

AASHTOWare BrR 6.8

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***Load Rating Tool Tutorial***

*LRT1 – Load Rating Tool Example*

## LRT1 - Load Rating Tool

This example describes the use of the Load Rating Tool feature in BrR. *Note: At the time of this writing, the Load Rating Tool only supports high-speed ratings of multi-girder bridges which contain steel, reinforced concrete, and/or prestressed concrete members.*

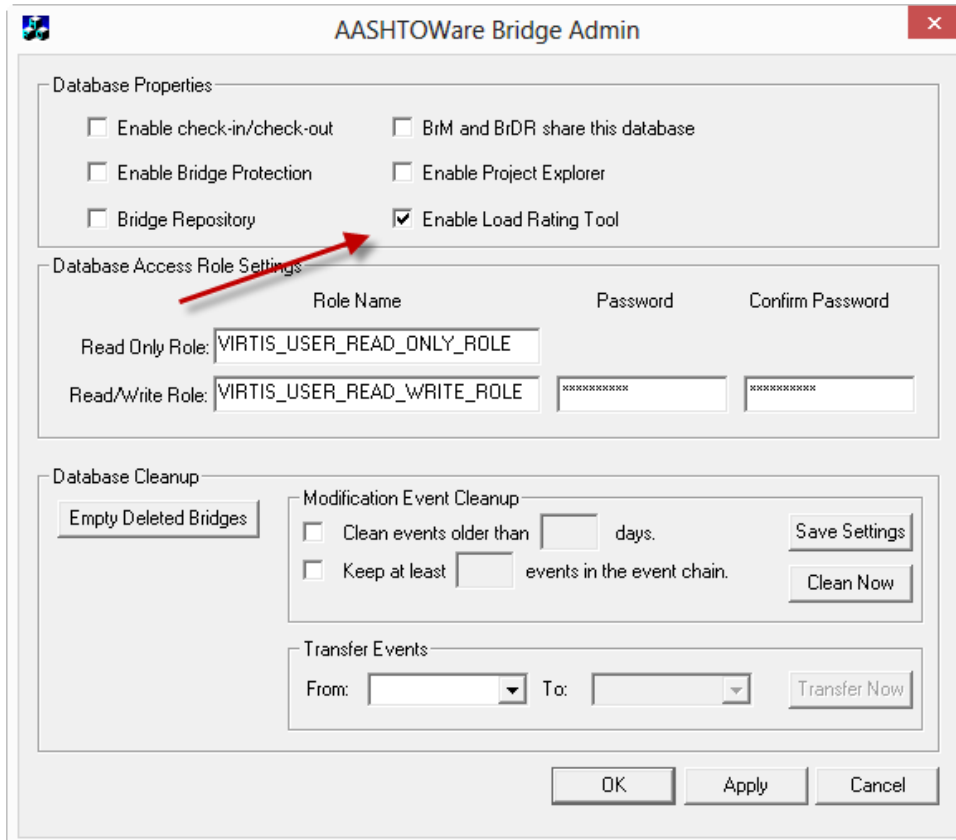
### Topics covered:

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

### Configuration

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 BrR product.*

To enable the Load Rating Tool, open the AASHTOWare Bridge Admin Utility from the start menu shortcut, login with the appropriate credentials, and select “Enable Load Rating Tool”. Press ‘OK’ or ‘Apply’ to accept the changes.

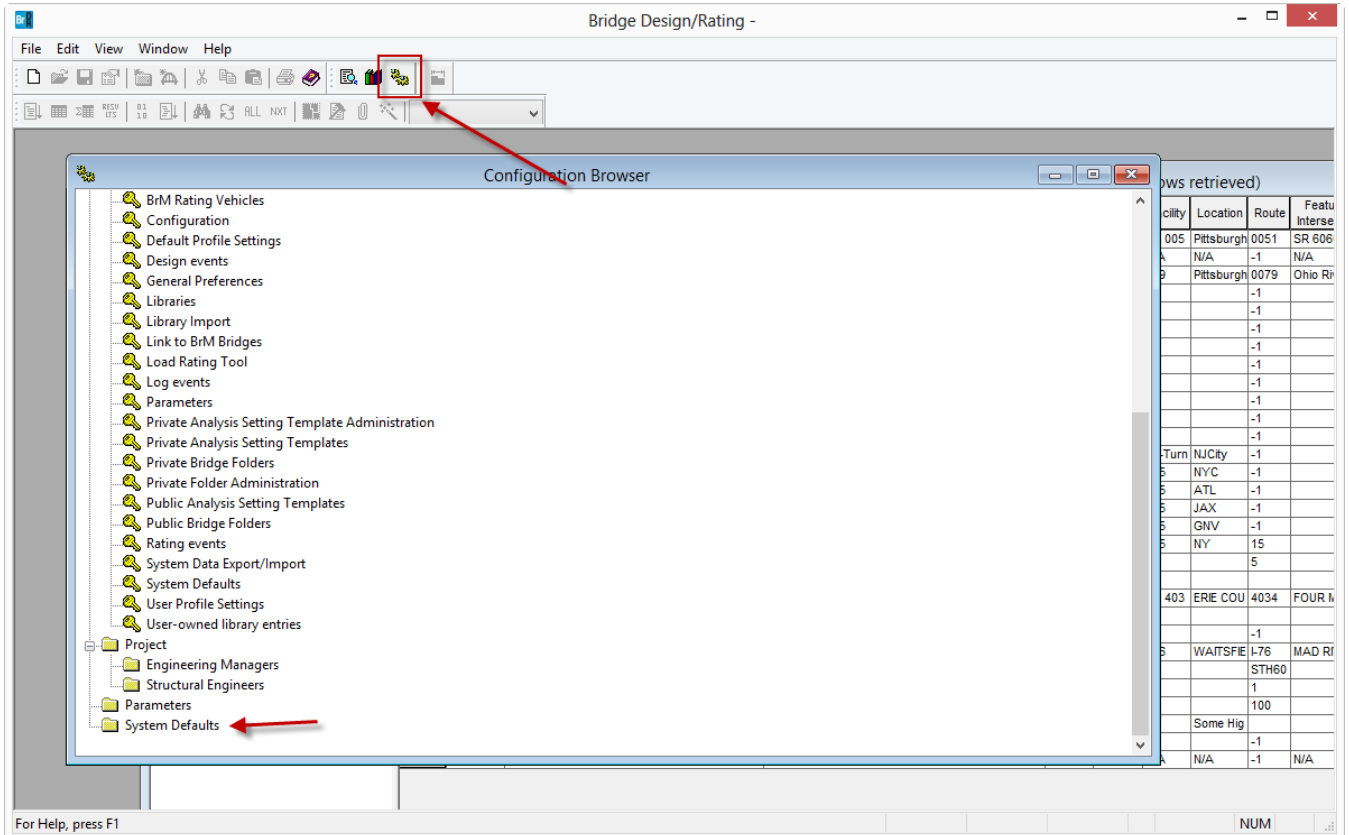


The screenshot shows the 'AASHTOWare Bridge Admin' window. It is divided into three main sections: 'Database Properties', 'Database Access Role Settings', and 'Database Cleanup'. In the 'Database Properties' section, the 'Enable Load Rating Tool' checkbox is checked, and a red arrow points to it. The 'Database Access Role Settings' section contains fields for 'Read Only Role' (VIRTIS\_USER\_READ\_ONLY\_ROLE) and 'Read/Write Role' (VIRTIS\_USER\_READ\_WRITE\_ROLE), along with password fields. The 'Database Cleanup' section includes options for 'Modification Event Cleanup' and 'Transfer Events'. At the bottom, there are 'OK', 'Apply', and 'Cancel' buttons.

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

The Load Rating Tool configuration can be accessed by selecting the Configuration Browser and then by opening the “System Defaults” window.



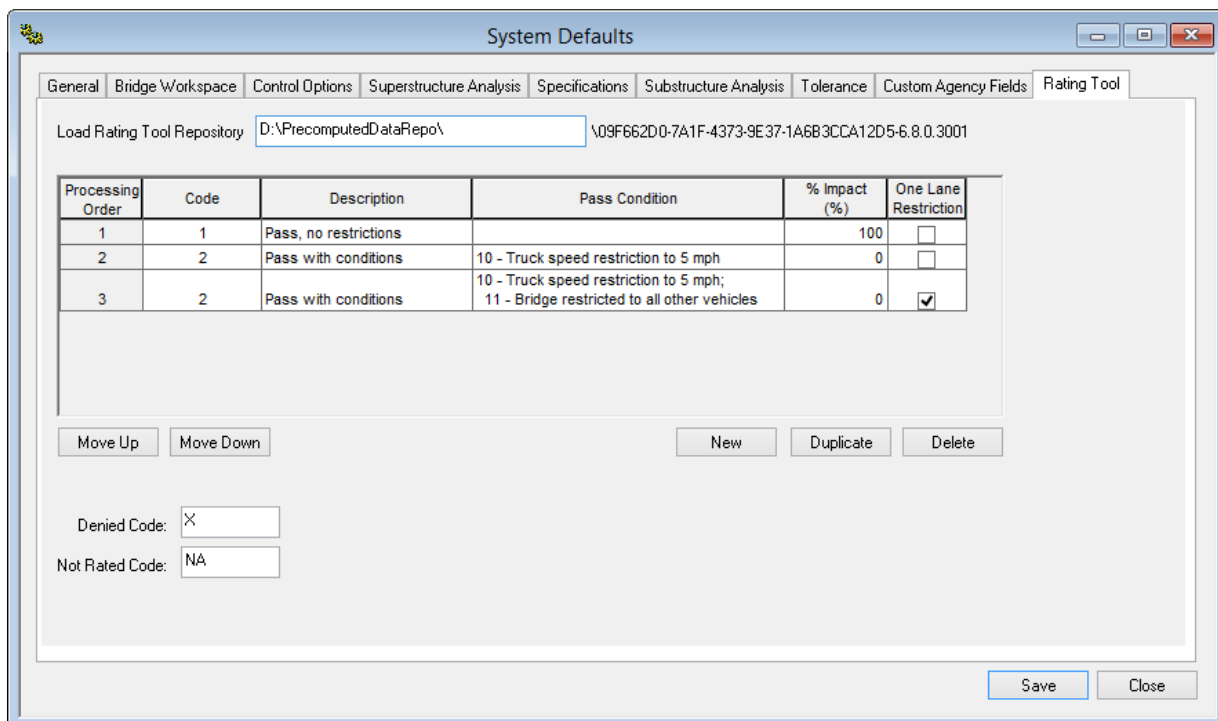
## LRT1 - Load Rating Tool

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

For the purpose of this tutorial, only the Load Rating Tool Repository location configuration will need to be set. The repository 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 of 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 throw an error that the precomputed data cannot be successfully saved.*

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.



System Defaults

General | Bridge Workspace | Control Options | Superstructure Analysis | Specifications | Substructure Analysis | Tolerance | Custom Agency Fields | Rating Tool

Load Rating Tool Repository: D:\PrecomputedDataRepo\ \09F662D0-7A1F-4373-9E37-1A6B3CCA12D5-6.8.0.3001

Processing Order	Code	Description	Pass Condition	% Impact (%)	One Lane Restriction
1	1	Pass, no restrictions		100	<input type="checkbox"/>
2	2	Pass with conditions	10 - Truck speed restriction to 5 mph	0	<input type="checkbox"/>
3	2	Pass with conditions	10 - Truck speed restriction to 5 mph; 11 - Bridge restricted to all other vehicles	0	<input checked="" type="checkbox"/>

Move Up | Move Down | New | Duplicate | Delete

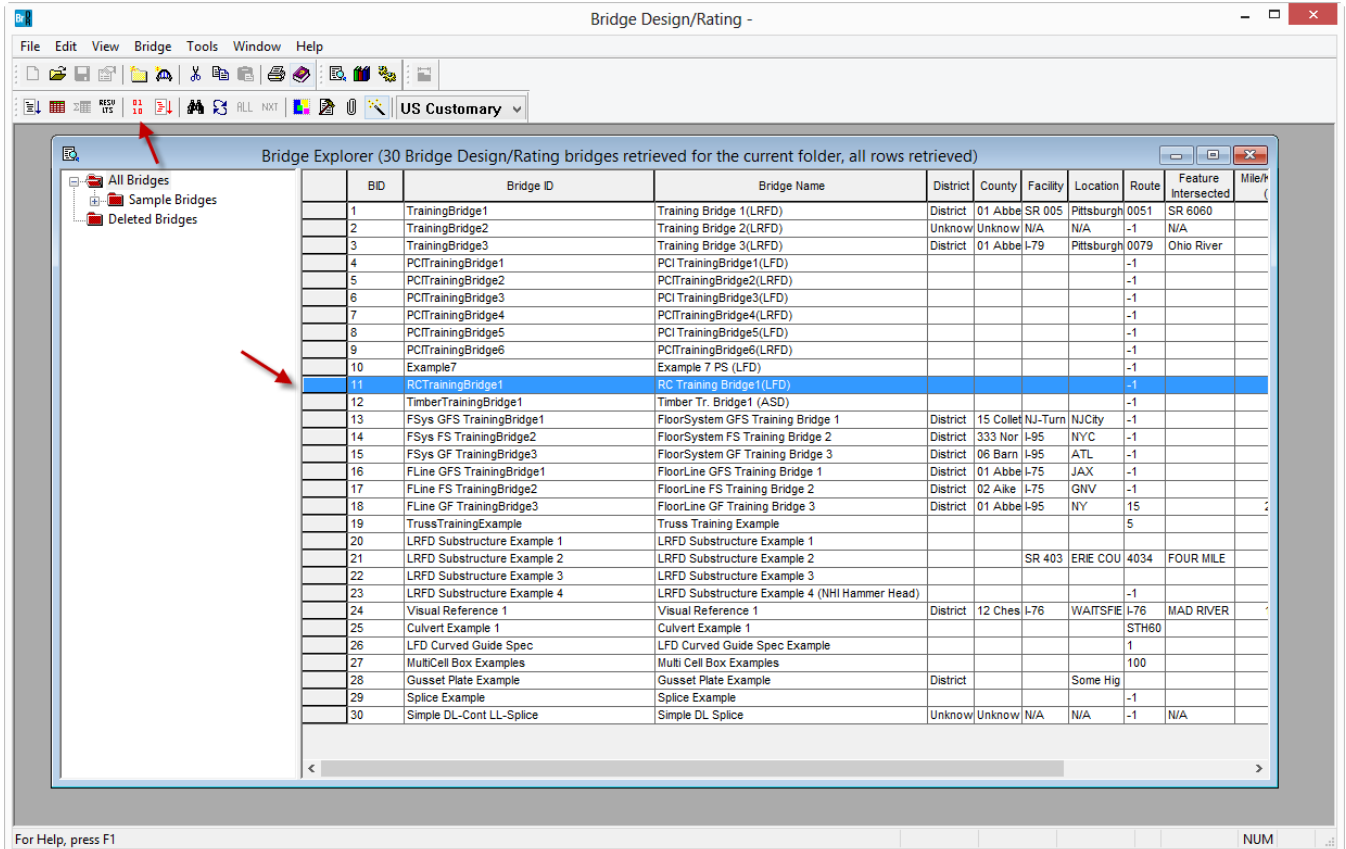
Denied Code: X

Not Rated Code: NA

Save | Close

## Precomputed Data

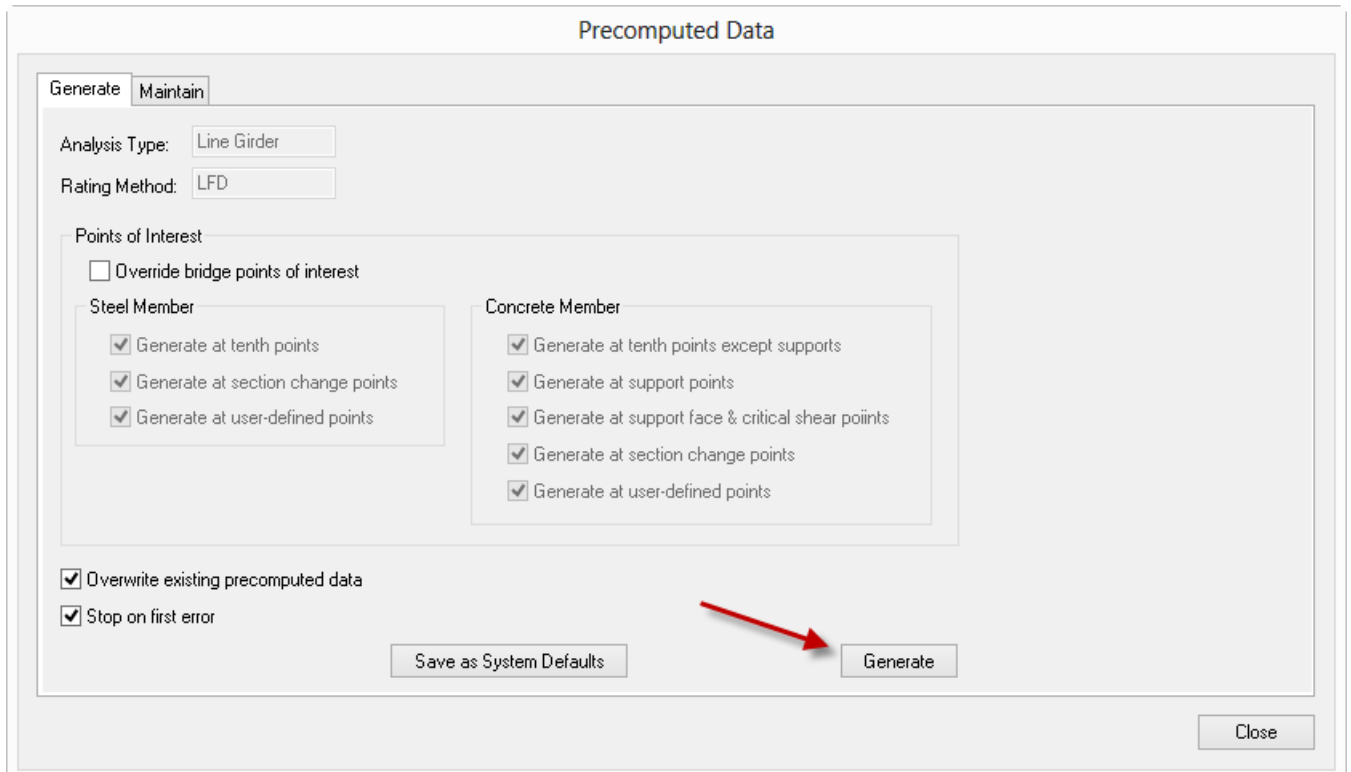
Generating precomputed data is the first step in using the Load Rating Tool. The precomputed data is required by the Load Rating Tool to perform near-instantaneous ratings, thus it is a required step in operation. To generate precomputed data, select bridges from the Bridge Explorer directly or by selecting a folder (list or query based). Once the bridges of interest are selected, press the precomputed data icon on the toolbar (see the arrow in the following figure).



## Generating Precomputed Data

The Generate tab, on the Precomputed Data dialog, is used to specify overrides and other miscellaneous options for the precomputed data analysis. No analysis template is required for this step.

For this tutorial, leave the options set as the defaults and press the Generate button. This will open the Analysis Progress dialog and generate precomputed data for the selected bridges. Once the analysis is complete, close the Analysis Progress dialog and return to the Bridge Explorer.

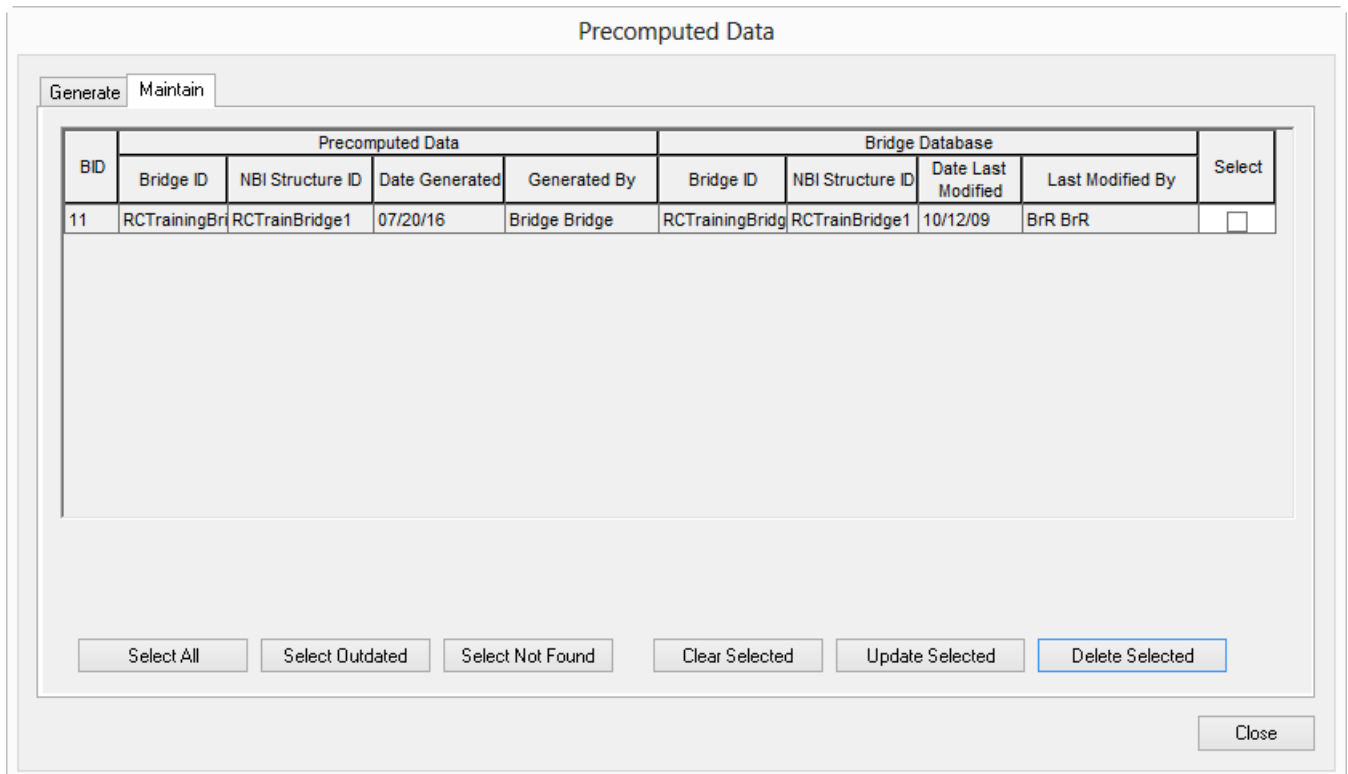


### Maintaining Precomputed Data

Reopen the Precomputed Data window by clicking the Precomputed Data button on the toolbar. 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” could be pressed to regenerate the precomputed data for those bridges.

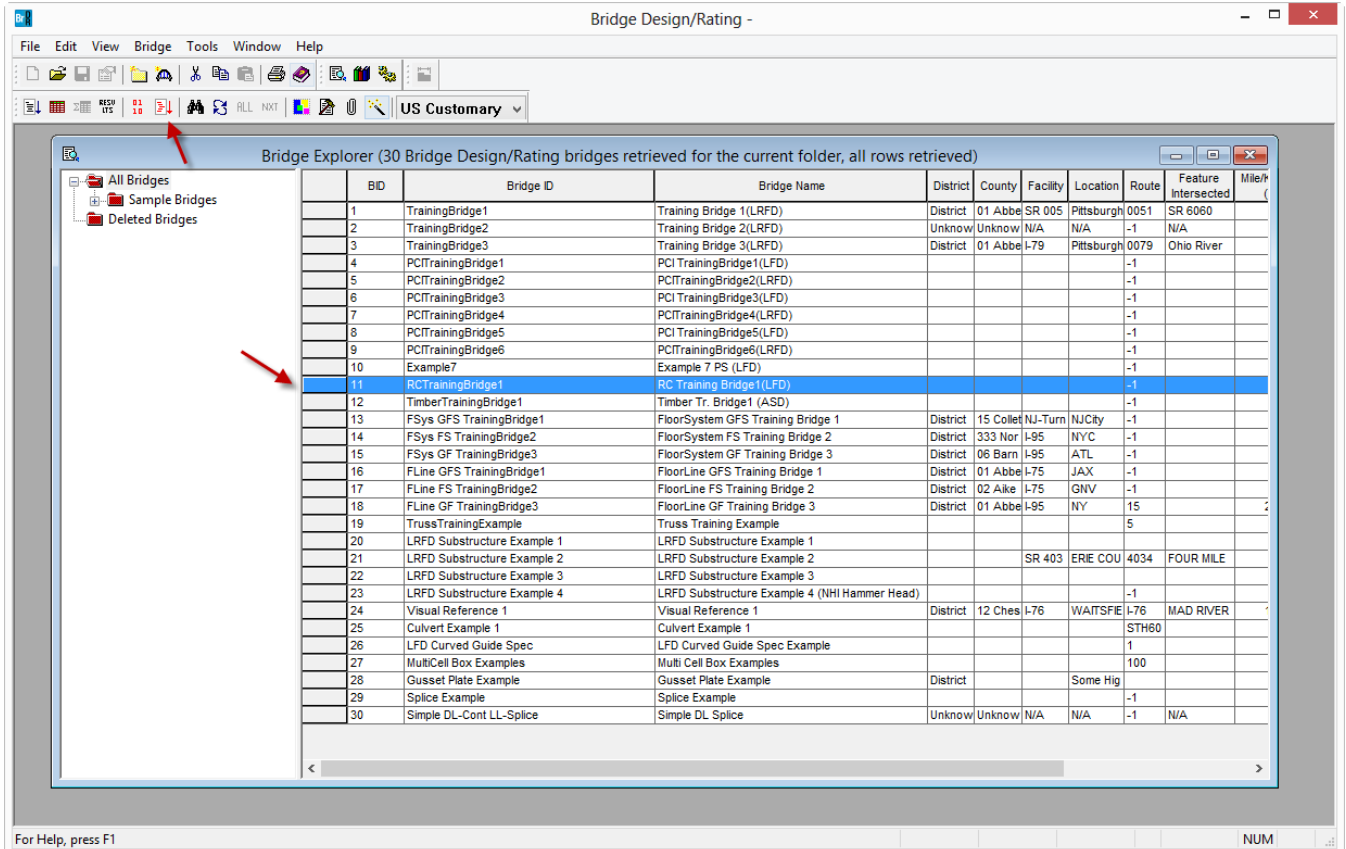
Press the “Close” button to return to the Bridge Explorer.



## Operation

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 press the Load Rating Tool icon on the toolbar (see the arrow in the following figure) to open the tool.

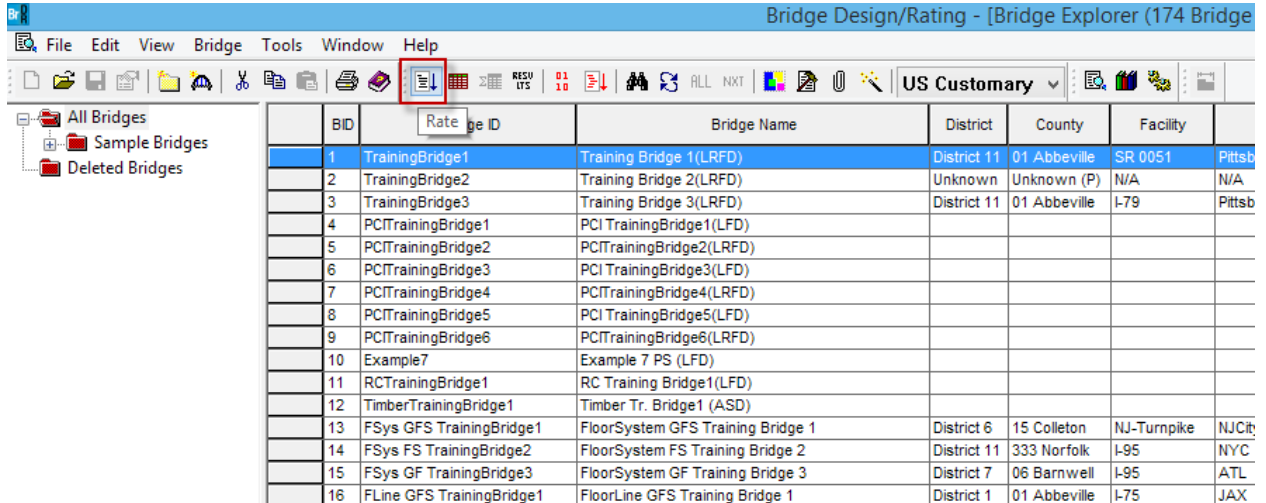




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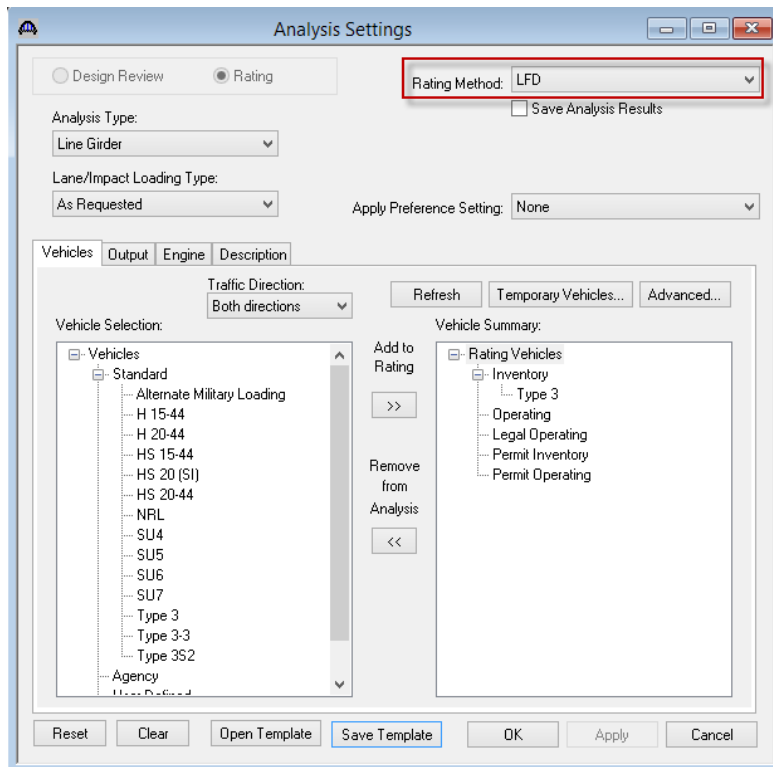
The Load Rating Tool window shows several attributes specific to the rating event along with several configuration options. The only required items for rating are a minimum allowable rating factor and an LFD template with only Inventory and Operating vehicles.

To create a LFD template, click on the Analysis Settings (Rate) icon from the bridge explorer.



BID	Bridge ID	Bridge Name	District	County	Facility	
1	TrainingBridge1	Training Bridge 1(LRFD)	District 11	01 Abbeville	SR 0051	Pittsb
2	TrainingBridge2	Training Bridge 2(LRFD)	Unknown	Unknown (P)	N/A	N/A
3	TrainingBridge3	Training Bridge 3(LRFD)	District 11	01 Abbeville	I-79	Pittsb
4	PCITrainingBridge1	PCI TrainingBridge1(LRFD)				
5	PCITrainingBridge2	PCI TrainingBridge2(LRFD)				
6	PCITrainingBridge3	PCI TrainingBridge3(LRFD)				
7	PCITrainingBridge4	PCI TrainingBridge4(LRFD)				
8	PCITrainingBridge5	PCI TrainingBridge5(LRFD)				
9	PCITrainingBridge6	PCI TrainingBridge6(LRFD)				
10	Example7	Example 7 PS (LFD)				
11	RCTrainingBridge1	RC Training Bridge1(LRFD)				
12	TimberTrainingBridge1	Timber Tr. Bridge1 (ASD)				
13	FSys GFS TrainingBridge1	FloorSystem GFS Training Bridge 1	District 6	15 Colleton	NJ-Turnpike	NJCity
14	FSys FS TrainingBridge2	FloorSystem FS Training Bridge 2	District 11	333 Norfolk	I-95	NYC
15	FSys GF TrainingBridge3	FloorSystem GF Training Bridge 3	District 7	06 Barnwell	I-95	ATL
16	FLine GFS TrainingBridge1	FloorLine GFS Training Bridge 1	District 1	01 Abbeville	I-75	JAX

Choose LFD as the rating method and select a vehicle for Inventory and/or Operating.



Analysis Settings

Design Review  Rating

Rating Method: LFD

Save Analysis Results

Analysis Type: Line Girder

Lane/Impact Loading Type: As Requested

Apply Preference Setting: None

Vehicles Output Engine Description

Traffic Direction: Both directions

Refresh Temporary Vehicles... Advanced...

Vehicle Selection:

- Vehicles
  - Standard
    - Alternate Military Loading
    - H 15-44
    - H 20-44
    - HS 15-44
    - HS 20 (SI)
    - HS 20-44
    - NRL
    - SU4
    - SU5
    - SU6
    - SU7
    - Type 3
    - Type 3-3
    - Type 3S2
    - Agency

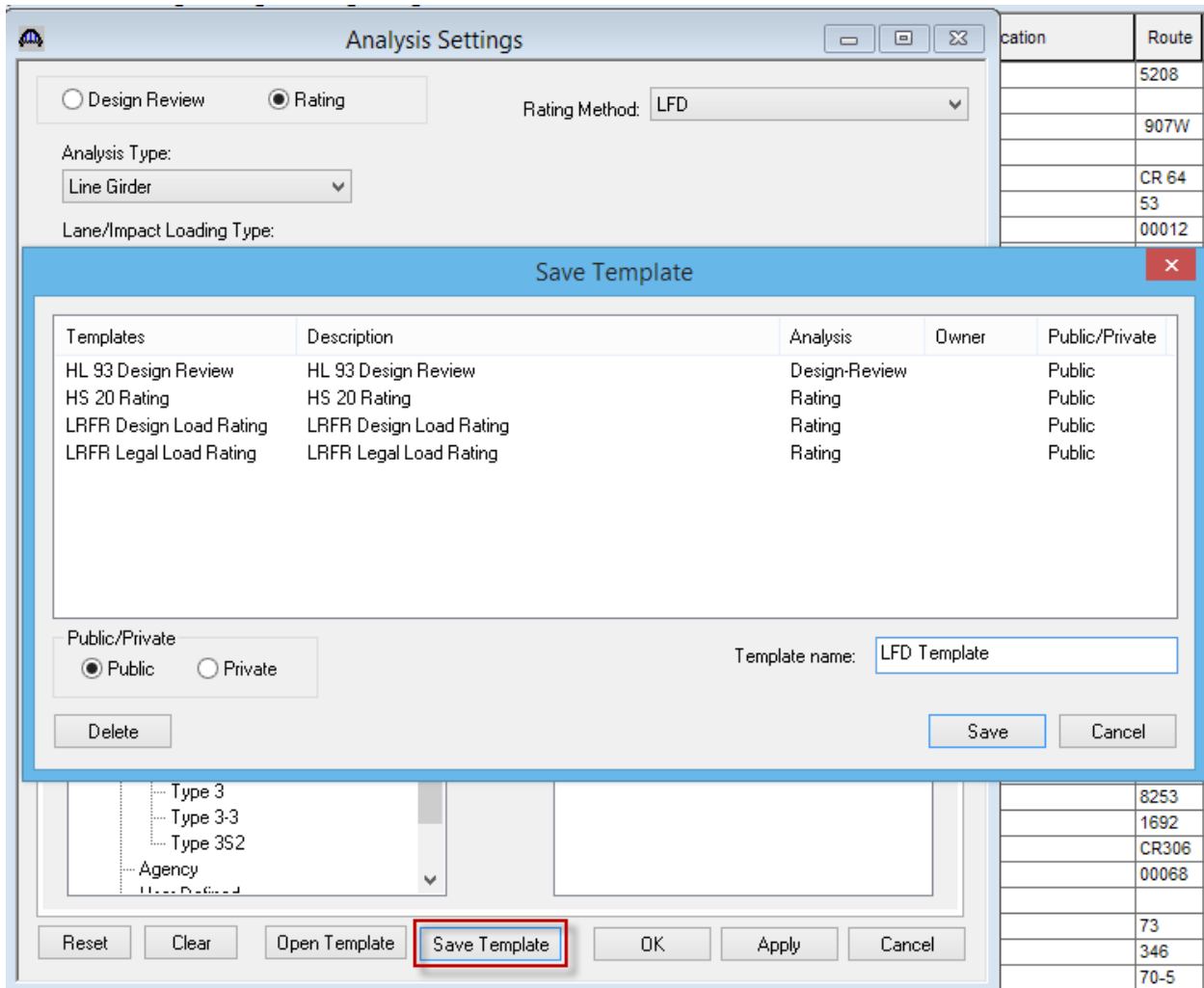
Vehicle Summary:

- Rating Vehicles
  - Inventory
  - Operating
  - Legal Operating
  - Permit Inventory
  - Permit Operating

Reset Clear Open Template Save Template OK Apply Cancel

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Click on the Save Template button and save the template with a given name as follows.



The purpose of opening the analysis settings window here is to create a template and not run an analysis so click cancel to close the window.

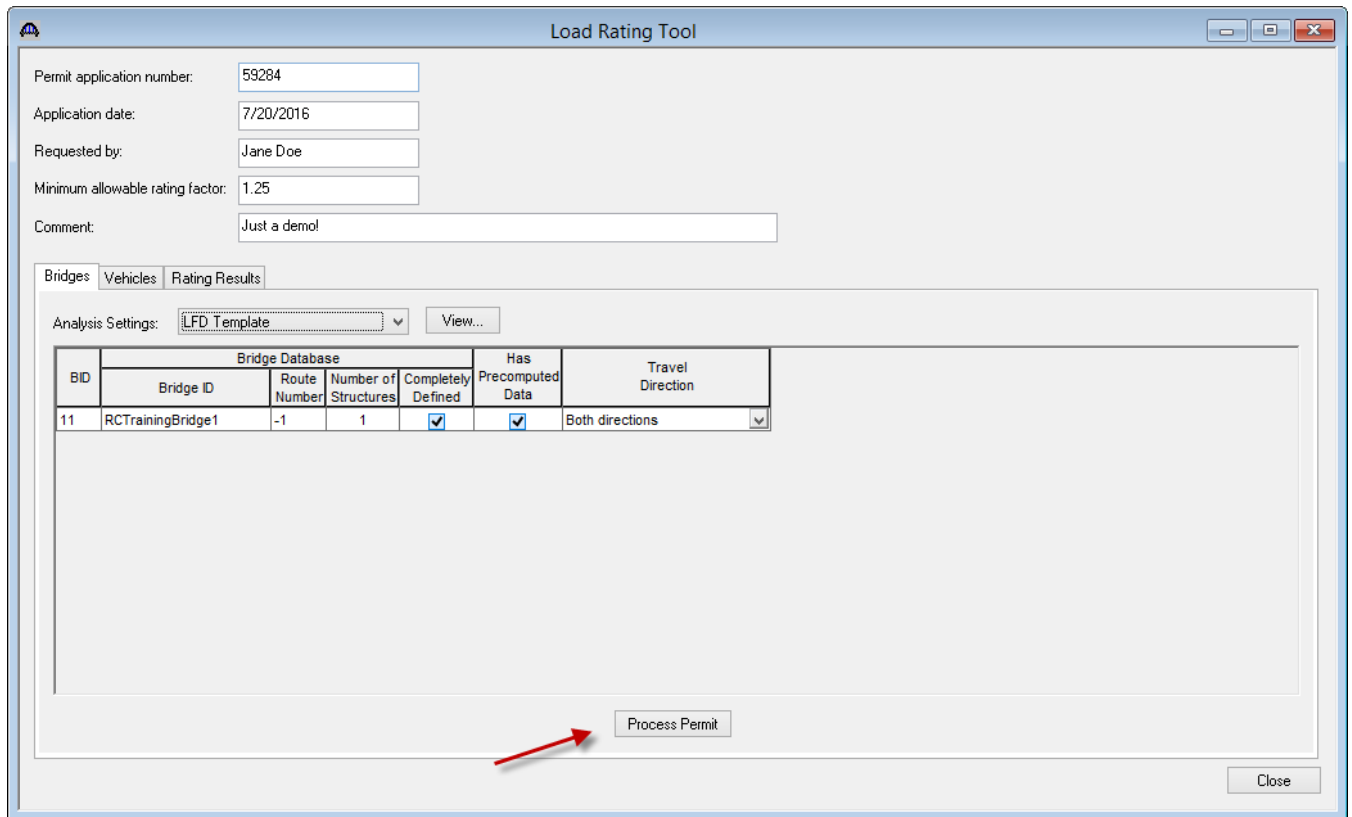
Your predefined LFD template is now available in the Analysis Settings drop-down box of the Load Rating Tool window.

Pressing 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

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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.



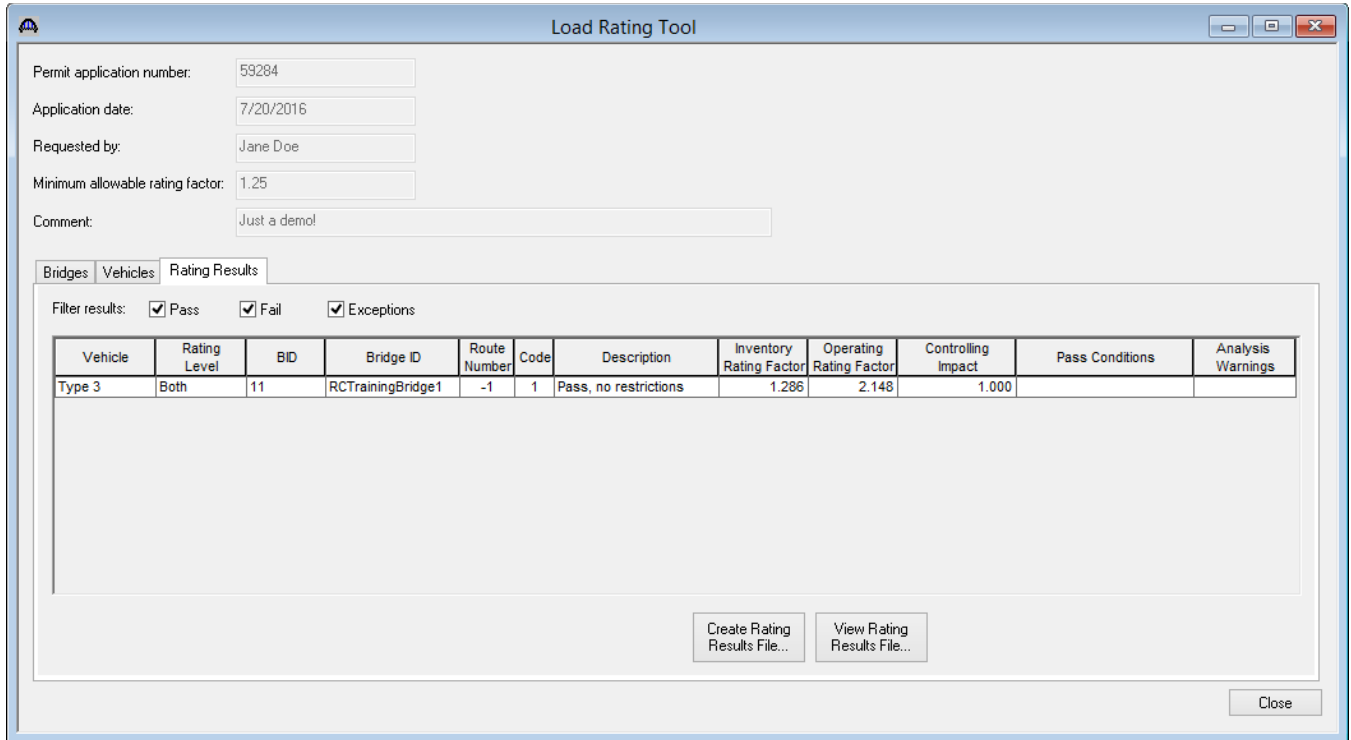
The screenshot shows the 'Load Rating Tool' window. At the top, there are input fields for permit information: Permit application number (59284), Application date (7/20/2016), Requested by (Jane Doe), Minimum allowable rating factor (1.25), and a Comment field (Just a demo!). Below these is a tabbed interface with 'Bridges', 'Vehicles', and 'Rating Results' tabs. The 'Bridges' tab is active, showing 'Analysis Settings' set to 'LFD Template' and a 'View...' button. A table titled 'Bridge Database' contains the following data:

BID	Bridge Database			Completely Defined	Has Precomputed Data	Travel Direction
	Bridge ID	Route Number	Number of Structures			
11	RCTrainingBridge1	-1	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Both directions

At the bottom of the window, there is a 'Process Permit' button with a red arrow pointing to it, and a 'Close' button in the bottom right corner.

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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.



The “Create Rating Results File...” button can be used to create a formatted report containing the results of the rating analysis.

