE tab in the ribbon (or by right clicking Structure Typical Section and selecting Schematic from the popup menu). The following schematic will be displayed. The girders are displayed as dashed boxes since we have not yet defined what type of girder we will have.

Typical section         Image: Control of the section         Image: Control of the section         2SpanPlateGirderTr         2SpanPlateGirderTraining - 2 Span 4 Girder System         2/24/2022	¥ X
B R Q Q ⊕ B R H 100% Y 2SpanPlateGirderTr 2SpanPlateGirderTraining - 2 Span 4 Girder System 2/24/2022	÷
2SpanPlateGirderTr 2SpanPlateGirderTraining - 2 Span 4 Girder System 2/24/2022	
071.01	
* 37-0"	-
4	*
Deck Thickness 8 1/2" 2 3/4" Asphalt Travelway 1	ſ
3@10'-0" = 30'-0"	-6"

Define stiffeners to be used by the girders. Expand the Stiffener Definitions tree item and double click on Transverse. Select "Trans. Plate Stiffener" for stiffener type. Define the stiffener as shown below. Click Ok to save to memory and close the window.

The Z Side	d Dia Conn PL	
Stiffener typ	e	Тор дар:
) Single		in
🖲 Pair		Width:
Plate		6 in +>
hickness:	0.75 in	
Aateria <mark>l:</mark>	Grade 50W	Bottom gap:
Welds		in L
op:	None 🗸	
Veb:	None 👻	
lottom:	None 👻	

Now define the bearing stiffeners by double clicking on Bearing (under Stiffener Definitions in the tree). Select "Plate Stiffener" for stiffener type. Define the stiffener as shown below. Click Ok to save to memory and close the window.

COULD BE STORE	g Stiffener	
Plate	75	
hickness:	0.875 in	in T
/laterial:	Grade 50W	
Nelds		9 in +++++
op:	None 🗸	
Veb:	None 🗸	in type
ottom:	None 👻	
		in <del>3 K 3 K</del> ir

Describing a member:

Expand MEMBERS in the tree. The G2 member window shows the data that was generated when the structure definition was created. No changes are required at this time. The first Member Alternative that we create will automatically be assigned as the Existing and Current Member alternative for this Member.

🗛 Member									×
Member name:	G2				Lin	k with: None			
Description:									
	Existing	Curre	nt   N	lember alternativ	e name	Description			
									~
Number of span	is: 2 ()	8	Span no.	Span length (ft)					
		Þ.	1	90	-				
			2	90					
					~				
						OK Apply	/	Canc	el

Next double click on the Member loads in the tree and select SIP Forms from the dropdown list. Enter the load due to stay-in-place forms as shown below.

nifa	rm Distributed	Concentrated	Settlement			
	Load case name	Span	Uniform load (kip/ft)	Description		
F	SIP Forms *	All Spans *	0.135			4

Support constraints were generated when the structure definition was created and are shown below.

ene	eral Elast	tic 3D General	3D Elastic		2	
Ĩ	Support	Support	Translation	constraints	Rotation constraints	
	number	type	Х	Y	Z	
Þ.	1	Pinned *	V	1		
	2	Roller *		V		
	3	Roller *		J		

Defining a Member Alternative:

Double-click MEMBER ALTERNATIVES in the tree to create a new alternative. The New Member Alternative dialog shown below will open. Select Steel for the Material Type and Plate for the Girder Type.

Vaterial type:	Girder type:
Post tensioned concrete	Built-up
Prestressed (pretensioned) concrete	Plate
Reinforced concrete	Rolled
Steel	
Timber	

Click Ok to close the dialog and create a new member alternative.

The Member Alternative Description window will open. Enter the appropriate data as shown below. Select Schedule-based Girder property input method. The additional self-weight of 0.170 kip/ft is estimated for the weight of the diaphragms and stiffeners.

ember alterna	ative: Plat	te Girder							
Description	Specs	Factors	Engine	Import	Control options	)			
Description:					Material type:	Steel			
					Girder type:	Plate			
					Modeling type	Multi Girder System			
					Default units:	US Customary	~		
Girder pro	perty inpu	t method	End be	earing locat	ions	Simple DL, continuous L	L		
Schedu	le based		Left:	6	in				
() Cross-s	ection bas	ed	Right:	6	in				
Self load					Default rating met	hod:			
Load case:		Engine Ass	igned	~	LFD	~			
Additional	self load:	0.17	kip/ft						
Additional	self load:		%						

If we now re-open the Member G2 window, we will see this Member Alternative designated as the existing and current member alternative for this Member.

🗛 Member								8	×
Member name:	G2	5				Lin	with: None		
Description:									
		Existing	Curr	ent	Member alternativ	e name	Description		
	Þ	V	V		Plate Girder				
Number of span	is:	2 0		Spa no	n Span length (fft)				 . 4.
			>	1	90				
				2	90				
						Ŷ			

Next describe the girder profile by double clicking on Girder Profile in the tree. The window is shown below with the data describing the web.

Begin depth (in)	Depth	vary	End depth (in)	Thickness (in)	Supp	oort Iber	Start distance (ft)	Length (ft)	End distance (ft)	Material		Weld at right			
36	None		36	0.4375	1	S₹	0	63	63	Grade 50W	*	None	×		
 36	None		36	0.5	1	•	63	54	117	Grade 50W	*	None	*		
36	None		36	0.4375	2	ंज्य	27	63	90	Grade 50W	×	None	×		

# STL2 - Two Span Plate Girder Example

Describe the flanges as shown below.

/eb	Тор	flange	Bottom fl	ange										
	Begin width (in)	End width (in)	Thickness (in)	Supp	ort d	Start distance (ft)	Length (ft)	End distance (ft)	Material		Weld	Weld at right		
•	12	12	0.75	1		0	63	63	Grade 50W	Ŧ	None	None	*	
	16	16	1	1	•	63	54	117	Grade 50W	•	None	None	*	
	12	12	0.75	2		27	63	90	Grade 50W	Ŧ	None	None		

	FIGLE GI	ilue:												
Vel	o Top	flange	Bottom fl	ange	1									
	Begin width (in)	End width (in)	Thickness (in)	Sup	port nber	Start distance (ft)	Length (ft)	End distance (ft)	Material		Weld	Weld at right		
÷	16	16	0.875	1		0	63	63	Grade 50W	Ŧ	None *	None	*	
	16	16	1.5	1	-	63	54	117	Grade 50W	Ŧ	None *	None		
	16	16	0.875	2	×	27	63	90	Grade 50W	Ŧ	None *	None	÷	
											1		1.12.0cm	

Next open the Deck Profile and enter the data describing the structural properties of the deck. The deck concrete and reinforcement windows are shown below.

e: [	Plate																
eck	k concrete	Rei	inford	ement	Shea	connect	ors										
	Material		Sup	oport nber	Start distance (ft)	Length (ft)	Er dista (f	nd ance t)	Structural thickness (in)	Start effective flange width (Std) (in)	End effective flange width (Std) (in)	Start effective flange width (LRFD) (in)	End effective flange width (LRFD) (in)	n			
8	Class A (US)		1		(	180		180	8	96	96	120	120	8			1

e:	Plate			Ī											
20	ck concrete	Reinforcem	ent She	ar connec	tors										
	Material	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Std bar count	LRFD bar count	Bar size	Distance (in)	Row	Bar spaci (in)	ng			
	Grade 60 💌	1 *	63	54	117	6.24	6.24	9 -	2.97	Top of Slab *					
	Grade 60 💌	1 -	63	54	117	4.16	4.16	9 -	1.91	Bottom of Slab *					
													Nour	Duplicato	Doloto
_													New	Duplicate	Delete

## STL2 - Two Span Plate Girder Example

Composite regions are described using the Shear Connectors tab as shown below.

	Plate										
ck	c concrete	Reinfor	cement	Shear cor	nnectors						
and the second s	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Connector ID	Number of spaces	Number per row	Transverse spacing (in)			
Ī	1 -	0	180	180	Composite *						
	Shear stud		View						New Duplicate	Delete	•
	Shear stud	l bl	View calcs						New Duplicate	Delete	e
	Shear stud		View calcs						New Duplicate	Delete	e
	Shear stud design toc	i st	View calcs						New Duplicate	Delete	e
	Shear stud design toc		View calcs						New Duplicate	Delete	e

The haunch profile is defined by double clicking on Haunch Profile in the tree. The window is shown below.

A Steel Haunch Profile	ь	8		×
Haunch type:	Embedded flange			
	Support numberStart distance (ft)Length (ft)End distance (ft)Z1Z2Y1(in)(in)(in)(in)(in)(in)			
	▶ 1   0 180 180 8 8 2			
	New Duph	cate	Delete	
	ОК Ар	ply	Cancel	

Regions where the slab is considered to provide lateral support for the top flange are defined using the Lateral Support window shown below. It can be opened by double clicking on Lateral Support in the tree.

				~		 		
	Start Dista	nce H	Length	<u> </u>		 		
lar	nges Loo	cations				 		
Top	p flange							
	Support number	Start distance (ft)	Length (ft)	End distance (ft)				
Þ	1 -	0	180	180				-
								1.00
				1	1		-	_

Stiffener locations are described using the Stiffener Ranges window shown below.

A Start Distance	Spi	acing				]						
Transverse stiffen	er ranges	Longitu	udinal stiffe	ner ranges								
Nam	•	Support number	Start distance (ft)	Number of spaces	Spacing (in)	Length (ft)	End distance (ft)					
												-
												v
Apply at diaphragms	Stiffene diapł	rs betweer aragms	٦					New	Duplicate	0	Delete	v

Click on the "Apply at Diaphragms..." button to open the following dialog. Select the 2 Sided Conn PL as the stiffener to apply at the interior diaphragms.

ind diaphragms an	d diaphragms at piers
earing stiffener:	Bearing Stiffener
ransverse stiffener:	2 Sided Dia Conn PL

### Selecting Apply will create the following transverse stiffener locations.

		C	_ Start	Number of	Cassing	Length	End		
	Name	numbe	r distance r (ft)	spaces	(in)	(ft)	distance (ft)		
1	2 Sided Dia Con *	1	* 37	1	0	0	37		1
	2 Sided Dia Con *	1	* 74	1	0	0	74		
	2 Sided Dia Con 🔹	2	+ <mark>1</mark> 6	1	0	0	16		
	2 Sided Dia Con *	2	* 53	1	0	0	53		

This example does not have any intermediate transverse stiffeners so we can click Ok to close this window

Bearing stiffener definitions were assigned to locations when we used the Apply at Diaphragms... button on the Transverse Stiffener Ranges window. The Bearing Stiffener Location window is opened by expanding the Bearing Stiffener Locations branch in the tree and double clicking on each support. The assignment for Support 1 is shown below.

				CL of Bearing 			
irs o	of bearin	ig stiffeners at this support:		×	*Negative cl bearing 6	offset to left of	
St	tiffener pair	Name	Offset (in)	522			
Ì	1	Bearing Stiffener *	0				

The description of an interior beam for a structure definition is complete.

While "Plate Girder" is selected in the Bridge tree, open the schematic for the girder by selecting the Schematic button under the WORKSPACE tab in the ribbon (or by right clicking Plate Girder and selecting Schematic from the popup menu). The following schematic will be displayed.

Schematic				_ 🗆 ×
Girder profile				<b>▼</b> ×
B 🕅 🕅 🖓 🖓 🕀				÷
2SpanPlateGirderTr 2SpanPlateGirderTraining - 2 2/24/2022	Span 4 Girder System - G2			
Top Flange Transitions	PL 3/4"x12"x63"-0"			PL 1"x18"x54'-0"
Web Transitions	7/16'x38'x83'-0"			1/2"x38"x54'-0"
Stiffener Spacing	37-0"	37'-0"	н	32'-0'
Shear Connector Spacing				
Top Flange Lat. Support				180'-0"
Top Flange Deterioration				
	7/18/98* MEA		1	117-y24" Mich.
	1.10 MO. HEEL		Ť	HE NOT THE
Bottom Flange Deterioration				
Bottom Flange Transitions	PL 7/8"x16"x63-0"			PL 1 1/2"x16"x54'-0"
Span Lengths	** 90'-0'			
	Notes: ~All fanse length dimensions are horiz: (length along flange may differ). *Transverse stifferer pairs shown in tolue. *Single transverse stifferer shown in green. *Deransioning starts and end as at LC bearings. *X denotes cross frame locations.			
<				>

Distribution Factors (Standard):

Double click Live Load Distribution to open the window, and use the Compute from Typical Section button to compute the following Standard (LFD) distribution factors.

D	Distribution I	factor input	method			0	5				
0	Use simpl	ified metho	d Ous	se advanced	l method	Use advance	d method wit	h 1994 guide	e specs		
	Allow distrib	bution facto	rs to be use	ed to compu	ite effects o <mark>f</mark>	permit loads wit	routine traff	ic			
		Distribution factor (wheels) Shear Shear at Moment Deflection			ni -						
	loaded	Shear	Shear at	Moment	Deflection						
	1 Lane	1.428571	1.4	1.428571	0.5						
	Multi-lane	1.818182	2	1.818182	1						

We do not need to enter any LRFD distribution factors since AASHTO LRFD will compute them for us since we have a girder system structure definition.

Interior (LFD wheels)

Lanes Loaded	Shear	Shear at Support	Moment	Deflection
1 lane	1.43	1.4	1.43	0.5
Multi-lane	1.81	2.0	1.81	1.0

Interior (LRFD lanes)

Lanes Loaded	Shear	Shear at Support	Pos. Moment	Neg. Moment	Deflection
1 lane	0.76	0.76	0.484	0.503	0.3*
Multi-lane	0.952	0.952	0.698	0.726	0.5

\* includes 1.20 multiple presence factor

Live load distribution factor calculation details can be viewed by clicking "View Calcs" button.

The member alternative can now be analyzed. To perform LRFR rating, select the Analysis Settings button on the DESIGN/RATE tab of the ribbon to open the window shown below. Click Open Template button and select the LRFR Design Load Rating to be used in the rating and click Ok.

Design review   Rating		Rating metho	d:	LRFR	>	
alysis type: Line Girder	~	Apply prefere	nce setting:	None	>	
Traffic direction: Both directions Vehicle selection	~	F	Refresh	Temporary vehicles	Advanced	
<ul> <li>-Vehicles</li> <li>-EV2</li> <li>-EV3</li> <li>-H 15-44</li> <li>-H 20-44</li> <li>-HL-93 (SI)</li> <li>-HS 15-44</li> <li>-HS 20 (SI)</li> <li>-HS 20 (SI)</li> <li>-HS 20 (SI)</li> <li>-HS 20 (SI)</li> <li>-HS 20 -44</li> <li>-Lane-Type Legal Load</li> <li>-LRFD Fatigue Truck (SI)</li> <li>-LRFD Fatigue Truck (US)</li> <li>-NRL</li> <li>-SU4</li> <li>-SU5</li> <li>-SU6</li> <li>-SU7</li> <li>-Type 3-3</li> <li>-Type 3-3</li> <li>-Type 3S2</li> <li>-Agency</li> <li>-User defined</li> <li>Temporary</li> </ul>		Add to >> Remove from <<	Rating vehicl LRFR	les yn load rating wentory HL-93 (US) perating 		

Next click the Analyze button on the DESIGN/RATE tab to perform the rating. When the rating is finished you can review the results by clicking the Tabular Results button on the ribbon. The window shown below will open.

<b>A</b>	Analysis Res	ults - Plate Girder													- 0	×
Rep	ort type:		ne/Impact	t loading type	Displ	ay Format										
Ra	tin <mark>g Results</mark> S	Summary 🔛 🤇	As reque	ested 🔿 Deta	ailed	tiple rating lev	els per row	~								
_																
	Live Load	Live Load Type	Rating Method	Inventory Load Rating (Ton)	Operating Load Rating (Ton)	Legal Load Rating (Ton)	Permit Load Rating (Ton)	Inventory Rating Factor	Operating Rating Factor	Legal Rating Factor	Permit Rating Factor	Inventory Location (ft)	Inventory Location Span-(%)	Operating Location (ft)	Operating Location Span-(%)	Le Loca (f
•	HL-93 (US)	Truck + Lane	LRFR	8.49	11.00			0.236	0.306			90.00	1 - (100.0)	90.00	1 - (100.0)	-
1	HL-93 (US)	Tandem + Lane	LRFR	9.98	12.94			0.277	0.359			90.00	1 - (100.0)	90.00	1 - (100.0)	
	HL-93 (US)	90%(Truck Pair + Lane)	LRFR	6.09	7.90			0.169	0.219			90.00	1 - (100.0)	90.00	1 - (100.0)	
																Ŵ
	4															•
AA	SHTO LRFR E	ngine Version 7.2.0.1														
Ana	lysis prefere	nce setting: None														
																01

An LRFD design review of this girder for HL-93 loading can be performed by AASHTO LRFD. To do LRFD design review, enter the Analysis Settings window as shown below:

Design review	lating	Design	method:	LRFD	>		
nalysis type: ne / Impact loading type	Line Girder	V Apply	preference setting:	None	V		
Vehicles Output E	ngine Description				Lunio I		
Traffic direction: Both c	directions 👻		Refresh	Temporary vehicles	Advanced	]	
Vehicle selection			Vehicle summar	у			
<ul> <li>Cehicles</li> <li>Standard</li> <li>Alternate Mi EV2</li> <li>EV3</li> <li>HL-93 (SI)</li> <li>HL-93 (US)</li> <li>HS 20 (SI)</li> <li>HS 20 (SI)</li> <li>HS 20 (SI)</li> <li>HS 20 Fatigue</li> <li>Agency</li> <li>User defined</li> <li>Temporary</li> </ul>	litary Loading = Truck (SI) = Truck (US)	Add to >> Remove from <<	E-Design veh	icles loads 33 (US) oads loads			

AASHTO LRFD analysis will generate a spec check results file. Click the Engine Outputs button on the DESIGN/RATE tab in the ribbon to open the following window.

2SpanPlateGirderTr	-		0
🖹 2 Span 4 Girder System			
自-G2			
B-Plate Girder			
Live Load Distribution Factors Calculations			
live Load Distribution Factors Calculations Summany			
Stage 3 Spec Check Results (Thursday Eeb 24 2022 11:55:5/	0		
on File	a.		
- House Load Distribution Factors Calculations			
live Load Distribution Factors Calculations			
Stage 2 Spec Check Posults			
las file			
Log File			
			- 22
		1	- I

To view the spec check results, double click the Spec Check Results in this window.