AASHTOWare BrDR 7.5.1 Steel Design Tool Two Span Girder Design Example

Two Span Girder Design Example

Start the **Steel Design Tool** program, create a new input file using the **File** | **New** command. The program will switch from the **File** tab to the **Design Input** tab.

File | New and File | Save As

••• A	ASHTOWere Bridge Design: Steel Design: Tool	-	×
File	New		
•	Open		
B	Save		
ø	Save As		
٨	Print		
2	Recent		
10	Library		
۲	Configuration		
0	Help		
1	License		
	Close		
×	Exit		

Before proceeding with **Design Input** return to the **File** tab and click **Save As** to rename the file from **New Project** to **STL15 Design Example**.

New Project - AASHTOWare Bridge Design: Steel Design Tool	-	×
File Design liput Design		
Nev		
Dpen .		
E Save		
Ei Sme As		
😸 Print		
Recent		
D Library		
Configuration		
🕡 Help		
E License		
Close		
🖬 Exit		
P		

The new file name will appear in the program title bar and the program will again bring up the the **Design Input** with the **Project** input screen. The **Project** property will still say **New Project** and this will be changed in the next step. The **Project** property determines the name of the subfolder in the Documents\AASHTOWare\SteelDesign75\ folder where design run output files will be stored. In the bottom left corner of the program window, there is a **Validation** button that enables input validation. When validation is enabled, the program will mark sections and input boxes with missing or incorrect information. For the purposes of this example, the **Validation** will be disabled during input and will be enabled after all input is entered to verify that there are no validation errors.

Design Input | Project

On the Design Input | **Project** input screen, enter the data as shown below.

STL15 Design Example.brdx - AAS	SHTOWare Bridge Design: Steel Design Tool	- 0	
Proiect	Project: STL15 Design Example		
Project Library	Description: 2 Span 4 Girder Bridge		
Geometry			
Deck	Designer:		
Typical Section Loads	Date: 7/11/2024 15		
Beam Parameters	Edition: AASHTO LRFD 9th		
Lateral Support	Limit states: Strength-I Strength-II Strength-II Strength-V		
Member Loads	Service-II		
Control Options	Fatigue-I Fatigue-II		
Input Report	Design vehicles		
	Permit load:		
	Fatigue load:		
	Design ADTT: 0		
idation Off	Back	Forward	

Design Input | Project Library | Appurtenance

On the **Apputenance** tab, select **Parapet** for **Type** from the drop down menu and click the **Copy from library** button to add a new parapet. Select the Jersey Barrier.

Design Input Design														
oject	Appurtenance Mate	rial Vehicle												
oject Library	Type Parapet	~												
ometry	Additional load centroid	Additional load												
ck	X1	X2 X3		Ro	adway									
ical Section Loads	ine	Y1 Y2			ипасе									
am Parameters		¥ 13												
eral Support	Back	Front 14		*										
mber Loads	Name	Description	X1 (in)	X2 (in)	X3 (in)	Y1 (in)	Y2 (in)	Y3 (in)	Y4 (in)	Additional load centroid (in)	Additional load (kip/ft)	Parapet unit load (kcf)	Calculated Net centroid (in)	Total load (kip/ft)
ntrol Options														
ut Report														
	Copy from library												New	Duplicate De
													4	

Bro Select Item	-		×
Name	Description		
> Jersey Barrier	Standard New Jersey Barrier		
	OK	Ca	ancel

STL15 - Steel Design Tool Example

STL15 Design Example.brdx - AASHTOV	Vare Bridge Design: Steel Design	Tool											-		×
File Design Input Design															
Project	Appurtenance Material	Vehicle													
Project Library	Type: Parapet	~													
Geometry	Additional load Additional load	lditional load													
Deck	X1 Reference	×3	Ro	adway											
Typical Section Loads	line	Y1 Y2	Si	urface											
Beam Parameters	Pask	¥ 73													
Lateral Support	Dack	riont#	*												
Member Loads	Name	Description X1 (in)	X2 (in)	X3 (in)	Y1 (in)	Y2 (in)	Y3 (in)	Y4 (in)	Additional load centroid (in)	Additional load (kip/ft)	Parapet unit load (kcf)	Calculated Net centroid (in)	Total load (kip/ft)	I	
Control Options	> Jersey Barrier Sta	andard New Jers 12.00	2.0000	7.0000	0.0000	19.0000	10.0000	3.0000			0.1500	7.8801	0.5	05	
Input Report	Copy from library											New	Duplicate		
Validation Off												d Back	Forv	vard Þ	

Design Input | Project Library | Material

On the **Material** tab, select **Concrete** for **Type** from the drop down menu and click the **Copy from library** button to copy the **Class A** (**US**) concrete material definition from **File** | **Library** to the **Project Library**.

oject	Appurtenance Materia	Vehicle											
roject Library	Type: Concrete	~											
eometry	Name	Description	Compressive strength at 28 days fc (ksi)	Initial compr strength f'ci	Coefficient thermal expa (1/F)	Density for DL (kcf)	Density modulus of e (kcf)	Std Modulus of elasticity* (ksi)	LRFD Modulus of elasticity (ksi)	Std Initial moduli of elasticity' (ksi)	LRFD Initial module of elasticity (ksi)	Poisson's ratio	
eck			_										
pical Section Loads			Select Item		-		×						
			Name		Description								
am Parameters			> Class A	Class A cemen	it concrete	_							
			Class A (US)	Class A cemen	t concrete								
teral Support			Class B (US)	Class B cemen	t concrete								
ember Loads			Class C	Class C cemen	it concrete								
			Class C (US)	Class C cemen	it concrete								
ontrol Options													
out Report					ОК	Can	el						
participant													
													_

On the **Material** tab, select **Structural Steel** for **Type** from the drop down menu and click the **Copy from library** button to copy the **Grade 50W** steel material definition from **File** | **Library** to the **Project Library**.

STL15 Design Example.brdx - AASHTOWa	are Bridge Design: Steel De	esign Tool							- 0	\times
File Design Input Design										
Project	Appurtenance Mat	erial Vehicle								
Project Library	Type: Structural Steel	~	-							
Geometry	Name	Description	Specified yield strength (Fy) (ksi)	Specified tensile strength (Fu) (ksi)	Modulus of elasticity (ksi)	Coefficient of thermal expansion	Density			
Deck										
Typical Section Loads			BI Select H	em ame	Description	- 0 X				
Beam Parameters			Grade (90 - > AASHTO	0 M270M - over 6 0 M270M - over 6	5 to 100 mm				
Lateral Support			Grade	AASHTO	0 M270 Grade 36					
Member Loads			Grade	60W AASHTO	0 M270 Grade 50	v				
			Grade	OW AASHTO	0 M270 Grade 70\	V				
Control Options			Grade Grade	100 <= AASHTO	0 M270 Grade 100 0 M270 Grade 100	up to 2.5" t				
Input Report					OK	Cancel				
										2
	Copy from library							New Du	plicate De	lete
Validation Off								Back	Forward	I 📐

On the **Material** tab, select **Reinforcing Steel** for **Type** from the drop down menu and click the **Copy from library** button to copy the **Grade 60** reinforcing steel material definition from **File** | **Library** to the **Project Library**.

STL15 Design Example.brdx - AASHTO	Ware Bridge Design: Steel Design Tool							-		>
File Design Input Design										
Project	Appurtenance Material V	ehicle								
Project Library	Type: Reinforcing Steel	~								-
Geometry	Name Desc	ription Specified yield strength (Fy) (ksi)	Modulus of elasticity (ksi)	Ultimate strength (Fu) (ksī)	Туре					
Deck									_	
Tunical Castion Lands		Select It	em.	-	o x					
Typical Section Loads		Na	me	Description						
Beam Parameters		> Grade 3	00 300 M	Pa reinforcing steel	nil-steel)					
Lateral Support		Grade 3	0 40 ksi	reinforcing steel	all-steel)					
		Grade 4	00 400 M	Pa reinforcing steel						
Member Loads		Grade 5	0 50 ksi	reinforcing steel (rail	steel)					
Control Ontions		Grade 5 Grade 6	0 500 M	reinforcing steel	I					
control options		Grade 7	5 75 ksi	reinforcing steel						
Input Report				OK	Cancel					
									v	
	Copy from library						 New	uplicate	Delete	e
alidation Off							Back	For	rward	

Design Input | Project Library | Vehicle

On the Vehicle tab, copy the HL-93 (US) and LRFD Fatigue Truck (US) vehicle definitions from library.

		Tal Venere										
Project Library						Tandem			I	Lane		
eometry	Name	Description	Library type	Notional	Axle load (kip)	Spacing between axles (ft)	Transverse wheel spacing* (ft)	Uniform lane load (kip/ft)	Concentrat load for mon (kip)	Concentrated load for shea (kip)	Add second concentrated load*	
,	HL-93 (US)	AASHTO LRFD Live Load - US unit system	Standard 🗸 🗸		25.0000	4.00	6.00	0.640				Г
eck	LRFD Fatigue Truc	AASHTO LRFD Fatigue Truck - US unit sys	Standard 🗸 🗸									1
am Parameters teral Support	Carry Street Vibra									Neur	Dualizata	
	Copy from library									New	Duplicate [Dele
ember Loads	Truck:											
ember Loads	Truck:	oad Gage distance Wheel	Axle spacin	g (ft)								
ember Loads ontrol Options	Truck: Axle no. Axle I (kip	oad Gage distance Wheel (ft) (in)	Axle spacir Minimum	g (ft) Maximum								
ember Loads introl Options sut Report	Truck Axle no. Axle (kip	oad Gage distance U/heel (ft) (ft) (in)	Axle spacin Minimum	g (ft) Maximum								
ember Loads untrol Options put Report	Truck Axle no. Axle (lóip	oad Gage distance Wheel contact width*	Axle spacin Minimum	g (ft) Maximum 0.00								

Design Input | Project

Return to the **Project** tab to define the vehicles for the girder design. Click on the ellipsis button to assign the HL-93 (US) vehicle as the design load and the LRFD Fatigue Truck (US) as the fatigue load. Leave the permit load blank. Define the design average daily truck traffic as 5000.

STL15 Design Example.brdx - AASH	TOWare Bridge Design: Steel Design Tool	-		×
Project	Project: STL15 Design Example			
Project Library				
Geometry				
Deck	Designer:			
Typical Section Loads	Uate: ()///cocc [15]			
Beam Parameters	LRFD specifications Edition: AASHTO LRFD 9th			
Lateral Support	Limit states: 🥑 Strength-II 🕑 Strength-II 🕑 Strength-V			
Member Loads	Service-II			
Control Options				
Input Report	Design vehicles Design load: HL-93 (US) Permit load: Single lane permit load Fatigue load: LRFD Fatigue Truck (US)			
	Design ADTT: 5000			
alidation Off		Back Ft	ward	

Design Input | Geometry

On the **Geometry** tab, enter the data as shown below. Depending on your screen resolution, scroll down to enter the **Support** information.

STL15 Design Example.brdx - AASH	TOWare Bridge Design: Steel Design Tool	—		×
le Design Input Design				
Project	Superstructure definition type: System definition			
Project Library	Number of spans: 2 🗘			
Geometry	Number of beams: 4 🗘			
	Girder spacing: 10 ft			
Deck	Support skew: 0 Degrees			
Typical Section Loads	Number of design lanes: 3 🗘			
Beam Parameters	Spans:			
Lateral Support	Span (ft)			
Member Loads	2 100.00			
Control Options				
Input Report				
npurneport	Supports:			
	Support Support type			
	1 Pinned V			
	2 Roller V			
	3 Roller V			
	End bearing location: Left: 0 in Right: 0 in			
lidation Off	a Ba	ck Fc	orward	

Design Input | Deck

On the **Deck** tab, enter the data as shown below. The **Splice location gaps** table can be used to input regions where the program should avoid placing shear studs. For this example, leave this table empty.

Design Input Design											
roject	Deck co	oncrete:	Class A (US)		~						
roject Library	Deck to	otal thickness: tructural thickness:	9 in								
eometry	Deck	k reinforcement									
Deck		Support	Start distance (ft)	Length (ft)	End distance (ft)	Bar size	Clear cover (in)	Measured from	Bar spacing (in)		
Typical Section Loads	>	1 ~	80.00	40.00	120.00	6 ~	2.0000	Top of Str $$	4.000		*
3eam Parameters											
Lateral Support											
Lateral Support Member Loads											
Lateral Support Member Loads Control Options											-
Lateral Support Vember Loads Control Options nput Report									New Duplicate	Delet	te
Lateral Support Member Loads Control Options Input Report	Deck o Haunct Edge o	verhang: h depth: f haunch to edge c	3 2 0	ft in in					New Duplicate	Delet	te
Lateral Support Member Loads Control Options Input Report	Deck o Haunch Edge o V Co	verhang: h depth: f haunch to edge c ymposite deck ar connectors	3 2 0 5 6 beam: 0	ft in in					New Duplicate	Delet	te
Lateral Support Member Loads Control Options Input Report	Deck o Haunch Edge o Co Shee Stuc	verhang: h depth: f haunch to edge co omposite deck ar connectors d diameter: 0.5 Provide shear stud	3 2 of beam: 0 in s in negative flexure	ft in in e regions					New Duplicate	Delet	te
Lateral Support Member Loads Control Options Input Report	Deck or Haunch Edge o Shee Stuc Stuc	verhang: h depth: f haunch to edge c proposite deck ar connectors d diameter. 0.5 Provide shear stud blice location gaps	3 2 of beam: 0 in s in negative flexure	ft in in e regions					New Duplicate	Delet	te

Design Input | Typical Section Loads

On the **Parapet** tab in **Typical Section Loads**, enter the data as shown below.

oject	Stag	e 2 load distributio	n: 🜔 Unifo	rmly to all girders							
oject Library			By tril	butary area	r:%	First inte	rior:	%			
ometry	Wea	ring surface:	Thickness:	2 in	Density:	120 pcf					
ck	Арр	urtenance loads:									
pical Section Loads	Pa	Medi	an Railing	Generic	Sidewalk						
am Parameters		P. d									
eral Support		Back	Front								
mber Loads		Name	Stage	Load type	Measure to	Edge of deck distance measure from	Distance at start (ft)	Distance at end (ft)	Front face orientation		
ntroi Options		Jersey Bar \vee	Stage 2 🛛 🗸	DC ~	Back ~	Left Edge 🗸	0.00	0.00	Right ~	/	
ut Report	>	Jersey Bar \vee	Stage 2 \sim	DC ~	Back \vee	Right Edge 🛛 🗸	0.00	0.00	Left 🗸 🗸	·	
										New Duplicate	Delete
	Diap	hragm loads:									
	Gird	er bay: 1	✓ Copy bay	y to							
		Support	Start d	istance (t)	Diaphragm	Number	Length	End di (fi	stance t)	Load	

Make sure to scroll to the bottom of the page to define the diaphragm loads. Input the diaphragm loads as shown for Girder Bay 1 and use the **Copy bay to...** button to copy the loads to Girder Bay 2 and Girder Bay 3.

Control Options		Dia	aphrag rder b	gm loads: bay: 1	✓ Copy bay	• to								
Copy diaphragm to ba	ay(s)	×		Support	Start di (fi	stance ;)	Diaphragm spacing	Number	Length	End di (f	stance t)	Load		
Select the new bay(s):	Ray 2				Left girder	Right girder	(ft)	of spaces	(11)	Left girder	Right girder	(kip)		
	bay 2	-	1	~	0.00	0.00	0.00	1	0.00	0.00	0.00	1.000		
	Bay 3		1	~	0.00	0.00	25.00	8	200.00	200.00	200.00	1.000		
											Ν	New Duplicate	Delete	
ОК	Canc	el											ac	k Forwar

Design Input | Beam Parameters

In the **Beam Parameters** input section, enter the data as shown below. All of the plate dimensions except for the web depth can be designed. Providing a larger range of values for any given parameter can help the design tool converge on a solution. The program will design transverse stiffeners for shear resistance if the **Use transverse** stiffeners button is selected. This example does not use this option.

Design Input Design		er e engri i e	01							
Project	- Section configura	tion							 	
,	Web	Mir	n	м	ax		Increment			
Project Library	Depth	60	in	60	in					
	Thickness	0.3750	~	0.7500	~	1/8"	~			
eometry	Top flange	Mir	n	м	ax		Increment			
eck	Width	12	in	20	in	2	in			
	Thickness	0.5000	~	2.0000	~	1/4*	~			
ypical Section Loads	Bottom flange	Mir	n	м	ax		Increment			
Room Paramotors	Width	12	in	20	in	2	in			
Scall Falanciers	Thickness	0.5000	~	2.0000	~	1/4"	~			
Control Options	Beam		One sided		(in)	g				
antes Ontines	beam		Sine sided		(in)					
nput Report	interior									
	Web:	Grade 50W			~					
	Top flange:	Grade 50W								
	Bottom flange:	Grade 50W								
	Transverse stiffene	Grade 50W								
	Bearing stiffener:	Grade 50W								

Design Input | Lateral Support

In the **Lateral Support** input section, enter the data as shown below. Top flange lateral support ranges are regions where the top flange is continuously laterally supported and top flange lateral support locations are discrete points of lateral support. These entries define the top flange lateral support for Stage 2 and Stage 3.

Support Start distance (ft) End distance (ft) 1 0.00 200.00 200.00	Flang	ge Lateral Supp	port:										
Support Start distance (ft) Length distance (ft) End distance (ft) 1 0.00 200.00 200.00 0000 000 000	anges	s Locat	tions										
I V 0.00 200.00 200.00 200.00 200.00 C <th></th> <th>Support</th> <th></th> <th>Start distance (ft)</th> <th>Length (ft)</th> <th>End distance (ft)</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>		Support		Start distance (ft)	Length (ft)	End distance (ft)							
New Duplicate C Flange Lateral Support:	• 1	~	/	0.00	200.00	200.00							
New Duplicate I 1 0.00 0.00 1 0.00 200.00 200.00													
Support Start distance (ft) Spacing (ft) Number of spaces Length (ft) End distance (ft) 1 0.00 0.00 1 0.00 0.00 1 0.00 25.00 8 200.00 200.00													
End Support Locations Support Start distance (ft) End distance (ft) 1 0.00 0.00 1 0.00 0.00 1 0.00 25.00 8 200.00 200.00											New	Duplicate	D
1 v 0.00 0.00 1 0.00 1 v 0.00 25.00 8 200.00											New	Duplicate	D
1 0.00 25.00 8 200.00 200.00	Flange	ge Lateral Sup es Loca Support	port:	Start distance (ft)	Spacing (ft)	Number of spaces	Length (ft)	End distance (ft)			New	Duplicate	D
	Flange Range	ge Lateral Sup es Loca Support	port: Itions	Start distance (ft) 0.00	Spacing (ft) 0.00	Number of spaces	Length (ft) 0.00	End distance (ft) 0.00			New	Duplicate	
	→ Flang Range	ge Lateral Sup es Loca Support	port: titions	Start distance (ft) 0.00 0.00	Spacing (ft) 0.00 25.00	Number of spaces 1 8	Length (ft) 0.00 200.00	End distance (ft) 200.00			New	Duplicate	
	→ Flange Range ▶ 1 1	ge Lateral Sup es Loca Support	uport:	Start distance (ft) 0.00 0.00	Spacing (ft) 0.00 25.00	Number of spaces 1 8	Length (ft) 0.00 200.00	End distance (ft) 200.00			New	Duplicate	

Design Input | Member Loads

There are no member loads assigned in this example. Member concentrated loads, member distributed loads and pedestrian loads could be assigned here.

Design Input | Control Options

The **Control Options** input section provides options for analysis and design. For this example, leave the options as is.

STL15 Design Example.brdx - AASI	1TOWare Bridge Design: Steel Design Tool	- 0	
ile Design Input Design			
Project	Allow moment redistribution Use appendix A6 for flexural resistance		
Project Library	Allow plastic analysis Ignore longitudinal reinforcement in negative moment capacity		
Geometry	Consider deck reinforcement development length		
Deck			
Typical Section Loads			
Beam Parameters			
Lateral Support			
Member Loads			
Control Options			
Input Report			
idation Off	ack	Forward	

At this point, all design data has been defined. Turn **Validation** on and ensure that there are no validation error marks displayed next to the input section. Otherwise, go back to these sections and resolve the errors.

Validation	On	

Design Input | Input Report

The Input Report section provides a detailed report of the input data.

STL15 Design Example.brdx - AASHTC	Ware Bridge Design: Steel Design Tool											-		×
File Design Input Design														
Project	Project													
Project Library	Project: STL15 Design Exam Description: 2 Span 4 Gird Designer: Date: 07/11/2024	nple der Bridge												
Geometry	LRFD specifications Edition: AASHTO LRFD 9 Limit states: Strength	9th 1-I. Strength-II. Stren	eth-III. Strenet	h-V. Servi	ce-II. Fa	tique-T.	Fatigue-T	т						
Deck	Design vehicles Design load: HL-93 (US	5)		,				-						
Typical Section Loads	Permit load: Single lane permit loa Fatigue load: LRFD Fat	ad: False tigue Truck (US)												
Beam Parameters	Design ADTT: 5000													
Lateral Support	Project Library													
Member Loads	Appurtenance													
Control Options	raiaper													
Input Report	Name	Description	Distance from edge to centroid (in)	X1 (in)	X2 (in)	X3 (in)	Υ1 (in)	Y2 (in)	Υ3 (in)	Υ4 (in)	Additional load (kip/ft)	Median unit load (kcf)	Ne	Cal t cer (i
	Jersey Barrier	Standard New Jersey Barrier		12.0000	2.0000	7.0000	0.0000	19.0000	10.0000	3.0000		0.1	500	
	Material													
	Concrete													
	Name	Description	Compressive strength at 28 days f'c (ksi)	Initi compress strength (in)	al Coe ive f'ci e	efficient thermal expansion (1/F)	of Der fo (nsity r DL kcf)	Density modulus elastic (kcf	for of ity)	Poisson's ratio	Composition of concrete	Mod of ri (I	ulus uptur ksi)
alidation	4									_		4.0.1		•

File | Print

The **Print** and **Print Preview** buttons in the **File** | **Print** section apply to the **Input Report**.



Design | Design Input

After the input data is entered and reviewed, **Design Input** run can be performed by clicking on the **Design Input** button located on the **Design ribbon**. **Design Input** run is based on the input data and produces a design that is displayed in the **Design Run** grid with a brief description and values of the critical design ratios. Select the checkbox for **Shear connector design** to design the shear connectors along with the girder in the composite regions. The beam dropdown is the selection for which girder the program will design and the input for minimum design ratio defines the target design ratio for which the girder will be designed.



Design | Results Table

The results of the **Design Input** run are displayed in the table. The user can click on the **Critical design ratio** to open the **Analysis engine feedback report**, and on the page icon next to the **Critical design ratio** to open the **Specification Check Summary**.

D STL1	5 Design Example.	brdx - AASHTOW	/are Bridge Des	ign: Steel Desi	gn Tool					-		×
File	Design Input	Design										
Design input	Design review	Shear connector design	Beam: Minimum design ratio:	1 ~	Specification checks	Tabular results	Result graphs	Engine output	X Delete	S Reset	Export	
		Design run				View res	ults		Input an	d review	BrDR	
	Design run			Description	n			Critica design ra	l itio	Pin		
	1-11.1	G1 - Design (Volume = 79.9f	t^3)				✓ 1.010		-(#1		

Design | Girder Profile

The **Girder Profile** tab displays the ranges for steel plates along the web and flanges. After a design input run is completed, these tables will display the program computed ranges. The user may modify these ranges and reanalyze the member using the **Design Review** option.

	Depth (in)	Thickness	Su	upport	Start distance	Length	End distance		
>	60.000	0.500	1	~	0.000	75.000	75.000	A	
	60.000	0.625	1	~	75.000	50.000	125.000		
	60.000	0.500	2	~	25.000	75.000	100.000		

Design | Stiffeners

The **Stiffeners** tab displays the results of the stiffener design. This includes transverse stiffeners and bearing stiffeners. The transverse stiffeners will only be designed when the design input option to **Use Transverse Stiffeners** in the **Design Input** | **Beam Parameters** window is selected.

2	sign Input	Shear connector	Beam:	1 ~			*	•	¥	6	C)				
in D it n	Design		Minimum design ratio	n 💶 1 🔅	Specification checks	Tabular results	Result graphs	Engine	Delete	Reset	Export				
		Design run				View resu	ilts		Input and	review	BrDR				
	Design				Descr	intion						Critical	Die		
	run				Desci	iption						design ratio			
/ 1-11	.1	G1 - Design (Volume = 79	9.9ft^3)								✓ 1.010 🔳	-14	1	
Girde	r profile verse Stiffer One sided	Stiffeners Shea	r connectors	Schematic	s: Profile View										
Girde Transv Transv Transv Transv	r profile verse Stiffer One sided sverse Stiffe sverse Stiffe Supp	Stiffeners Shee ners: ner Width: ner Thickness: ort Start Di (ft	r connectors in in in	Schematic: Number of Spaces	s: Profile View Spacing (in)	Lengt (ft)	h I	End Distanc (ft)	ce						

Design | Shear connectors

The **Shear connectors** tab shows the results of the shear connector design if enabled and if the member has composite regions.

it i	Pesign review	Shear co design	nnector Beam Minin desig	num 1 0	Specification checks	Tabular Result results graphs	Engine output	S Export			
		00	ignitian			revies	mpacar	MICHEN DIDI			
	Design run				Descripti	ion			Critical design ratio	Pin	
2 1-I	1.1	G1 - 0	esign (Volum	e = 79.9ft^3)					🖌 1.010 📄	-(#1	
GIIGE	er profile	Stiffener	Shear conn	ectors Schemati	cs: Profile View						
Shei	ar Connector	Stiffener: 's	Shear conn	ectors Schemati	cs: Profile View						
Shei Stud	er profile ar Connector ad Height: el Minimum	Stiffener: 's Tensile St	Shear conn 6.000 rength: 60.000	ectors Schemati	cs: Profile View						
Shei Stur Stee	ar Connector d Height: el Minimum Shear Connecto	Stiffeners rs Tensile St or	5 Shear conn 6.000 rength: 60.000 Number per Row	schemati	cs: Profile View Transverse Spacing (in)	Support	Start Distance (ft)	Length (ft)	End Distance (ft)		
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Design | Schematics: Profile View

The Schematics: Profile View tab shows a schematic of the girder design.

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nge Tanationa	15,385(12)/942		PL15456947	is and to year	
e Spacing	141-801-25-01		NENRENSE OF	101401/8107	
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	12'16'' Web	•	Strate me	507.007 (Mai).	
			PL 15/8568-87	PL 15540367	
Forge Transitions	PL1XH3X542			500.07	

Design | Specification Check

To view the specification check results, click on the **Specification checks** button from the **View results** group of the **Design** ribbon.



Design | Tabular Results

To view the tabular results, click on the **Tabular results** button from the **View results** group of the **Design** ribbon.

L15 Design Exam	ple.brdx - AASHTOWare Bridg	je Design: Steel De	sign Tool								-	×		
ign Design ut review	Shear connector Beam: design Design run	n atio: 1 \$	Specification checks	Tabular results View resu	Result En graphs ou	gine itput Input	e Reset	Export BrDR						
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Girder profile	Stiffeners Shear connec	Span	Location	Moment (kin-ft)	Shear (kin)	Axial (kin)	Reaction (kin)	X deflection	Y deflection					
i 🛍 🔓 Q, C	रे 🕂 🗄 🗟 🛛 ३५% 🔹	1	0.00	0.00	(%p) 6.57	0.00	(NP) 657	0.0000	0,0000					
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Stiffener Specing		1	12.50	68.07	4.32	0.00		0.0000	-0.0834					
Cross Preme Specing Shear Connector Specing	10 STA. 8 4	3.1	20.00	05.30	2.07	0.00		0.0000	-0.1246					
Top Flange Lat. Support		1	25.00	107.96	2.97	0.00		0.0000	-0.1240					
		1	25.00	107.96	2.06	0.00		0.0000	-0.1463					
		1	30.00	116.03	1 16	0.00		0.0000	-0.1626					
Botom Flange Transitions		1	37.50	119.67	-0.19	0.00		0.0000	-0.1763					
Span Langtha	H Notes:	1	40.00	118.63	-0.64	0.00		0.0000	-0.1779					
	 All Tange length dimensions are horiz. (length along l ¹ Transverse stillaner pairs aboven in red. ² Eagle transverse stillaner aboven in tow. ³ Eagles adverse adverse is orean. 	1	50.00	103.20	-0.04	0.00		0.0000	-0.1779					
	* Dimensioning starts and ends all CL bearings. * X denotes cross frame locations.	1	50.00	103.20	-2.44	0.00		0.0000	-0.1697					
		1	60.00	69.74	-4.25	0.00		0.0000	-0.1097					
		1	62.50	58.56	-4.23	0.00		0.0000	-0.1317					
		1	70.00	18.24	-4.70	0.00		0.0000	-0.1317					
		1	70.00	-14.27	-0.05	0.00		0.0000	-0.0995					
			75.00	- 14.27	-0.95	0.00		0.0000	-0.0705					
		1	75.00	-14.27	-6.05	0.00		0.0000	-0.0762					

Design | Result Graphs

To view the result graphs, click on the **Result graphs** button from the **View results** group of the **Design** ribbon.



Design | Engine Outputs

To view the contents of the engine output files, click on the **Engine outputs** button from the **View results** group of the **Design** ribbon, and then double-click on the row corresponding to the required file.



Design | Design Review

To illustrate the ability of the program to adjust results of the **Design Input** run, modify the **Top flange** table to define a top flange width of 14 inches for all ranges and a thickness of 0.625 for the first and third range as shown below. Select **Design Review** to analyze this modified design.

Design funge Design Design run Image: Specification the construction the construle the construction the constructine construction th			_	lage besign.	Steel Design Tool									U
Design run Description Critical design ratio design ratio Pin 1-11.1 G1 - Design (Volume = 79.9ft^3) ✓ 1.010 Image: Critical design ratio Image: Cri	Desig Designer	gn Input Design Sign view D	onnector Beam: Minim design	i 1 num n ratio:	Specification checks	Tabular Resu results grap View results	It Engine hs output	Delete Rese	et Export BrDR					
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After the program finishes performing the design review, it will add another row to the design run grid. The design review runs are indicated with an **R** displayed in the **Design run** column in contrast to an **I** shown in that column for design input runs. The results for the **Design review** runs are displayed and can be reviewed or further modified the same way as design input runs. Additional design input runs can be performed by modifying the input on the **Design Input** tab. Each of the design runs, either input or review, stores a copy of its design input data that is reloaded every time the design input run is selected in the design run grid.

Design Inp	put Design	AASHIOWare Bri	iage Design: Sti	ei Design 1001							_	U
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1-R1.1	G1 -	Design Review							 ✓ 	1.008 📄	-(14)	
Top flange:	Vidth	Thickness	Support	Start distance	Length	End distance			 			
Top flange:	Vidth (in)	Thickness (in)	Support	Start distance (ft)	Length (ft)	End distance (ft)						
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