

AASHTOWare BrD/BrR 6.8.2

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:

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

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:

<i>Standard</i>	Items added to database by AASHTO. Standard library items are not editable.
<i>Agency</i>	All items added to the library by a user.
<i>User Defined</i>	Only available for vehicles.

Using Library Data

Two methods to use library items:

<i>Linking</i>	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)
<i>Copying</i>	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)

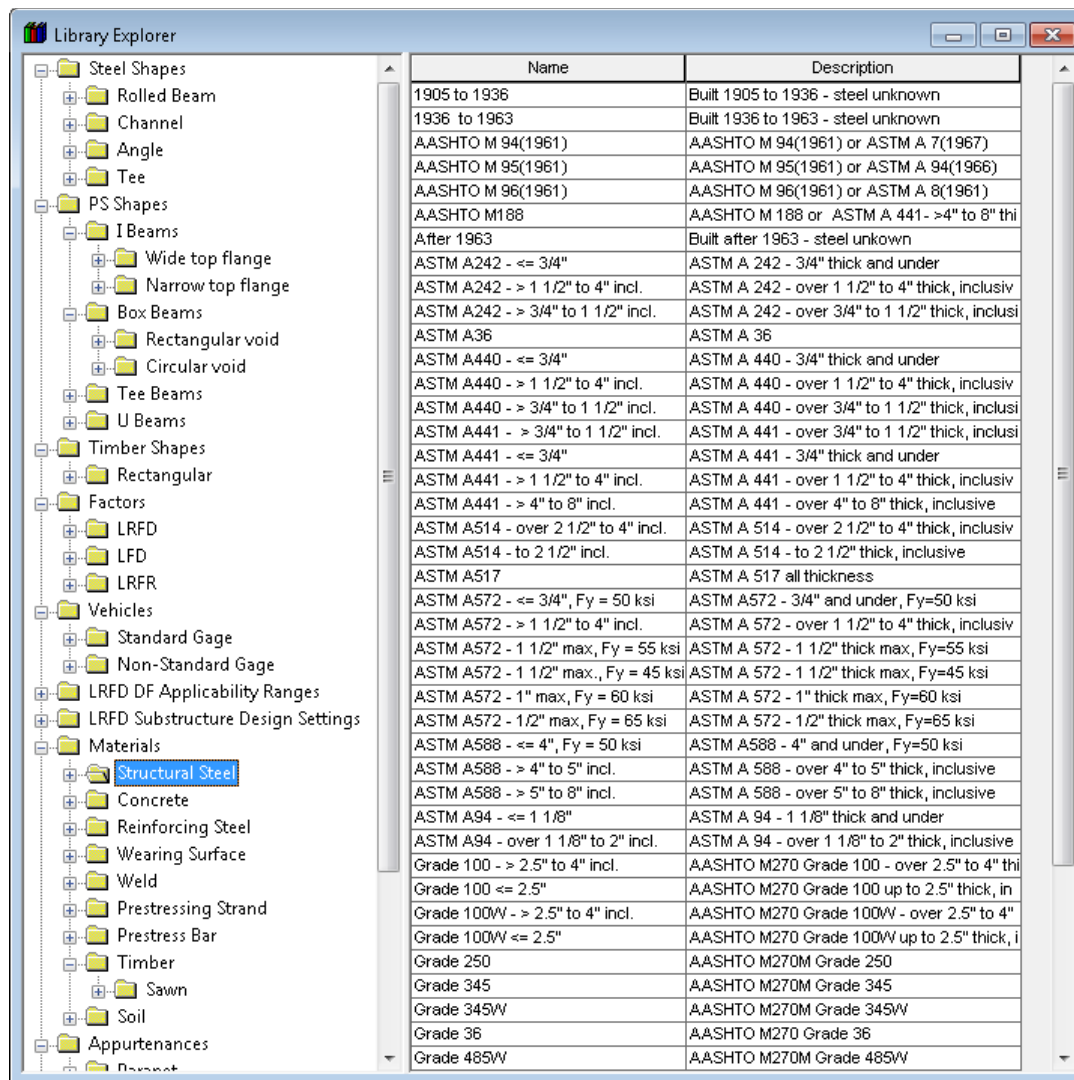
Linking is used to reduce amount of data stored in database for items that are unlikely to be modified.

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

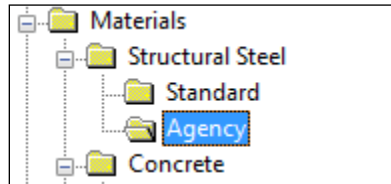
The Library Explorer is used to navigate the various libraries. The tree control in the left pane organizes the libraries. The item selected in the tree control determines the library items to be listed in the right pane of the window.



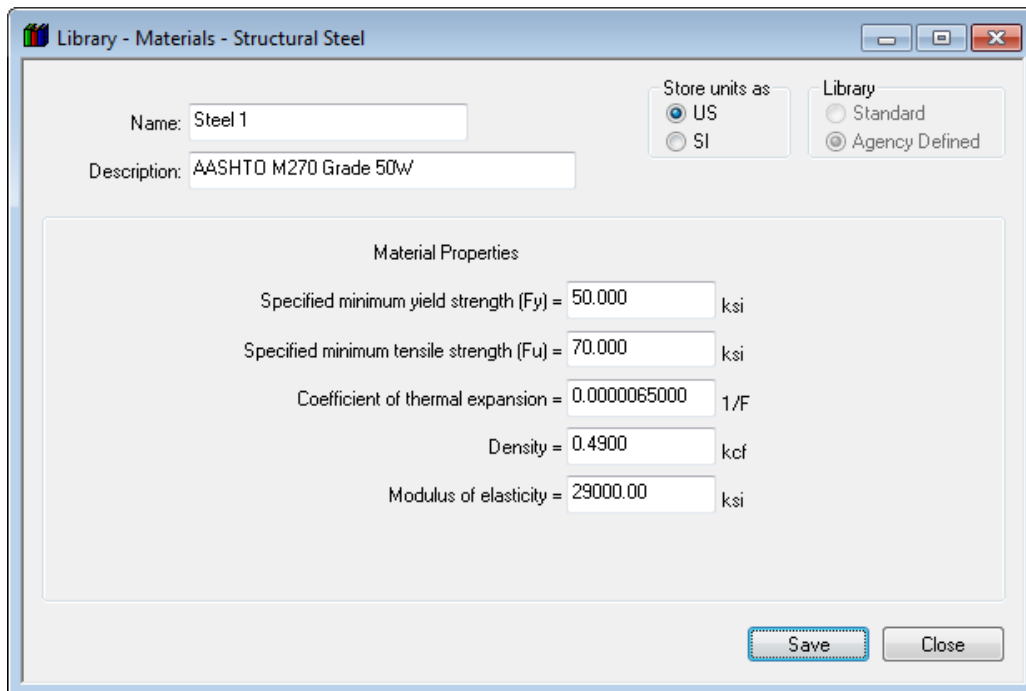
Exercise

Add Steel Material Library Item

1. Select the tree item Materials/Structural Steel/Agency in the Library Explorer as shown below.



2. Select File/New from the menu. A Library - Materials - Structural Steel window will appear.
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.



Library - Materials - Structural Steel

Name: Steel 1

Description: AASHTO M270 Grade 50W

Store units as:
☒ US
☐ SI

Library:
☐ Standard
☒ Agency Defined

Material Properties

Specified minimum yield strength (Fy) = 50.000 ksi

Specified minimum tensile strength (Fu) = 70.000 ksi

Coefficient of thermal expansion = 0.0000065000 1/F

Density = 0.4900 kcf

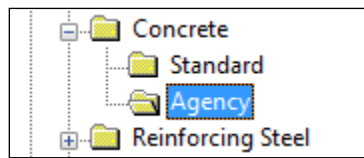
Modulus of elasticity = 29000.00 ksi

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/Agency and Materials/Structural Steel.

Add Concrete Material Library Item

1. Select the tree item Materials/Concrete/Agency in the Library Explorer as shown below.



2. Select File/New from the menu. A Library - Materials - Concrete window will appear.
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.

Library - Materials - Concrete

Name:

Description:

Store units as: ☒ US ☐ SI

Library: ☐ Standard ☒ Agency Defined

Specified Compressive Strength at 28 Days (f'c) = ksi

Initial Specified Compressive Strength (f'ci) = ksi

Coefficient of Thermal Expansion = 1/F

Density (for Dead Loads) = kcf

Density (for Modulus of Elasticity) = kcf

Std Modulus of Elasticity = ksi

LRFD Modulus of Elasticity = ksi

Std Initial Modulus of Elasticity = ksi

LRFD Initial Modulus of Elasticity = ksi

Poisson's Ratio =

Composition of concrete =

Modulus of Rupture = ksi

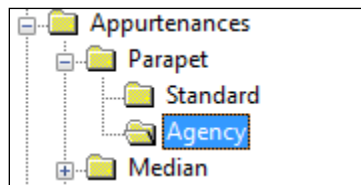
Shear Factor =

Splitting tensile strength (fct) = ksi

4. Click Save. The new concrete material will now be listed in the right pane of the Library Explorer for the tree items Materials/Concrete/Agency and Materials/Concrete.

Add Parapet Library Item

1. Select the tree item Appurtenances/Parapet/Agency in the Library Explorer as shown below.



2. Select File/New from the menu. A Library - Appurtenances - Parapet window will appear.
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.

Name: Parapet 1

Description: Standard Jersey barrier

All dimensions are in inches

Additional Load = 0.0000 kip/ft

Parapet unit load = 0.150 kcf

Calculated Properties

Net centroid (from reference line) = 7.880 in

Total load = 0.505 kip/ft

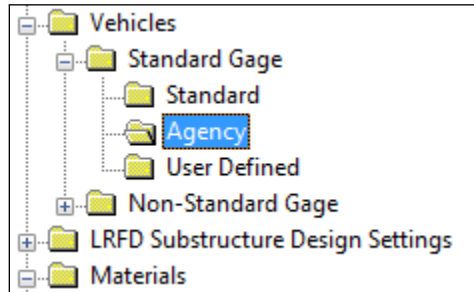
Save Close

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

Add Vehicle Library Item

The Vehicle Library has a library type called 'User Defined'. This library allows users to add their own vehicles.

1. Select the tree item Vehicles/Standard Gage/Agency in the Library Explorer as shown below.



2. Select File/New from the menu. A Library - Standard Gage Vehicle 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.

Library - Standard Gage Vehicle

Name:

Description:

Store units as: ☒ US ☐ SI

Library: ☐ Standard ☒ Agency Defined ☐ User Defined

☐ Notional Vehicle

Rating: ☒ LRFD ☒ ASD/LFD ☐ LRFR

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	8.00	6.00	10.0000		
2	32.00	6.00	20.0000	14.00	14.00
3	32.00	6.00	20.0000	14.00	30.00

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.

Library - Standard Gage Vehicle

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:
☒ LRFD
☒ ASD/LFD
☐ LRFR

Design:
☒ LRFD
☐ ASD/LFD

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/Agency and Vehicles.