

AASHTOWare BrDR 7.5.0

Load Rating Tool Tutorial
LRT1 – Load Rating Tool Example

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This example describes the use of the Load Rating Tool feature in BrDR.

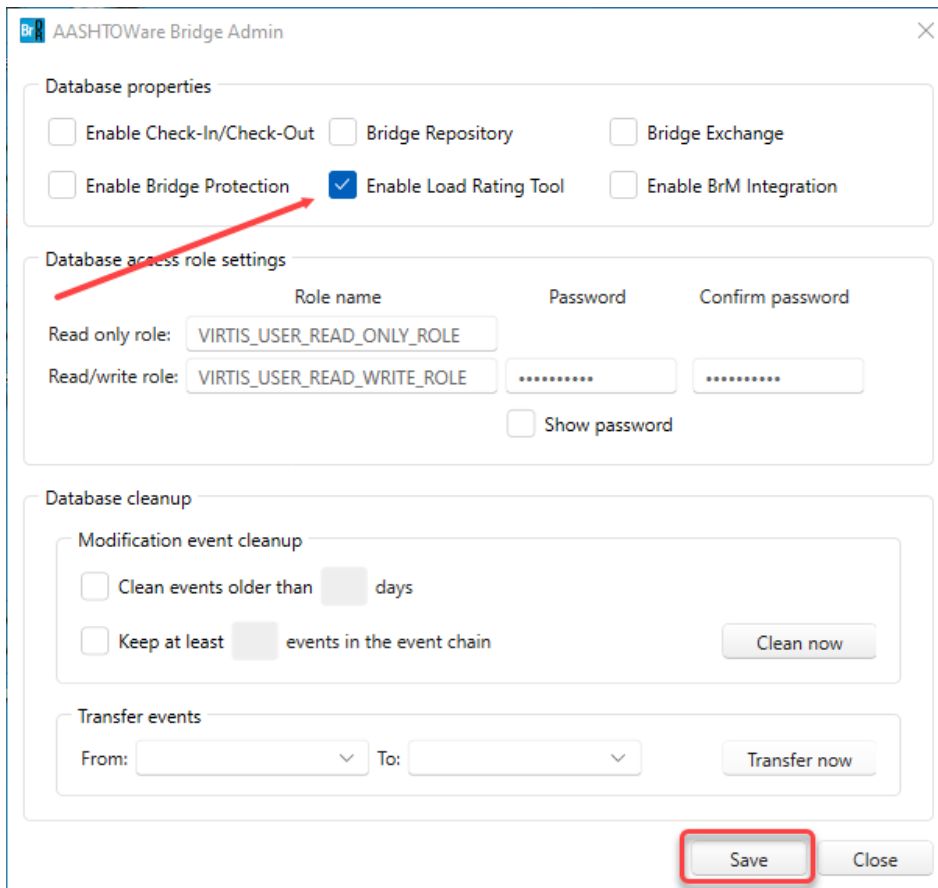
Topics covered

- Configuration of the Load Rating Tool
- Generation and maintenance of precomputed data
- Operation of the Load Rating Tool

Configuration of the Load Rating Tool

By default, the Load Rating Tool is disabled in the user interface. Before the Load Rating Tool can be used, it must be enabled through the **AASHTOWare Bridge Admin Utility**. *Note: The Bridge Admin Utility must have been selected for install while installing the BrDR product.*

To enable the Load Rating Tool, navigate to **Program Files/AASHTOWare/BrDR75** and open **AASHTOWareBridgeAdmin.exe**, login with the appropriate credentials, and select **Enable Load Rating Tool**. Click **Save** to accept the changes then **OK** followed by **Close** to close the window.

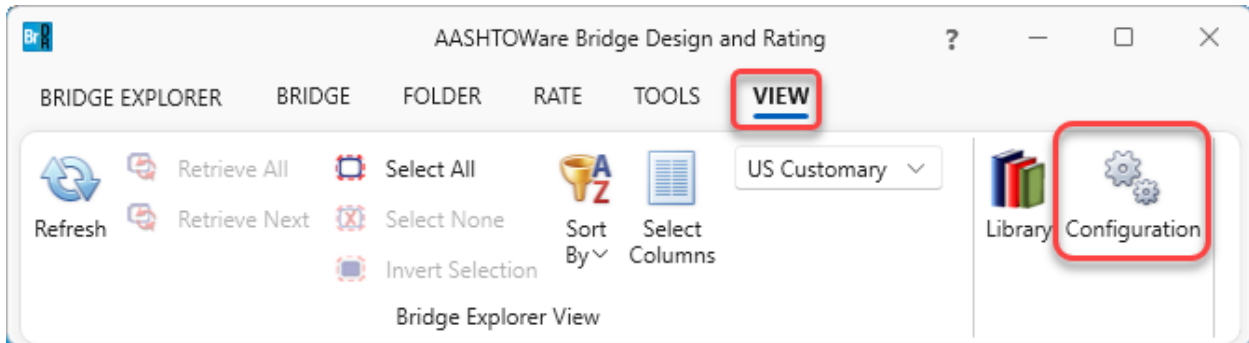


The screenshot shows the 'AASHTOWare Bridge Admin' window. It is divided into three main sections: 'Database properties', 'Database access role settings', and 'Database cleanup'. In the 'Database properties' section, the 'Enable Load Rating Tool' checkbox is checked, and a red arrow points to it. Other checkboxes include 'Enable Check-In/Check-Out', 'Bridge Repository', 'Bridge Exchange', 'Enable Bridge Protection', and 'Enable BrM Integration'. The 'Database access role settings' section has fields for 'Read only role' (VIRTIS_USER_READ_ONLY_ROLE) and 'Read/write role' (VIRTIS_USER_READ_WRITE_ROLE), with password fields and a 'Show password' checkbox. The 'Database cleanup' section has options for 'Modification event cleanup' (Clean events older than X days, Keep at least X events in the event chain) and 'Transfer events' (From: To: Transfer now). At the bottom right, the 'Save' button is highlighted with a red box, and the 'Close' button is next to it.

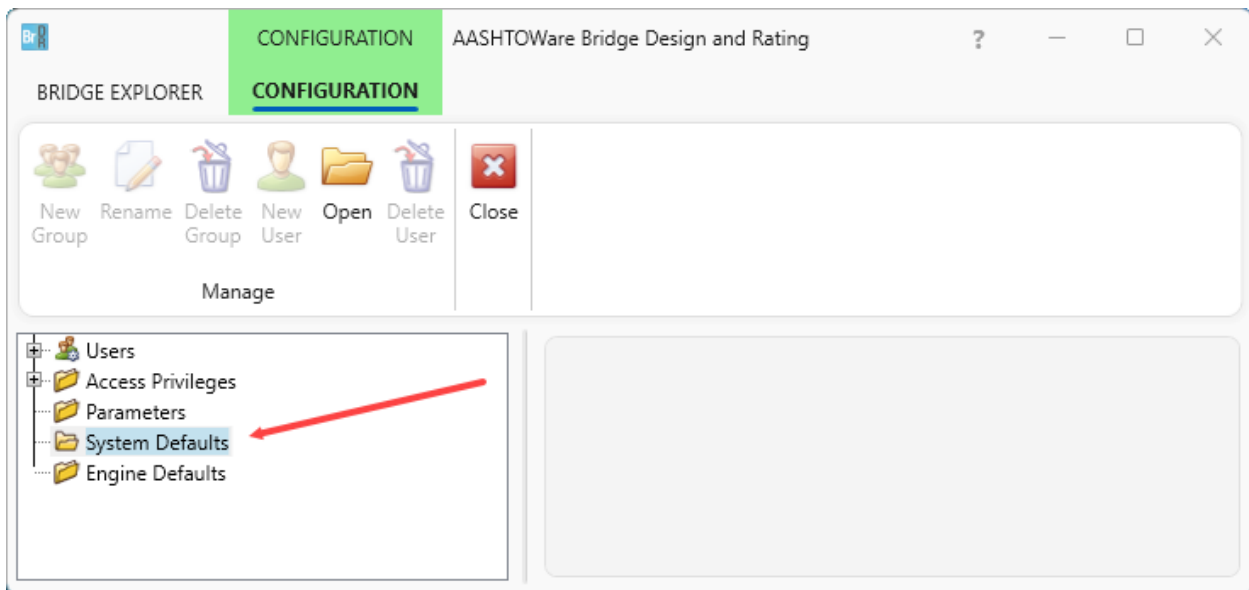
After the **Load Rating Tool** has been enabled in the **Bridge Admin Utility**, log into BrDR to begin the configuration process.

LRT1 – Load Rating Tool Example

The **Load Rating Tool** configuration can be accessed by selecting **View** from the ribbon and then clicking the **Configuration** button.



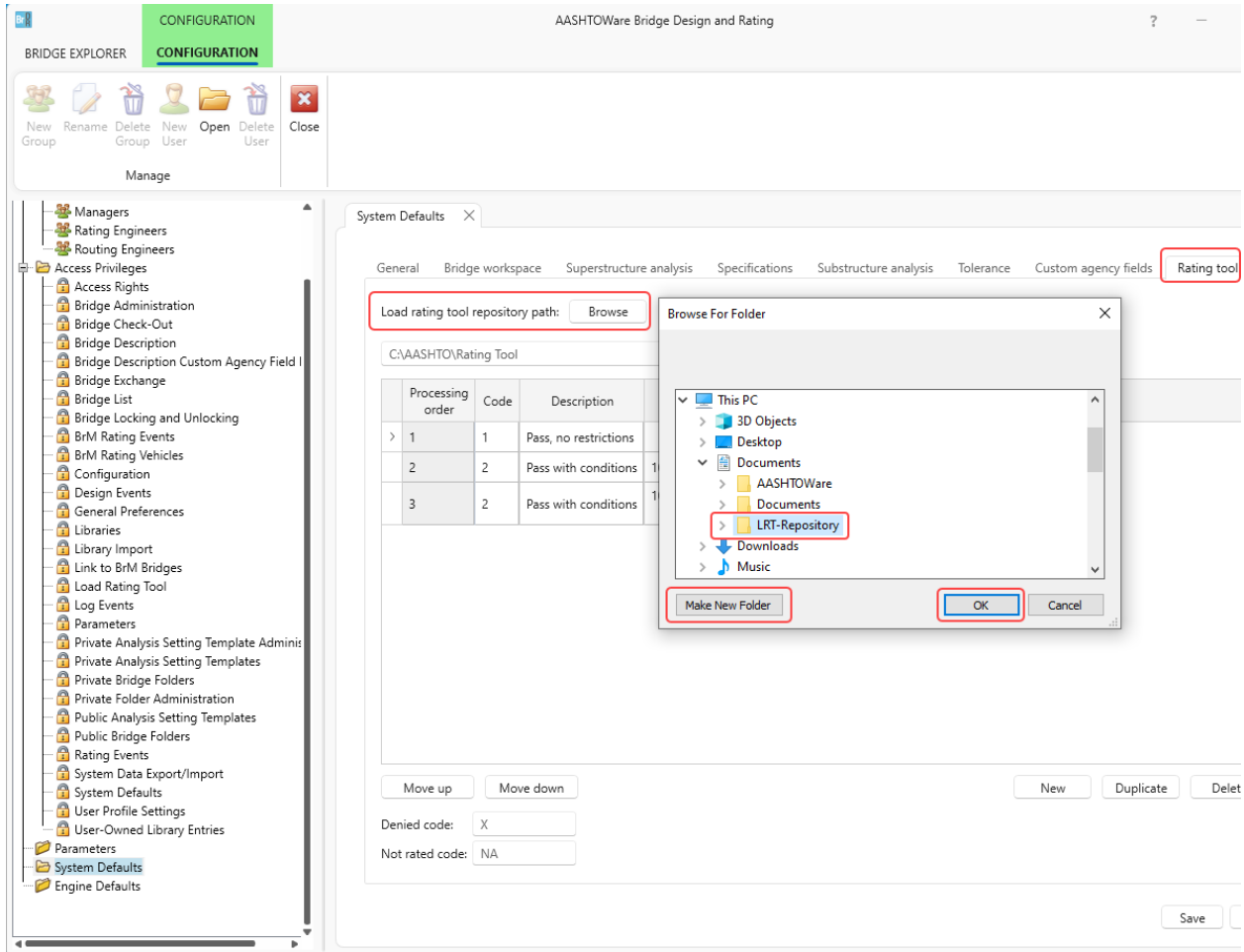
Navigate to **System Defaults**.



The **Rating Tool** configuration tab consists of setting the repository path, defining rating scenarios, setting the denied code, and setting the not rated code.

In this tutorial, only the **Load rating tool repository path** location will need to be set. The repository path location defines the folder where the precomputed data files will be stored. In a production environment, this repository location could be a network folder which would provide access to multiple users. This tutorial will review all the steps necessary to maintain the precomputed data and to keep it up to date as changes are made to the bridge. For this tutorial, manually create a local folder location and specify that location in the **Load rating tool repository** folder, as shown in the figure below. *Note: If this folder is not manually created, the application will provide a message indicating that the repository path is not set and will provide instructions to set the path location.*

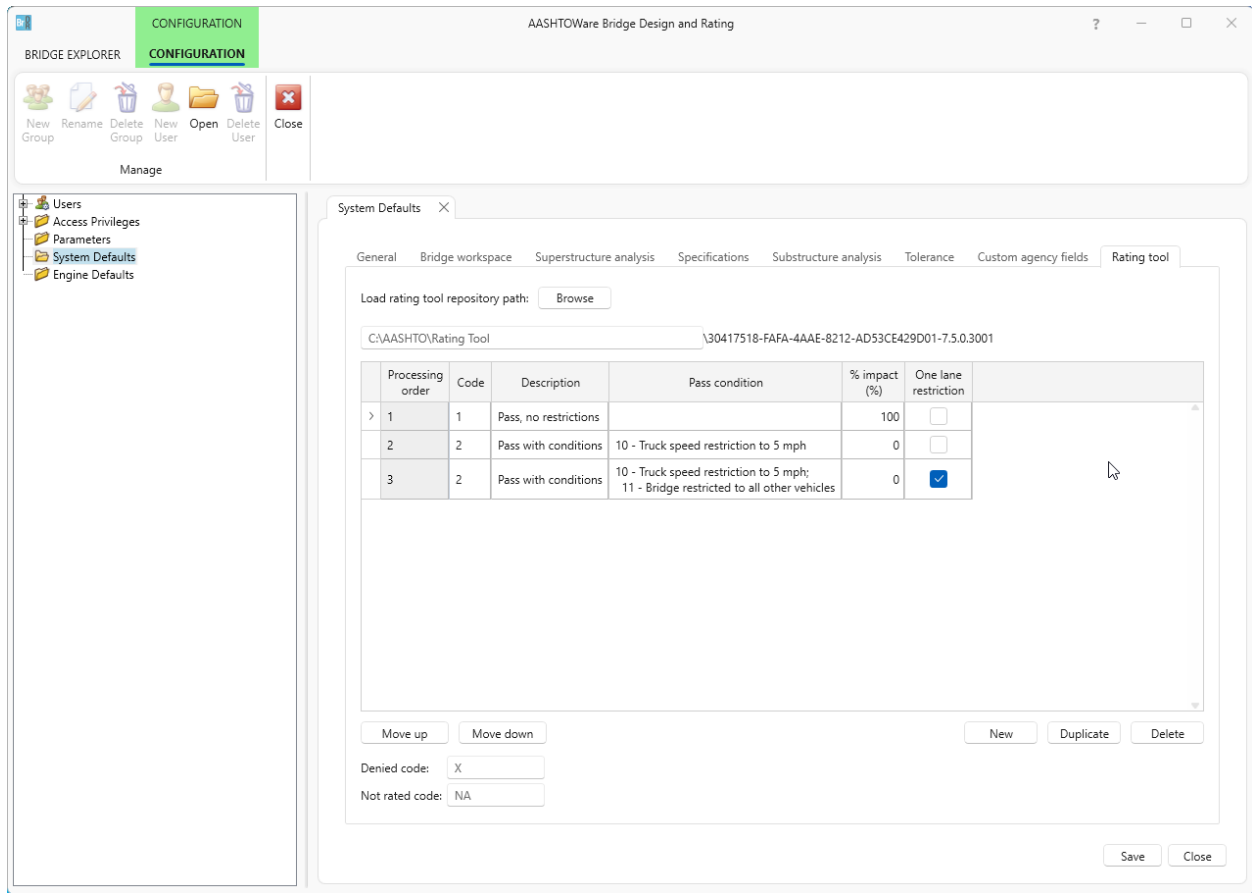
LRT1 – Load Rating Tool Example



The label shown after the repository path displays the unique folder that will be created after the first precomputed data analysis completes successfully. This folder will be created automatically, thus manual creation of this directory is not necessary. This unique folder name prevents precomputed data files from becoming mixed with other versions of the product.

The remaining options define the rating scenarios and analysis codes. These load rating scenarios and codes are usually customized per agency and vary state-to-state. These options provide a flexibility that allow the Load Rating Tool to be seamlessly integrated into existing agency processes without requiring them to adapt to the tool output. In brief, each scenario is run in the processing order described below. If the scenario is denied, the next scenario is run. If a scenario passes, no further scenarios are run for that bridge.

LRT1 – Load Rating Tool Example

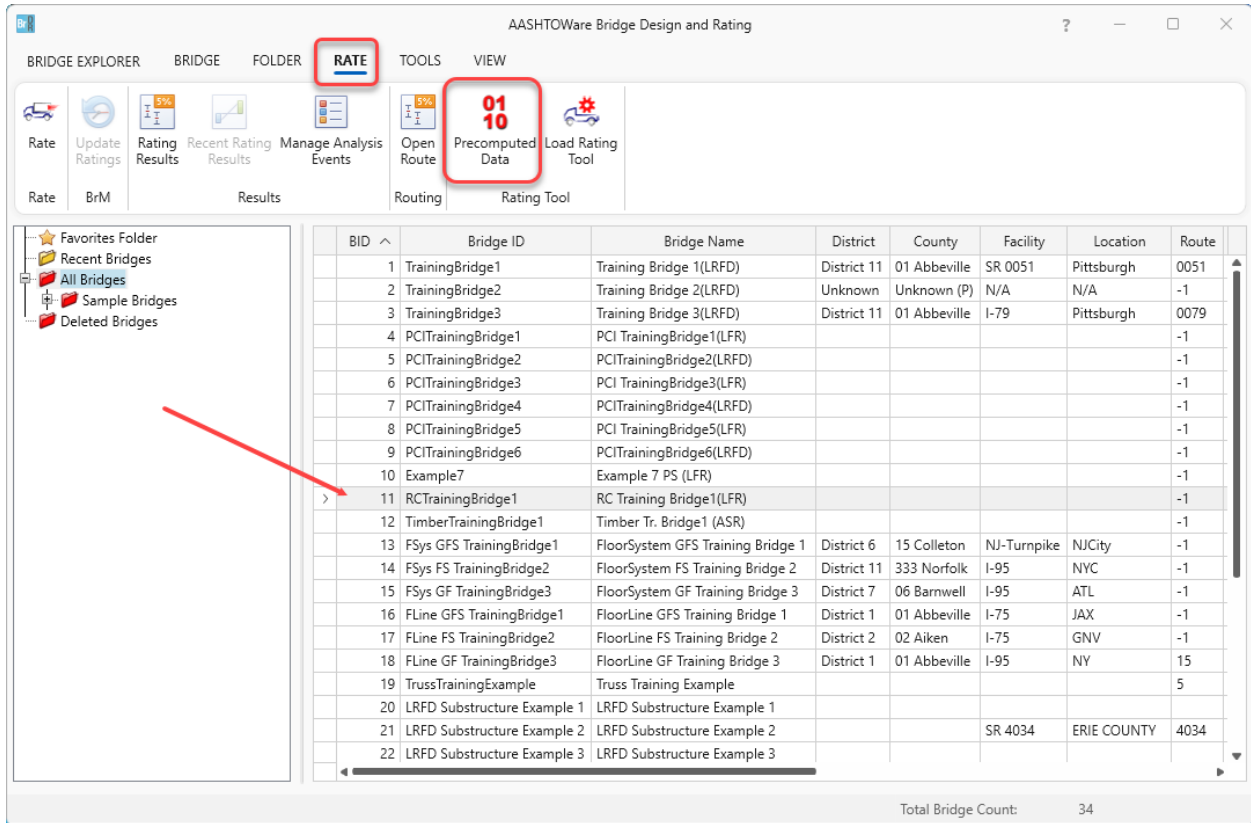


Select **Save** and **Close** the **Configuration** window.

LRT1 – Load Rating Tool Example

Precomputed Data

Generating precomputed data is the first step in using the Load Rating Tool. The precomputed data is required by the Load Rating Tool to perform near-instantaneous ratings, thus it is a required step in the operation. To generate precomputed data, select bridges from the **Bridge Explorer** directly or by selecting a folder (list or query based). Once the bridges of interest are selected, click on the **Precomputed data** button in the **Rating Tool** group of the **RATE** ribbon (see the following screen shot).

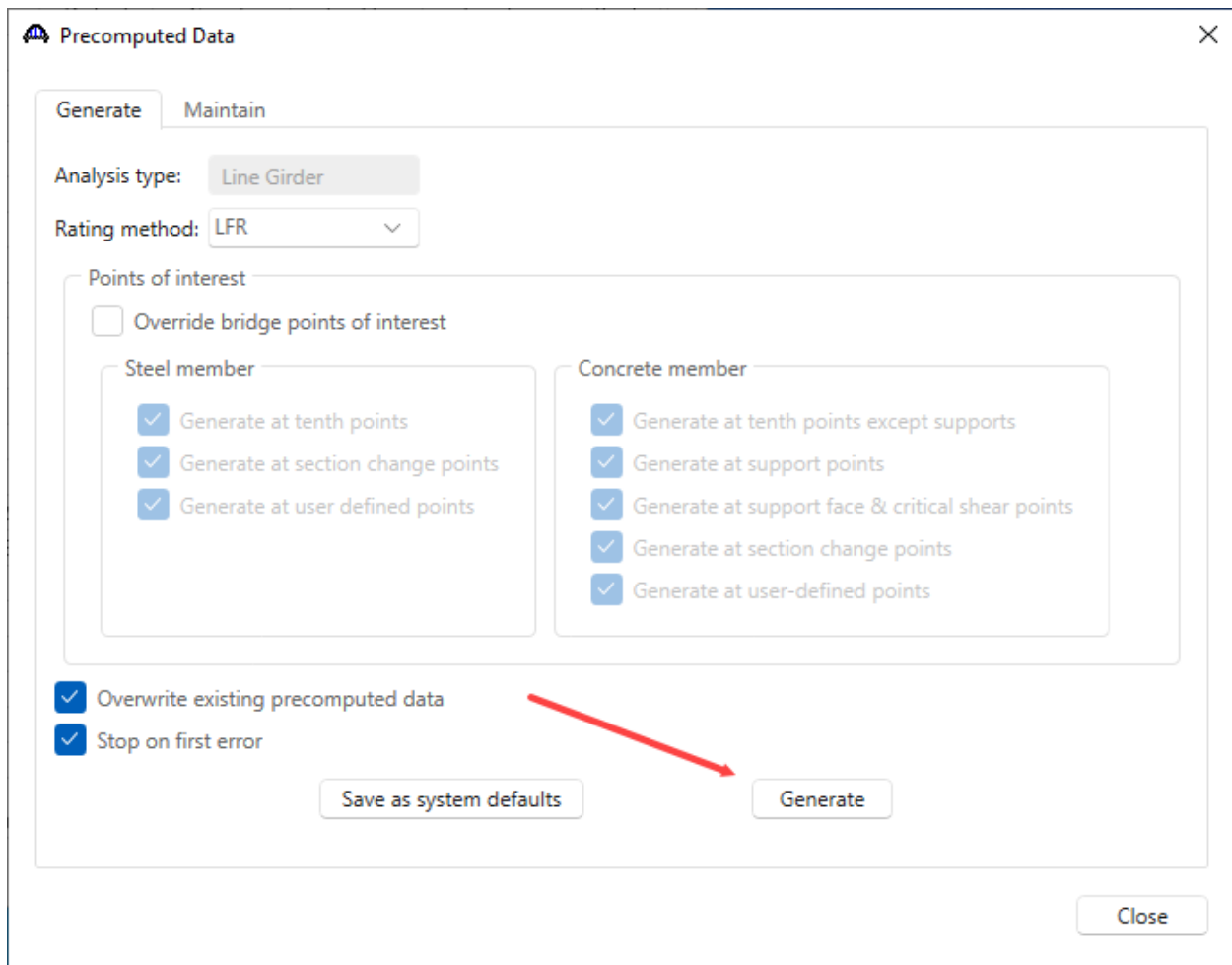


LRT1 – Load Rating Tool Example

Generating Precomputed Data

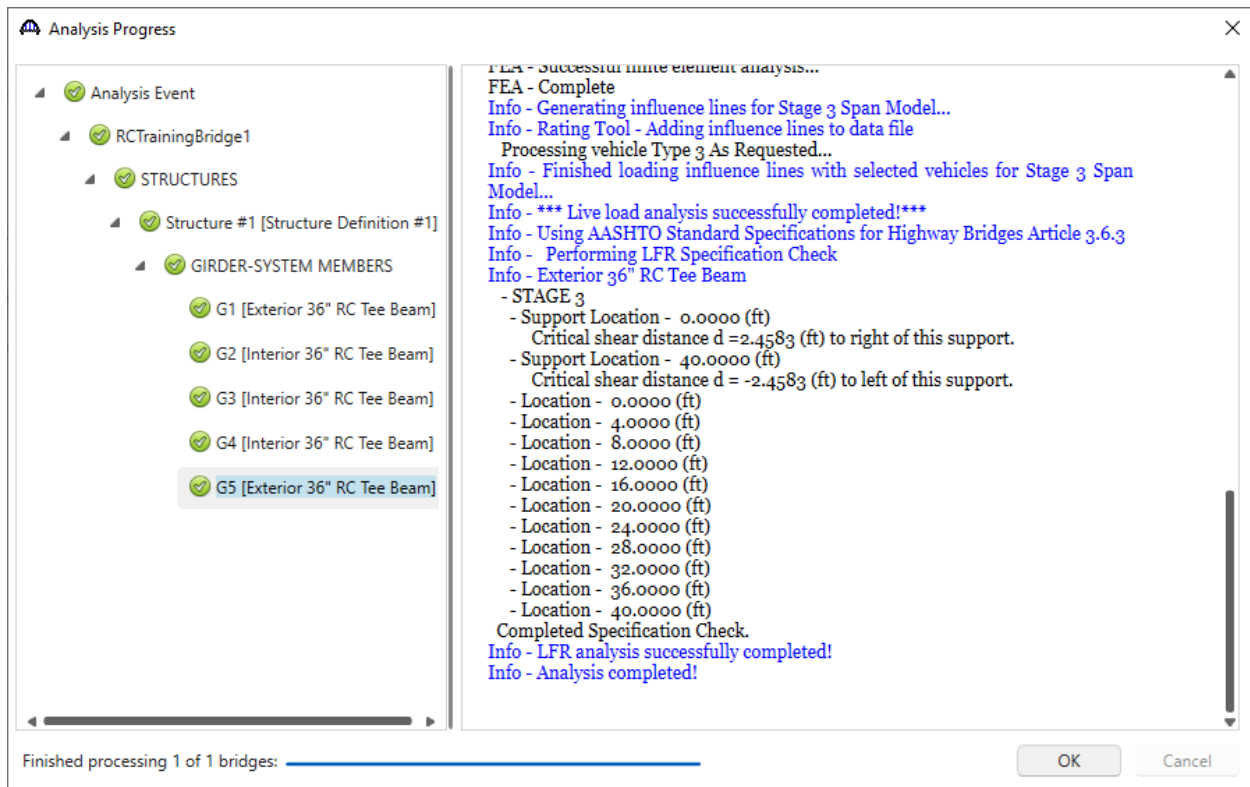
The **Generate** tab on the **Precomputed Data** window, is used to specify overrides and other miscellaneous options for the precomputed data analysis.

For this tutorial, leave the options set as the defaults and click the **Generate** button. This will open the **Analysis Progress** window and generate precomputed data for the selected bridges.



The screenshot shows the 'Precomputed Data' window with the 'Generate' tab selected. The window title is 'Precomputed Data' and it has a close button (X) in the top right corner. The 'Generate' tab is active, and the 'Maintain' tab is also visible. The 'Analysis type' is set to 'Line Girder' and the 'Rating method' is set to 'LFR'. Under the 'Points of interest' section, there is a checkbox for 'Override bridge points of interest' which is unchecked. Below this, there are two columns of options: 'Steel member' and 'Concrete member'. The 'Steel member' column has three checked options: 'Generate at tenth points', 'Generate at section change points', and 'Generate at user defined points'. The 'Concrete member' column has five checked options: 'Generate at tenth points except supports', 'Generate at support points', 'Generate at support face & critical shear points', 'Generate at section change points', and 'Generate at user-defined points'. At the bottom left, there are two checked options: 'Overwrite existing precomputed data' and 'Stop on first error'. At the bottom center, there are two buttons: 'Save as system defaults' and 'Generate'. A red arrow points from the 'Generate' button to the 'Generate' button. At the bottom right, there is a 'Close' button.

LRT1 – Load Rating Tool Example



Once the analysis is complete click **OK** to close the **Analysis Progress** window and return to the **Precomputed Data** window, click **Close** to return to the Bridge Explorer.

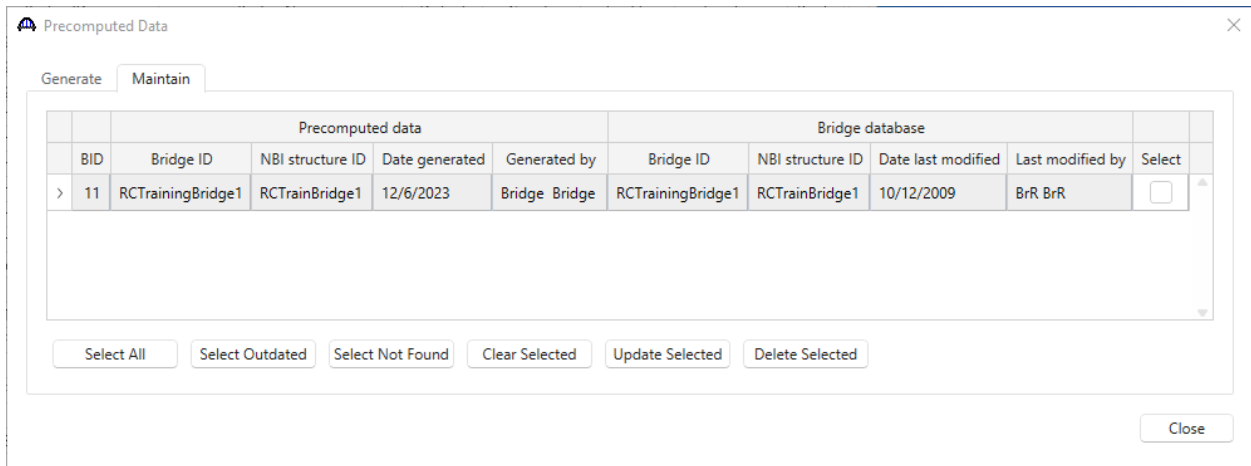
LRT1 – Load Rating Tool Example

Maintaining Precomputed Data

Reopen the **Precomputed Data** window by clicking the **Precomputed Data** button in the **Rating Tool** group of the **RATE** ribbon. Navigate to the **Maintain** tab to view bridges which are now in the precomputed data repository.

This tab provides information on when the precomputed data was last generated, by whom it was generated, when the bridge was last modified, and who modified the bridge. This information is useful for determining when precomputed data should be regenerated for a specific bridge. For example, the **Select Outdated** button will automatically select bridges that have been modified since the precomputed data was last generated and then **Update Selected** can be clicked to regenerate the precomputed data for those bridges.

Click the **Close** button to return to the Bridge Explorer.

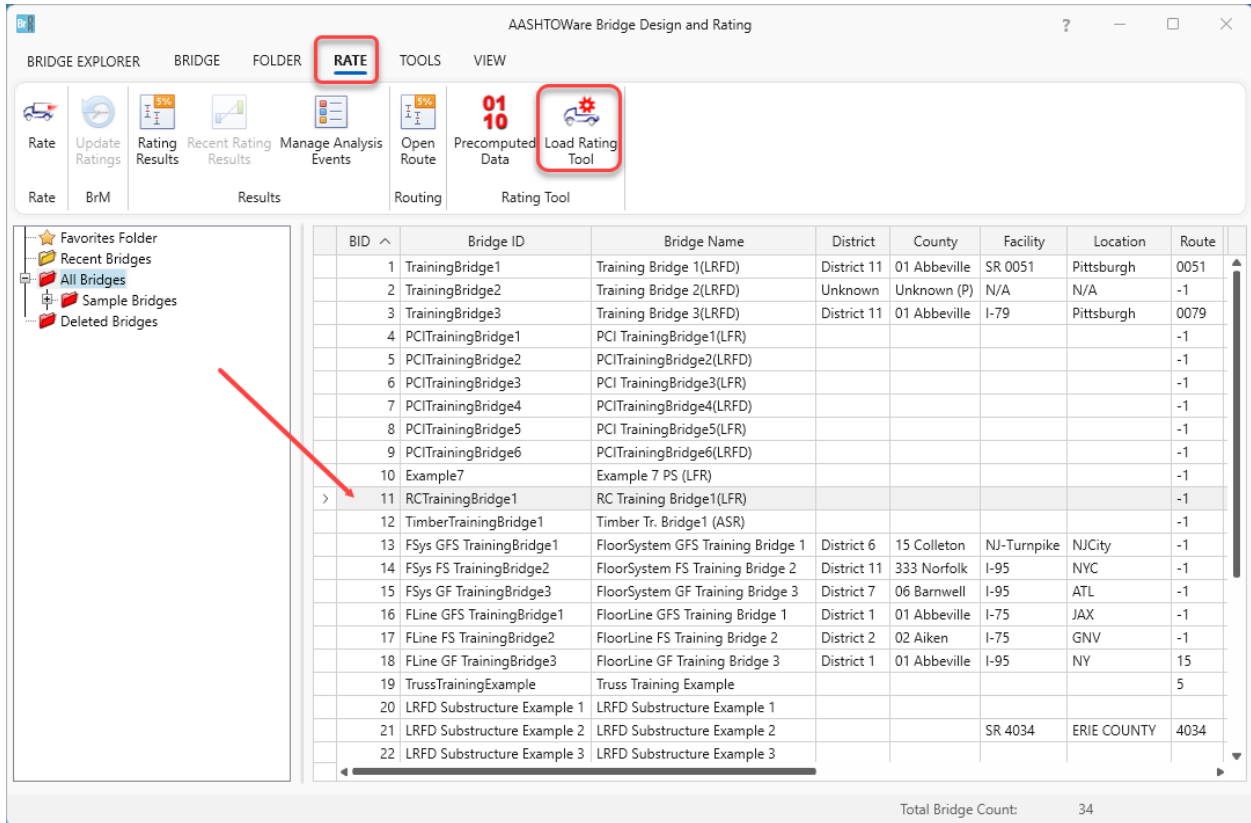


LRT1 – Load Rating Tool Example

Operation of the Load Rating Tool

Once precomputed data is available in the repository for a given bridge (or set of bridges), a high-speed rating from the Load Rating Tool can be made.

Select a bridge or set of bridges from the Bridge Explorer that has precomputed data and then click the **Load Rating Tool** button in the **Rating Tool** group (see the screen shot below) to open the tool.



LRT1 – Load Rating Tool Example

The **Load Rating Tool** window shows several attributes specific to the rating event along with several configuration options. The only required items for rating are a **Minimum allowable rating factor** and **Analysis settings** with only Inventory and/or Operating vehicles.

The screenshot shows the 'Load Rating Tool' window with the following fields and options:

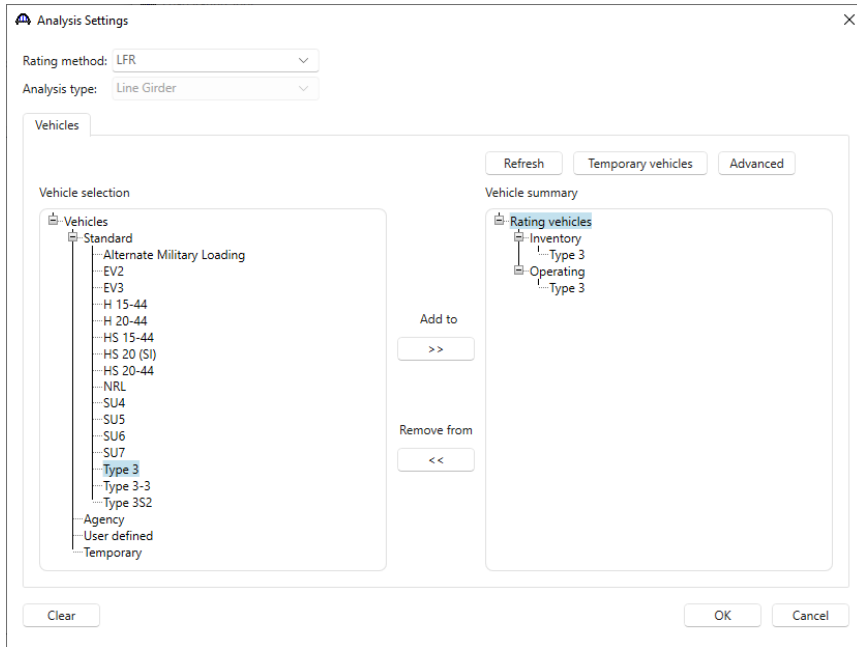
- Permit application number:
- Application date:
- Requested by:
- Minimum allowable rating factor: (highlighted with a red box)
- Comment:

Below the input fields are three tabs: 'Bridges', 'Vehicles', and 'Rating results'. The 'Bridges' tab is active, showing a 'Configure analysis settings...' button (highlighted with a red box) and a table of bridge data.

Bridge database							Has precomputed data	Travel direction	
BID	Bridge ID	NBI structure ID	Route number	Number of structures	Completely defined				
> 11	RCTrainingBridge1	RCTrainBridge1	-1	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Both directions	<input type="text"/>	

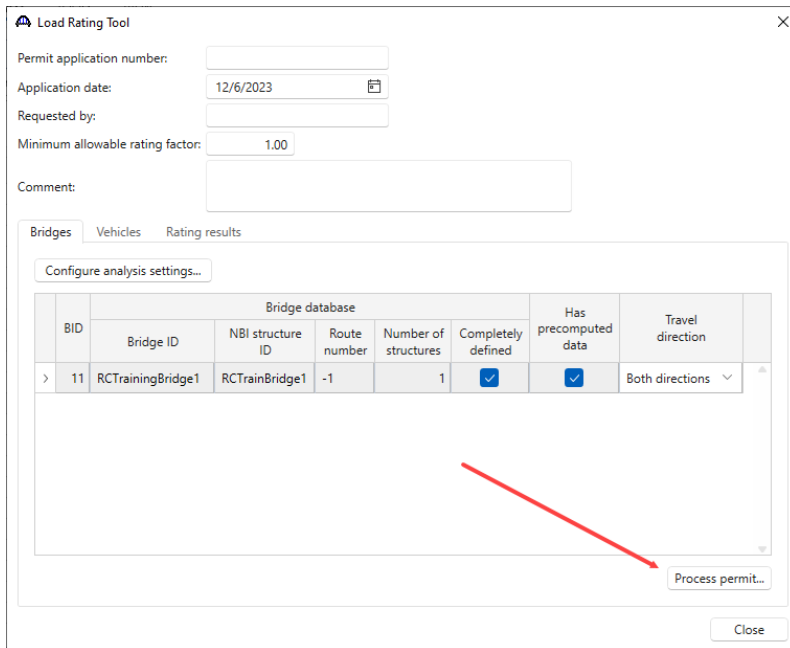
Buttons: 'Process permit...' and 'Close'.

LRT1 – Load Rating Tool Example



Click **OK** to apply the settings and close the window.

Clicking the **Process Permit** button will launch a rating. Any bridges that do not have precomputed data will be evaluated using a traditional full analysis.



The Load Rating Tool will evaluate the scenarios as outlined in the configuration step of this tutorial defined on the **System Defaults** window. For each bridge, the tool will start with the first scenario, test the rating factor from that scenario against the minimum allowable rating factor defined on the **Load Rating Tool** window, and then stop if the scenario passes. If the scenario fails, it will proceed on to the next scenario and repeat until all scenarios have been exhausted. The tool will then repeat that process for all the bridges selected to be analyzed.

LRT1 – Load Rating Tool Example

Once the rating has completed, the **Rating results** tab becomes focused. This tab shows the results for all the bridges and for each scenario run for each bridge. The **Filter results** checkboxes can be used to select the results displayed on this tab.

Load Rating Tool

Permit application number:

Application date: 12/6/2023

Requested by:

Minimum allowable rating factor: 1.00

Comment:

Bridges Vehicles **Rating results**

Filter results: Pass Fail Exceptions

	Vehicle	BID	Bridge ID	Route number	Code	Description	LFR		LRFR	Controlling impact	Pass conditions	Analysis warnings
							Inventory rating factor	Operating rating factor	Permit rating factor			
>	Type 3	11	RCTrainingBridge1	-1	1	Pass, no restrictions	1.286	2.148		1.000		

Create rating results file... View rating results file...

Close

The **Create rating results file...** button can be used to create a formatted report containing the results of the rating analysis.

LRT1 – Load Rating Tool Example

Permit Application Number:

Application Date: 12/6/2023

Requested By:

Processed Date: 12/6/2023 1:42:48 PM

Processed By: bridge

Minimum Allowable Rating Factor: 1.00

Comments:

Load Rating Tool Results Output

Vehicle	BID	Bridge ID	Route ID	Code	Description	Inventory rating factor	Operating rating factor	Permit rating factor	Controlling impact	Pass conditions	Analysis warnings
Type 3	11	RCTrainingBridge1	-1	1	Pass, no restrictions	1.286	2.148		1.000		

Vehicle Information

Vehicle name: Type 3

Description: AASHTO Type 3

Notional vehicle: False

Axle no.	Axle load (kip)	Gage distance (ft)	Wheel contact width (in)	Minimum axle spacing (ft)	Maximum axle spacing (ft)
1	16.00	6.00	14.1422		
2	17.00	6.00	14.5775	15.00	15.00
3	17.00	6.00	14.5775	4.00	4.00
Totals:	50.00			19.00	19.00