



What's Coming in BrDR 7.7 and 7.8 & Beyond

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ProMiles®

BrDR 7.7

Section 508 Accessibility Compliance

- Accessibility compliance ensures individuals with disabilities have access to information and data comparable to those without disabilities, unless it creates an undue burden
- The goal is to provide equal access to information and services for all, including those who use assistive technologies
- BrDR 7.7 will provide high contrast mode, screen dictation support, and vector images to support lossless scaling and high contrast mode
- Some windows, e.g. Appurtenances and Shapes, needed to be reworked
- PS Design Tool, Steel Design Tool, and Migration Wizard will also be compliant

BrDR 7.7

Section 508 Accessibility Compliance

AASHTOWare Bridge Design and Rating - Internal Release - Changeset: 118724

BRIDGE EXPLORER

BRIDGE

FOLDER

RATE

TOOLS

VIEW

HELP

New

Open

Batch

Import

Find

Copy

Paste

Copy To

Remove From

Delete

Override System Theme

Dark

Bridge

Manage

Appearance

Favorites Folder

Recent Bridges

All Bridges

Sample Bridges

Deleted Bridges

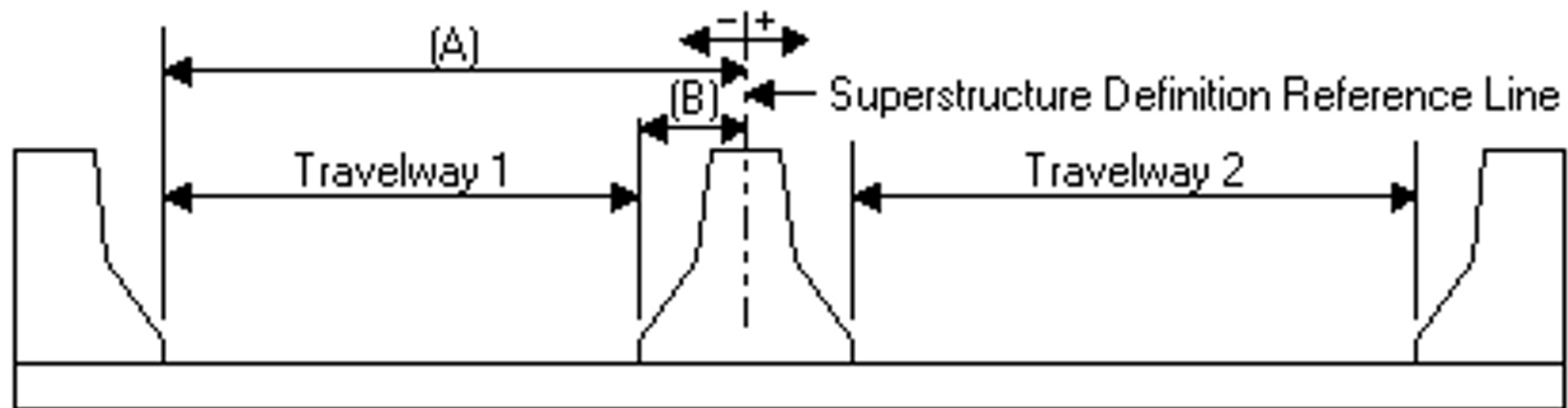
	BID	Bridge ID	Bridge Name	District	County	Facility	Location	Route	Feature In
>	1	TrainingBridge1	Training Bridge 1(LRFD)	District 11	01 Abbeville	SR 0051	Pittsburgh	0051	SR 6060
	2	TrainingBridge2	Training Bridge 2(LRFD)	Unknown	Unknown (P)	N/A	N/A	-1	N/A
	3	TrainingBridge3	Training Bridge 3(LRFD)	District 11	01 Abbeville	I-79	Pittsburgh	0079	Ohio River
	4	PCITrainingBridge1	PCI TrainingBridge1(LFR)					-1	
	5	PCITrainingBridge2	PCITrainingBridge2(LRFD)					-1	
	6	PCITrainingBridge3	PCI TrainingBridge3(LFR)					-1	
	7	PCITrainingBridge4	PCITrainingBridge4(LRFD)					-1	
	8	PCITrainingBridge5	PCI TrainingBridge5(LFR)					-1	
	9	PCITrainingBridge6	PCITrainingBridge6(LRFD)					-1	
	10	Example7	Example 7 PS (LFR)					-1	
	11	RCTrainingBridge1	RC Training Bridge1(LFR)					-1	
	12	TimberTrainingBridge1	Timber Tr. Bridge1 (ASR)					-1	
	13	FSys GFS TrainingBridge1	FloorSystem GFS Training Bridge 1	District 6	15 Colleton	NJ-Turnpike	NJCity	-1	
	14	FSys FS TrainingBridge2	FloorSystem FS Training Bridge 2	District 11	333 Norfolk	I-95	NYC	-1	
	15	FSys GF TrainingBridge3	FloorSystem GF Training Bridge 3	District 7	06 Barnwell	I-95	ATL	-1	
	16	FLine GFS TrainingBridge1	FloorLine GFS Training Bridge 1	District 1	01 Abbeville	I-75	JAX	-1	
	17	FLine FS TrainingBridge2	FloorLine FS Training Bridge 2	District 2	02 Aiken	I-75	GNV	-1	
	18	FLine GF TrainingBridge3	FloorLine GF Training Bridge 3	District 1	01 Abbeville	I-95	NY	15	
	19	TrussTrainingExample	Truss Training Example					5	
	20	LRFD Substructure Example 1	LRFD Substructure Example 1						
	21	LRFD Substructure Example 2	LRFD Substructure Example 2			SR 4034	ERIE COUNTY	4034	FOUR MIL
	22	LRFD Substructure Example 3	LRFD Substructure Example 3						
	23	LRFD Substructure Example 4	LRFD Substructure Example 4 (NHI Hammer Head)					-1	
	24	Visual Reference 1	Visual Reference 1	District 1	12 Chester	I-76	WAITSFIELD	I-76	MAD RIVE

Total Bridge Count:

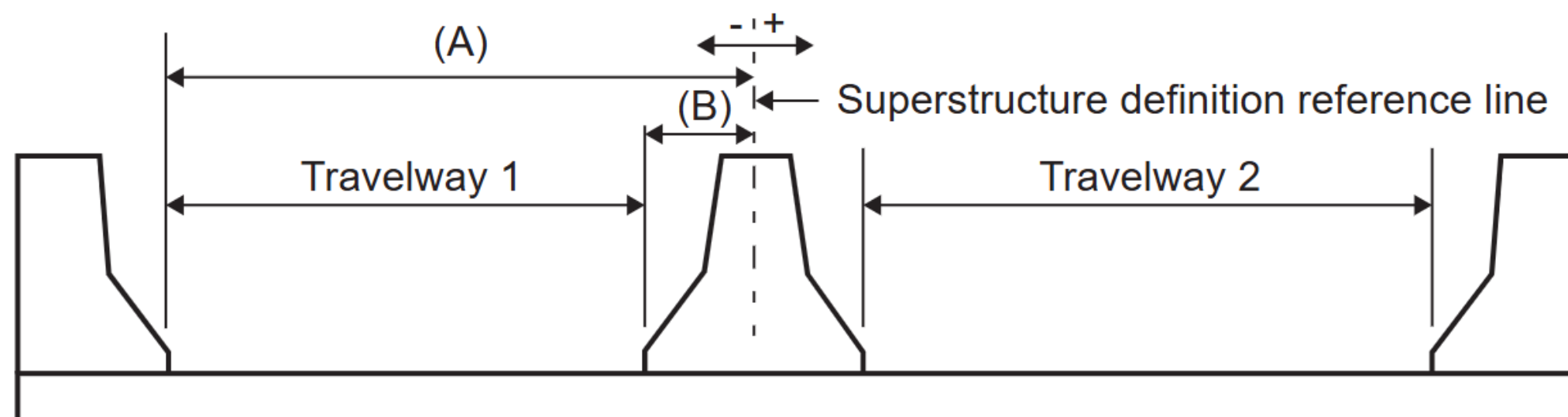
31

BrDR 7.7

Section 508 Accessibility Compliance



7.6



7.7

BrDR 7.7

Section 508 Accessibility Compliance

Prestress I Beam

Name:

BT-72

Description:

AASHTO-PCI Bulb-Tee BT-72

7.6

Top flange type

☐ Narrow
 ☒ Wide

Dimensions

Properties

Mild steel

Strand grid

Copy to library...

Copy from library...

OK

Apply

Cancel

Prestress | Beam

Name:

BT-72

Description:

AASHTO-PCI Bulb-Tee BT-72

7.7

Top flange type

☐ Narrow
☒ Wide

Dimensions

Properties

Mild steel

Strand grid

☐ Deck
☐ Radius fillet

TFW	42.0000	in	BFW:	26.0000	in
TFT1:	3.5000	in	BFT1:	6.0000	in
TFT2:	2.0000	in	BFT2:	4.5000	in
A1	2.0000	in	D:	72.0000	in
A2	2.0000	in			
WT	6.0000	in			

Copy to library...

Copy from library...

OK

Apply


Cancel

BrDR 7.7

MBE 2025 Interim Specification Updates

- 2024 Agenda Item 6 – Article 6B.5.3.3
 - Item #1: PS Inventory allowable stress minor coefficient change
 - Item #3: PS Operating PS steel tension minor coefficient change
 - Item #4: PS Inventory concrete tension minor variable definition changes
- 2024 Agenda Item 8 – Article C6A.5.6
 - Optional iterative method to compute K factor
 - New LRFR control option for all concrete members
 - Can lead to higher posting tonnage or a less restricted permit truck
- MBE 3rd 2025i Spec version will implement the 2022, 2023, and 2024 approved ballots
- MBE 3rd 2024i Spec version will not be available in version 7.7

LRFR

 Distribution factor application method

☐ By axle

☒ By POI

☐ Allow negative epsilon in general shear method


☐ Consider sloped portion of bent long. reinf.

☐ Allow moment redistribution

☐ Consider iterative minimum reinforcement factor

☐ Consider iterative shear rating

☐ Modify MCFT theta



BrDR 7.8

Substructure Reinforced Concrete Pier Cap LRFR

- Library and Bridge LRFR Factors for Reinforced Concrete Substructure

Factors - LRFR

Name:

Description:

Routine permit input

Permit weight

Permit weight ratio

Load factors

Legal loads

Permit loads

Concrete

Steel

Wood

Aluminum

Buried structures

Specifications

Bridge type:

Reinforced-Concrete Substructure

Limit state	Dead load				Design load		Legal load	Permit load	CE	BR	WA	SH	CR	EH active		EH at-rest		Vehicle			
	DC Max	DC Min	DW Max	DW Min	Inventory	Operating								Max	Min	Max	Min	Consider			
																		Inv	Op	Legal	Permit
> STRENGTH I							Table 6A.4.4.2.3	*	*												
STRENGTH II								Table 6A.4.5.4.2a-1	**	**											
SERVICE I																					

* Same as LL for Design/Legal loads

** Same as LL for Permit loads

Table 6A. 4.2.2-2-load factors for live load for the

Service-III load combinations at the design-load inventory level

Component	LL max
> Prestressed concrete components designed using the refined estimates of time-dependent losses as specified in Article 5.9.5.4 in conjunction with taking advantage of the elastic gain	
All other prestressed concrete components	

Copy from library...

OK

Apply

Cancel

BrDR 7.8 Substructure Reinforced Concrete Pier Cap LRFR

- Include the pier in a batch load rating

Pier

Pier name: Pier 1

Description Stream flow

Pier skew angle

☒ Input skew angle Skew angle: 0.00 Degrees Description:

☐ Input bearing angle

Finished groundline elevation: 54.50 ft ☒ Superstructure defined in BrDR

Soil density: kcf ☐ Include in structure load rating

Back superstructure longitudinal direction

☒ Consider as fixed ☐ Consider as expansion

Ahead superstructure longitudinal direction

☒ Consider as fixed ☐ Consider as expansion

Pier location relative to bridge alternative

Station: 130.83 ft Offset: -0.00 ft

Computed pier location relative to structure

Station: 130.83 ft Offset: 0.00 ft

Computed pier coordinates

X: 130.83 ft Y: -0.00 ft

	Existing	Current	Pier alternative name	Description
>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3-column pier	

OK Apply Cancel

BrDR 7.8

Substructure Reinforced Concrete Pier Cap LRFR

- Pier Alternative's Specs, Factors, and Control options tabs

Pier Alternative - 3-column pier

Name: 3-column pier Type: RC Frame Pier

Description Specs Factors **Control options** Stiffness Reports

LRFD

- Points of interest
 - ☒ Generate at tenth points except supports
 - ☒ Generate at support points
 - ☐ Generate at support face & critical shear points
 - ☐ Generate at section change points
 - ☐ Generate at user-defined points
 - ☒ Generate at beam reaction points
- Shear computation method
 - ☐ Ignore
 - ☐ General procedure
 - ☒ General procedure - Appendix B5
 - ☐ Simplified procedure
- ☐ Consider inclined flexural forces
- ☐ Allow negative epsilon in general shear method

LRFR

- Points of interest
 - ☒ Generate at tenth points except supports
 - ☒ Generate at support points
 - ☐ Generate at support face & critical shear points
 - ☐ Generate at section change points
 - ☐ Generate at user-defined points
 - ☒ Generate at beam reaction points
- Shear computation method
 - ☐ Ignore
 - ☐ General procedure
 - ☒ General procedure - Appendix B5
 - ☐ Simplified procedure
- ☐ Ignore design & legal load shear
- ☐ Ignore permit load shear
- ☐ Consider legal load tensile concrete stress
- ☐ Consider inclined flexural forces
- ☐ Allow negative epsilon in general shear method

OK Apply Cancel

BrDR 7.8 Substructure Reinforced Concrete Pier Cap LRFR

- Additional inputs for load rating purpose including points of interest and deterioration profiles

Column Deterioration Profile

Concrete Flexural Shear

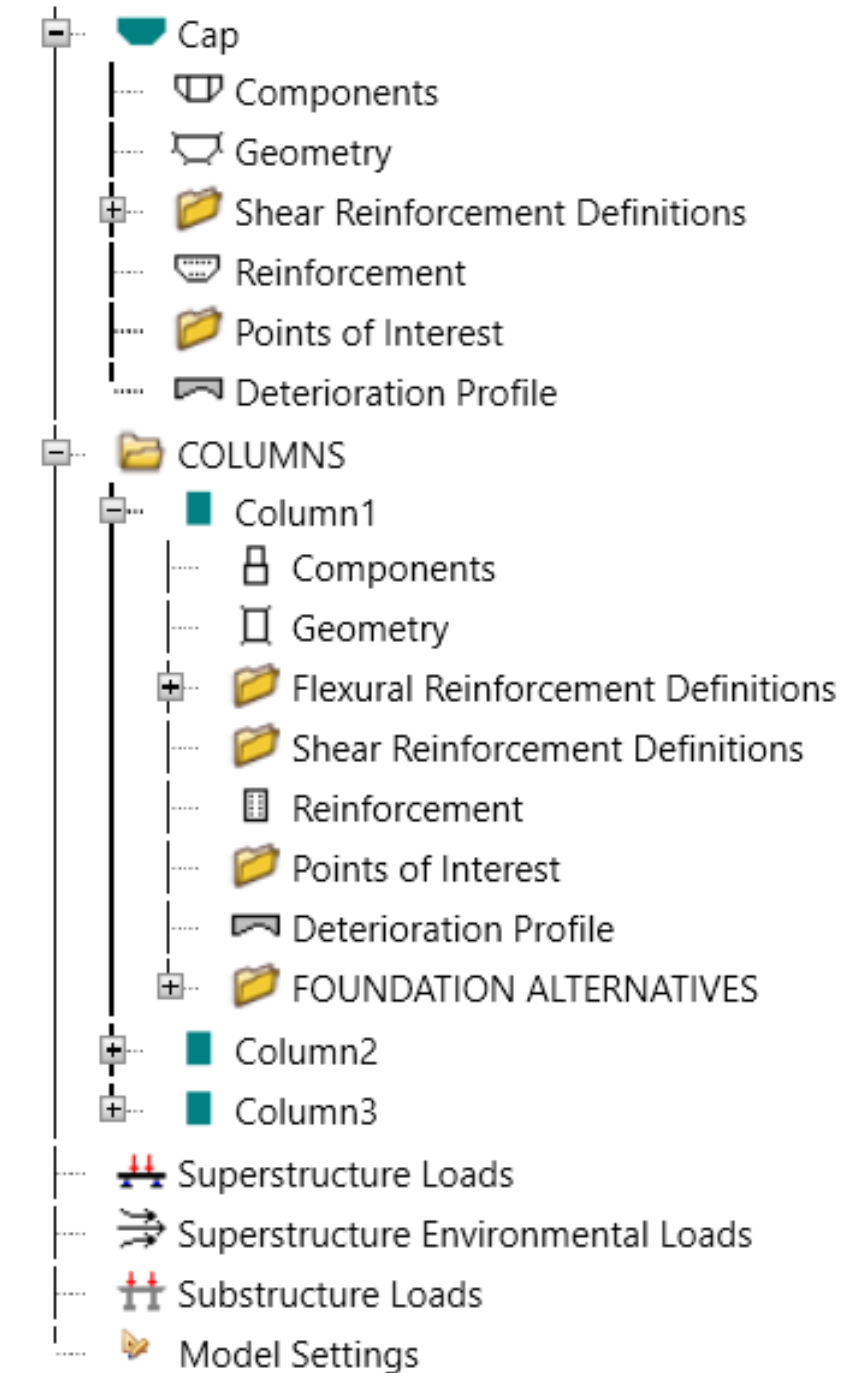
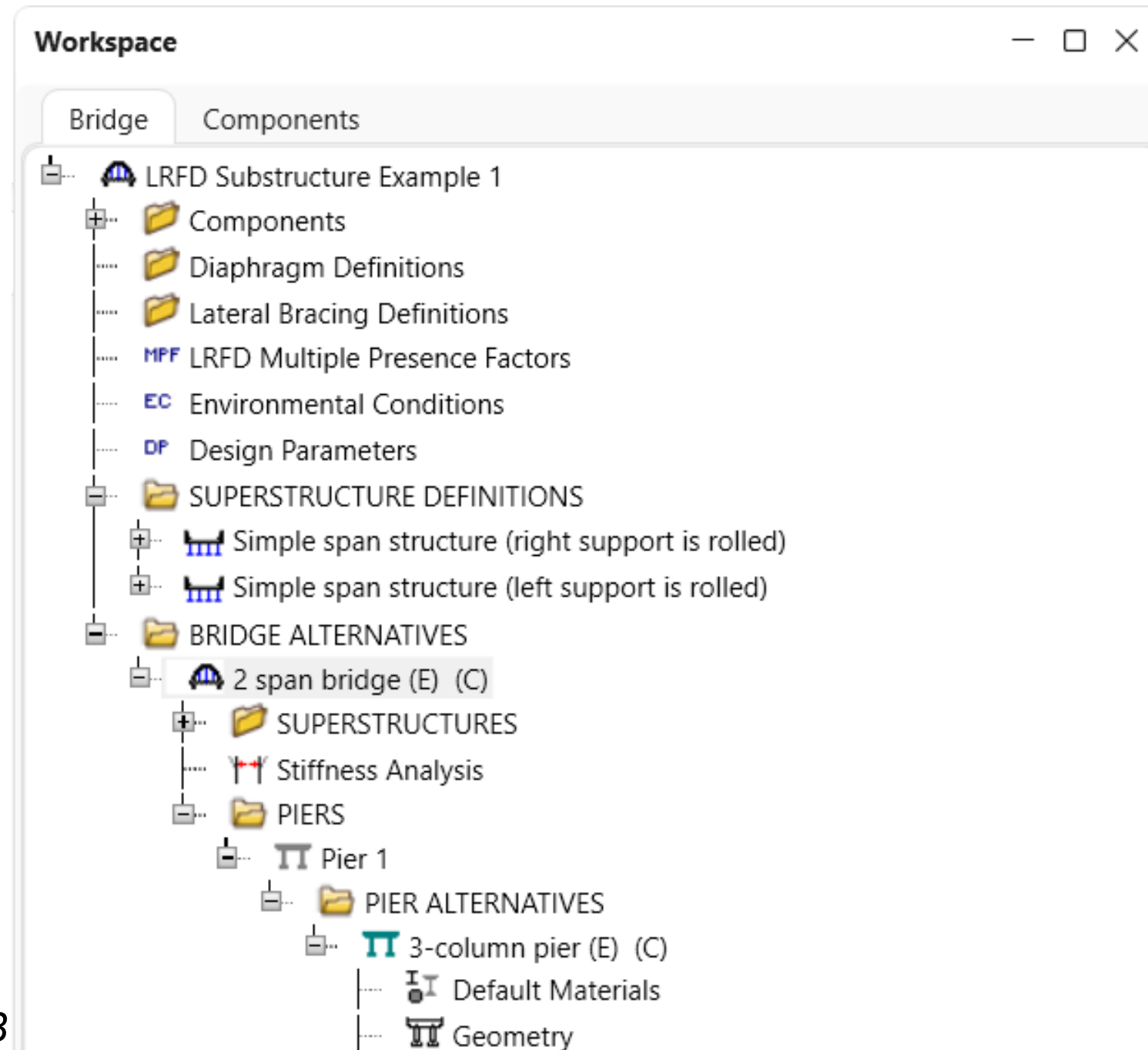
Face	Width loss (in)	Thickness loss (in)	Distance from face control point (in)	Control point	Start distance (ft)	Straight length (ft)	End distance (ft)
> Ahead Sta				Bottom of column			0.00

New Duplicate Delete

OK Apply Cancel

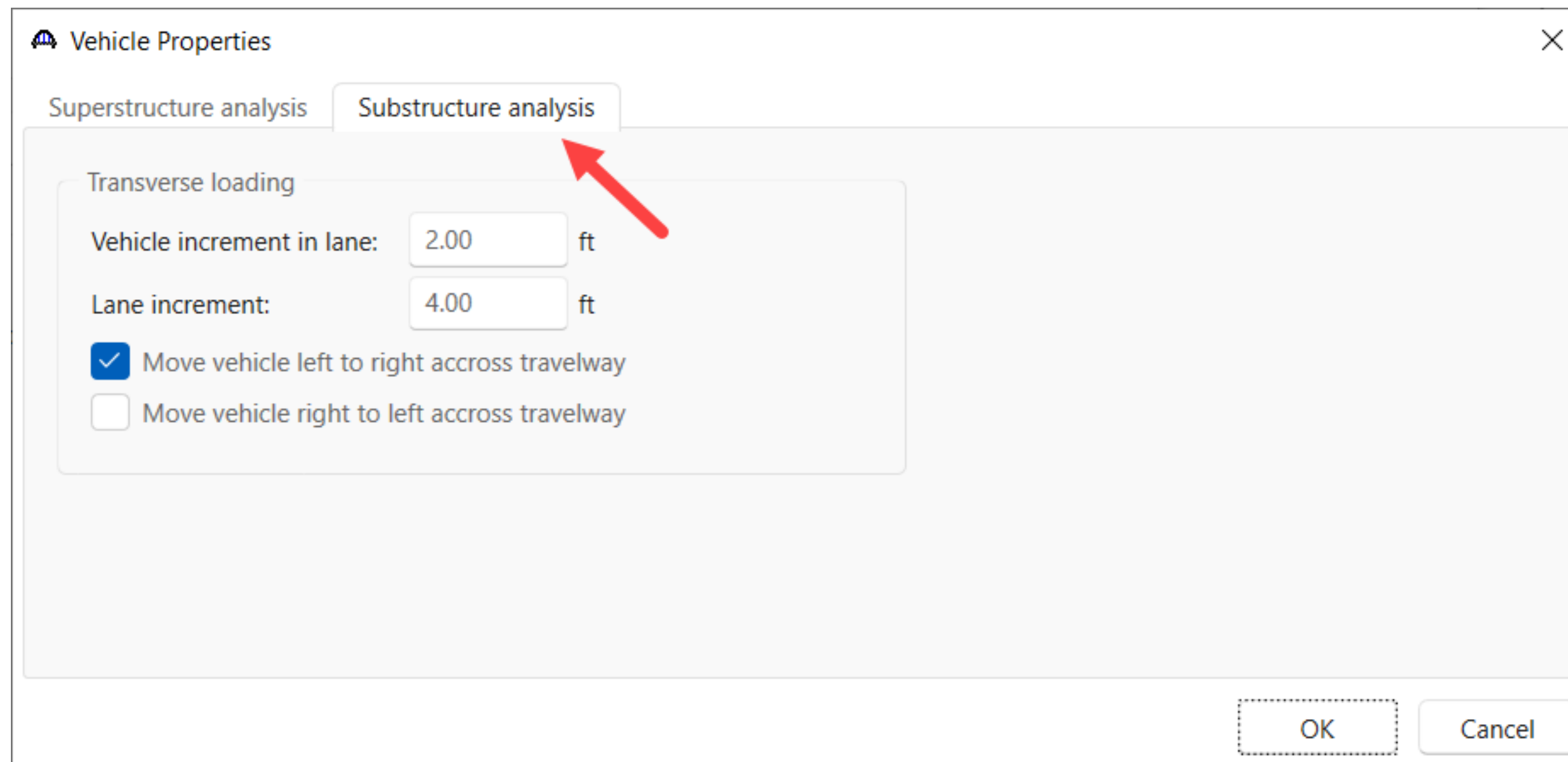
BrDR 7.8 Substructure Reinforced Concrete Pier Cap LRFR

- Bridge workspace tree



BrDR 7.8 Substructure Reinforced Concrete Pier Cap LRFR

- Support Adjacent vehicle analysis and NSG vehicle analysis



The screenshot shows the 'Vehicle Properties' dialog box with the 'Substructure analysis' tab selected. A red arrow points to the 'Substructure analysis' tab. The 'Transverse loading' section contains the following settings:

- Vehicle increment in lane: 2.00 ft
- Lane increment: 4.00 ft
- ☒ Move vehicle left to right accross travelway
- ☐ Move vehicle right to left accross travelway

At the bottom right, there are 'OK' and 'Cancel' buttons.

BrDR 7.8 Substructure Reinforced Concrete Pier Cap LRFR

- Load Rating Use Case 1
 - **Select a Pier Alternative in the BWS tree** and click the Analyze button
 - The pier alternative will be load rated and the controlling component within the pier will be shown
 - Only Caps will be rated initially

BrDR 7.8

Substructure Reinforced Concrete Pier Cap LRFR

- Load Rating Use Case 2
 - **Select a Superstructure Definition in the BWS tree** and click the Analyze button
 - Girder Member Alternatives marked as “Existing” in that Superstructure Definition will be rated
 - No Piers will be rated as Piers support Superstructures not Superstructure Definitions

Superstructure

Superstructure name: 2 continuous span

Description Alternatives Vehicle path Engine Substructures

Select the substructure supports:

Support	Substructure support
> 1	abutment 3
2	Pier 2
3	abutment 4

New Delete

OK Apply Cancel

BrDR 7.8

Substructure Reinforced Concrete Pier Cap LRFR

- Load Rating Use Case 3
 - **Select the Bridge in the BWS tree** and click the Analyze button
 - Girder Member Alternatives marked as “Existing” in the Superstructure Definition assigned to Superstructure Alternatives marked as “Existing” in the Bridge Alternative marked as “Existing” will be rated
 - The Pier Alternative marked as “Existing” for the Piers with “Include in structure load rating” checked that support the Superstructures will be load rated
- Load Rating Use Case 4
 - **Load rate a bridge from the Bridge Explorer**
 - Girder Member Alternatives marked as “Existing” in the Superstructure Definition assigned to Superstructure Alternatives marked as “Existing” in the Bridge Alternative marked as “Existing” will be rated
 - The Pier Alternative marked as “Existing” for the Piers with “Include in structure load rating” checked that support the Superstructures will be load rated

BrDR 7.8 Substructure Reinforced Concrete Pier Cap LRFR

- Substructure Bridge Workspace architecture revisions
 - Associating pier alternatives to link certain pier geometry and data between alternatives
 - User fully enters a pier alternative for a pier. This pier alternative is considered as the control pier alternative.
 - For another pier within the same bridge alternative, user creates a new pier alternative of the same type and associates this new pier alternative with the control pier. This pier alternative is considered as the dependent pier alternative.

BrDR 7.8

Substructure Reinforced Concrete Pier Cap LRFR

- Substructure reinforcement data entry revisions
 - Control point data entry method

Cap Reinforcement - Pier 1 - 3-column pier

Pier cap length: 51.00 ft

Flexural | Left cantilever shear | Column bays shear | Right cantilever shear

☐ Associate reinforcement with associated pier

Longitudinal skin

Bar size: 6 Bar spacing: 15.000 in Bar material: Grade 60 Stirrup clear cover: 2.0000 in

Primary flexural

Reinforcement input method: ☒ Simplified ☐ Advanced ☒ Reinforcement follows cap profile Full length bar edge distance: ft

	Set	Measure from cap	Clear cover (in)	Bar size	Number	Material	Control point	Start distance (ft)	Straight length (ft)	End distance (ft)
>	1	Top	2.625	10	6.000	Grade 60	Left Edge of Cap	0.500	50.000	50.500
	2	Top	5.395	10	6.000	Grade 60	Left Edge of Cap	0.500	50.000	50.500
	3	Bottom	2.625	9	5.000	Grade 60	Left Edge of Cap	0.500	50.000	50.500
	4	Bottom	5.253	9	5.000	Grade 60	Left Edge of Cap	5.167	40.667	45.833

New Duplicate Delete

OK Apply Cancel

BrDR 7.8

Substructure Reinforced Concrete Pier Cap LRFR

- 10 Additional Substructure TAG enhancement requests
 - 3D Schematic - predefined plan view, show reinforcement
 - Copy/paste enhancement
 - Hexagon column shape

BrDR 7.8 Next Generation of Report Tool Phase 2

- Bridge Workspace input data for all structure types
- Microsoft Word Report Writer
- General Preference Template Report
- Girder Member Alternative FE Model Report
- Phase 3 will be for reporting analysis results

BrDR 7.8

AASHTO FE Engine Non-Linear Formulation of Soil-Culvert Interaction

- Developing FE elements similar to CANDE
- Using modern programming techniques and practices
- Creating the analysis engine to run Level 3 models
- Validation with CANDE
 - Tools for comparing the results of existing CANDE models
- FE Engine included in version 7.8 of the BrDR software
 - Will not be available to users (no user interface)
 - User Interface will be provided in a later version (Phase II)

BrDR 7.8 Analysis API 2.0

- Currently, all the analysis results are stored in an in-memory data structure, and all bridges and results are stored in-memory during a batch analysis
 - Results in poor runtime performance and memory usage during large batch analyses
- Changing that logic to retain data for a single bridge in memory at one time
 - Will greatly improve runtime performance and reduce processing complexity during large batch analyses
- Must be complete in conjunction with the Results API

BrDR 7.8 Results API

- Currently, all the analysis results are stored in an in-memory data structure
 - There's code to iterate over the analysis results and determine critical ratings in various locations for different purposes
 - Created technical debt and inconsistency in processing analysis results
- Moving all this logic to a new Results API so analysis results can be saved, restored, and processed in a consistent manner
 - Will allow for post-processing of analysis results, even if the BrDR is closed and reopened
 - New Results API will be made available to 3rd-party developers

BrDR 7.8 Data Exchange Through BrM 7.1 OpenAPI

- Update the existing BrDR/BrM data exchange features to support the BrM 7's SNBI implementation
- Utilize the BrM 7's AASHTOWare OpenAPI connection
- BrDR/BrM data exchange support for versions prior to BrM 7.1 will be dropped in BrDR 7.8

BrM Version	BrDR Version
6.4	7.1, 7.2, 7.3 and up to 7.6
6.5	7.1, 7.2, 7.3 and up to 7.6
6.6	7.3 and up to 7.6
6.7	7.3 and up to 7.6
7.0	Not supported in 7.6

BrDR 7.8 RADBUG Enhancement Requests

- BSSD-1891 Tabular Results Filter by Action and Limit State
 - Filter rating summary tabular results by action type (flexure, shear, bearing etc.) and limit state group (Strength/Service/Fatigue)
 - Available at the Bridge Workspace and all 3 Bridge Explorer levels
- BSSD-3361 Tabular Results Updates
 - Addition of a new column for displaying Safe Posting Load as per MBE 6A.8.3
 - Filter critical rating factor per vehicle per rating level instead of critical rating for each load combination per vehicle per rating level
 - Addition of rating summary tabular results per superstructure definition

BrDR 7.8 Maintenance Items

- BSSD-1572 Use the average K_g to calculate the LLDF when K_g is different for the left side and right side of the node
- BSSD-1594 Additional Deck template for the Superstructure Definition Wizard
- BSSD-1595 Superstructure wizard does not set LRFR analysis module
- BSSD-1625 Add splice locations to the bridge schematic
- BSSD-1633 Shear reinforcement for Edge Beams in a slab system
- BSSD-3998 Effective Radius of Gyration for Flanges and Cover Plates of Different Widths
- BSSD-4008 Consider Lane Loading in the Load Rating Tool
- BSSD-4043 Application of Concentrated Member Loads in 3D FE models

BrDR 7.8 Maintenance Items

- BSSD-4096 Consider LRFD Equation 6.10.4.2.2-4 for Load Ratings
- BSSD-4098 Consider Flange Lateral Bending Stress for MBE 6A.6.4.2.2 Service Limit State
- BSSD-4340 Consider revising 'Ignore long. reinf. in rating' LRFR control option
- BSSD-4371 Square Rebar Schematic
- BSSD-4458 Ability to Specify Allowable Stress Factors for Each Material

Beyond

2024 Top 5 BrD RADBUG Large Enhancement Survey Results

Rank	Description
1	Design: Steel Design Tool Enhancements
2	Design: PS Design Tool Enhancements
3	Analysis: Complex framing plans
4	Analysis: Complex curved girder layout
5	Member Types: Concrete - Frame/Arch structures

2024 Top 5 BrR RADBUG Large Enhancement Survey Results

Rank	Description
1	Rating: Enhanced deterioration modelling
2	Rating: Implement remaining structure types in LRT
3	Member Types: Steel - Tub/box girders
4	Member Types: Concrete - Frame/Arch structures
5	Member Types: Concrete - Channel beams

Thank You

Any Questions

