

AASHTOWare BrD/BrR 7.2.0

Library Tutorial

LIB1 - Libraries

Library Concepts

The libraries of BrD/BrR allow for the description of items that are standardized or used frequently in the description of a bridge or by analysis events. The libraries of BrD/BrR currently define the following items:

- Appurtenances (parapets, medians, railings, etc.)
- Connectors (bolts, nails)
- Corrugated Metal Panel
- Factors
- LRFD DF Applicability Ranges
- LRFD Substructure Design Settings
- Materials (steel, concrete, etc.)
- Prestress Shapes
- Steel Shapes
- Timber Shapes
- Vehicles

BrD/BrR is pre-loaded with library items selected by AASHTO. These items were taken from various sources including the following:

- *AASHTO LRFD Bridge Design Specifications*
- *AASHTO Manual for Bridge Evaluation*
- *AASHTO Standard Specifications for Highway Bridges*
- *AASHTO Standard Specifications for Transportation Materials*
- *AISC Manual of Steel Construction*
- *PCI Precast Prestressed Concrete Bridge Design Manual*

Library Types

Three types of library items:

Standard Items added to database by AASHTO. Standard library items are not editable.

Agency All items added to the library by a user.

User Defined Only available for vehicles.

Using Library Data

Two methods to use library items:

Linking Library item associated with a bridge component or analysis event. If the library item is modified then the updated data is used by the bridge component or analysis event. (Factors, Vehicles, LRFD DF Applicability Ranges)

Copying Data from library item copied from a library item to a bridge item. A change in the library item has no effect on bridge items that use data previously copied from library item. (Steel Shapes, PS Shapes, Timber Shapes, Factors, LRFD Substructure Design Settings, Materials, Appurtenances, Connections, Corrugated Metal Panel)

Linking is used to reduce amount of data stored in database for items that are unlikely to be modified.

Library Security

- Library access can be restricted for read, write, create, and delete access.
- Access restrictions apply to all libraries for a given user or group of users.
- Limit number of users with write, create, and delete access.
 - Reduce possibility of incorrect data.
 - Reduce duplicate items and inappropriate items.

Library Explorer

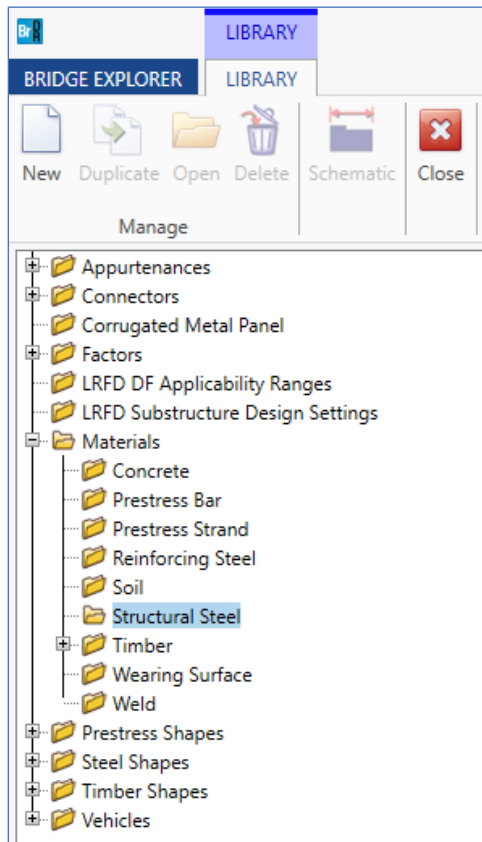
The Library Explorer is used to navigate the various libraries. The tree control in the left pane organizes the libraries. The item selected in the tree control determines the library items to be listed in the right pane of the window.

Library	Units	Name	Description
Standard	SI / Metric	Grade 250	AASHTO M270M Grade 250
Standard	SI / Metric	Grade 345	AASHTO M270M Grade 345
Standard	SI / Metric	Grade 345W	AASHTO M270M Grade 345W
Standard	SI / Metric	Grade 485W	AASHTO M270M Grade 485W
Standard	SI / Metric	Grade 690 <= 65 mm	AASHTO M270M Grade 690 up to 65 mm thick, in
Standard	SI / Metric	Grade 690W <= 65 mm	AASHTO M270M Grade 690W up to 65 mm thick,
Standard	SI / Metric	Grade 690 - > 65 to 100 incl.	AASHTO M270M - over 65 to 100 mm thick, inclu
Standard	SI / Metric	Grade 690W - > 65 to 100 incl.	AASHTO M270M - over 65 to 100 mm thick, inclu
Standard	US Customary	Grade 36	AASHTO M270 Grade 36
Standard	US Customary	Grade 50	AASHTO M270 Grade 50
Standard	US Customary	Grade 50W	AASHTO M270 Grade 50W
Standard	US Customary	Grade 70W	AASHTO M270 Grade 70W
Standard	US Customary	Grade 100 <= 2.5"	AASHTO M270 Grade 100 up to 2.5" thick, inclusi
Standard	US Customary	Grade 100W <= 2.5"	AASHTO M270 Grade 100W up to 2.5" thick, inclu
Standard	US Customary	Grade 100 - > 2.5" to 4" incl.	AASHTO M270 Grade 100 - over 2.5" to 4" thick, i
Standard	US Customary	Grade 100W - > 2.5" to 4" incl.	AASHTO M270 Grade 100W - over 2.5" to 4" thick
Standard	US Customary	Prior to 1905	Built prior to 1905 - steel unknown
Standard	US Customary	1905 to 1936	Built 1905 to 1936 - steel unknown
Standard	US Customary	1936 to 1963	Built 1936 to 1963 - steel unknown
Standard	US Customary	After 1963	Built after 1963 - steel unknow
Standard	US Customary	AASHTO M 94(1961)	AASHTO M 94(1961) or ASTM A 7(1967)
Standard	US Customary	AASHTO M 95(1961)	AASHTO M 95(1961) or ASTM A 94(1966)
Standard	US Customary	AASHTO M 96(1961)	AASHTO M 96(1961) or ASTM A 8(1961)
Standard	US Customary	ASTM A94 - <= 1 1/8"	ASTM A 94 - 1 1/8" thick and under
Standard	US Customary	ASTM A94 - over 1 1/8" to 2" incl.	ASTM A 94 - over 1 1/8" to 2" thick, inclusive
Standard	US Customary	ASTM A572 - 1 1/2" max., Fy = 45...	ASTM A 572 - 1 1/2" thick max, Fy=45 ksi
Standard	US Customary	ASTM A572 - 1/2" max, Fy = 65 ksi	ASTM A 572 - 1/2" thick max, Fy=65 ksi
Standard	US Customary	ASTM A514 - over 2 1/2" to 4" incl.	ASTM A 514 - over 2 1/2" to 4" thick, inclusive
Standard	US Customary	ASTM A242 - <= 3/4"	ASTM A 242 - 3/4" thick and under
Standard	US Customary	ASTM A440 - <= 3/4"	ASTM A 440 - 3/4" thick and under

Exercise

Add Steel Material Library Item

1. Click the Library button under the VIEW tab in the ribbon. Select the tree item Materials/Structural Steel as shown below.



2. Click the New button in the ribbon. A Materials: Structural Steel: New Item window will appear in the panel below the list of Standard library items.
3. Select the system of units using the radio buttons and then fill in the structural steel information as shown below. Note that the name must be unique among all structural steel library items.

Materials: Structural Steel: New Item

Name: Steel 1

Description: AASHTO M270 Grade 50W

Material properties

Specified minimum yield strength (fy): 50 ksi

Specified minimum tensile strength (Fu): 70 ksi

Coefficient of thermal expansion: 0.000065 1/F

Density: 0.49 kcf

Modulus of elasticity (E): 29000 ksi

Store units as: US SI

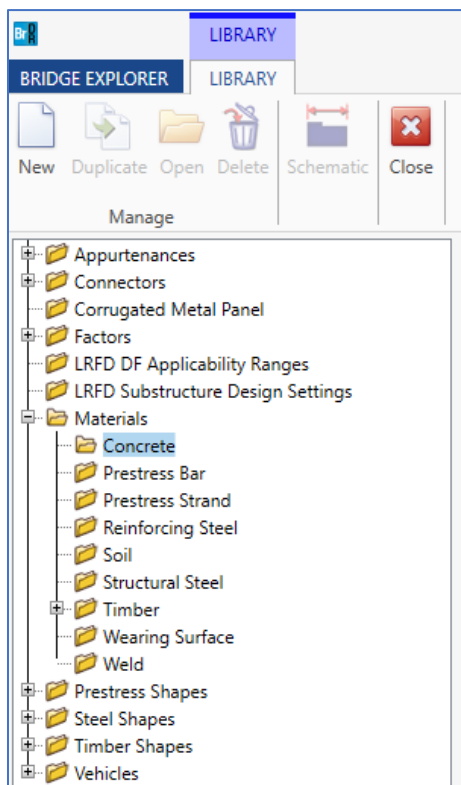
Library: Standard Agency defined

Save Close

4. Click Save. The new structural steel material will now be listed in the right pane of the Library Explorer for the tree items Materials/Structural Steel as an Agency item.

Add Concrete Material Library Item

1. Select the tree item Materials/Concrete as shown below.



2. Click the New button in the ribbon. A Materials: Concrete: New Item window will appear in the panel below the list of Standard library items.
3. Select the system of units using the radio buttons and then fill in the concrete information as shown below. Note that the name must be unique among all concrete library items.

Materials: Concrete: New Item

Name: PS 6.5 ksi

Description: PS 6.5 ksi (f'ci = 5.5 ksi)

Store units as: US SI

Library: Standard Agency defined

Specified compressive strength at 28 days (f'c): 6.5 ksi

Initial compressive strength (f'ci): 5.5 ksi

Composition of concrete: Normal

Density (for dead loads): 0.15 kcf

Density (for modulus of elasticity): 0.15 kcf

Poisson's ratio: 0.2

Coefficient of thermal expansion: 0.000006 1/F

Splitting tensile strength (fct):

Compute

Std modulus of elasticity (Ec):

LRFD modulus of elasticity (Ec):

Std initial modulus of elasticity:

LRFD initial modulus of elasticity:

Modulus of rupture:

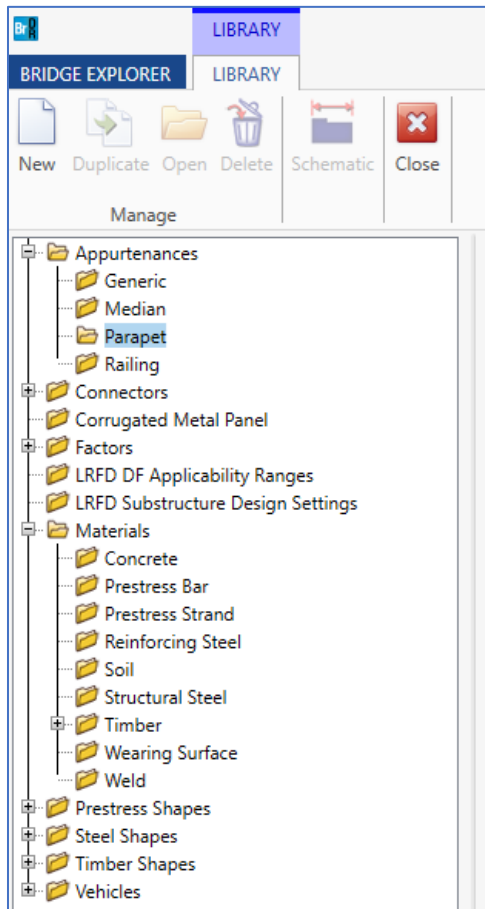
Shear factor:

Save Close

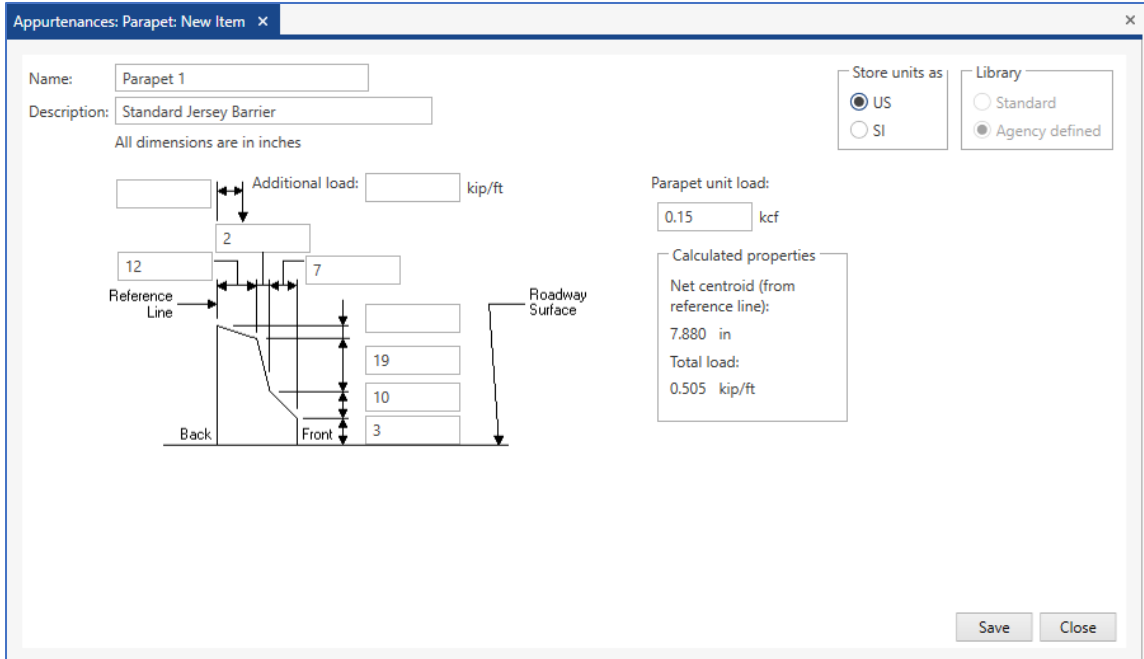
4. Click the Compute button to calculate the remaining properties or manually enter the values.
5. Click Save. The new concrete material will now be listed in the right pane of the Library Explorer for the tree items Materials/Concrete as an Agency item.

Add Parapet Library Item

1. Select the tree item Appurtenances/Parapet as shown below.



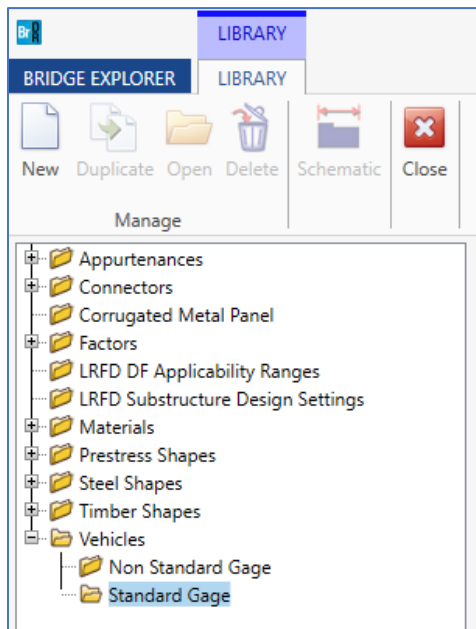
2. Click the New button in the ribbon. An Appurtenances: Parapet: New Item window will appear in the panel below the list of Standard library items.
3. Select the system of units using the radio buttons and then fill in the parapet information as shown below. Note that the name must be unique among all parapet library items.



4. Click Save. The new parapet will now be listed in the right pane of the Library Explorer for the tree items Appurtenances/Parapet as an Agency item.

Add Vehicle Library Item

1. Select the tree item Vehicles/Standard Gage as shown below.



2. Click the New button in the ribbon. A Vehicle: Standard Gage: New Item window will appear.
3. Select the system of units using the radio buttons and then fill in the vehicle information as shown below for all items not on the tab control. Note that the name must be unique among all vehicle library items. The checkboxes inside the Design and Rating groups are used to filter the vehicle during an analysis event based on the type of event and the type of analysis engine selected. The Vehicle Library has a library type called 'User Defined'. This library allows users to add their own vehicles.

Vehicle: Standard Gage: New Item

Name:

Description:

Store units as: US SI

Library: Standard Agency defined User defined

Notional vehicle

Rating: LRFD ASD/LFD LFR

Design: LRFD ASD/LFD

Truck **Tandem** Lane

Axle no.	Axle load (kip)	Gage dist. (ft)	Wheel contact width (in)	Axle spacing (ft)	
				Minimum	Maximum
1	8	6	10		
2	32	6	20	14	14
3	32	6	20	14	30

Totals:

4. Click the New button to add an axle to the vehicle.
5. Enter the first axle's dimensions. (Axle spacing is not applicable for the first axle.)
6. Repeat steps 4 and 5 for each additional axle.
7. Select the Lane Tab.
8. Enter data on the Lane tab as shown below.

Vehicle: Standard Gage: New Item

Name:

Description:

Store units as: US SI

Library: Standard Agency defined User defined

Truck Tandem Lane

Load per axle line

Uniform lane load: kip/ft

Concentrated load for moment: kip

Concentrated load for shear: kip

Add a second, equal magnitude concentrated load in one other span to determine maximum negative moment for continuous spans

Notional vehicle

Rating: LRF ASD/LFD LRFR

Design: LRF ASD/LFD

Save Close

9. Click Save. The new vehicle will now be listed in the right pane of the Library Explorer for the tree items Vehicles/Standard Gage.