Introduction

This document describes all of the vehicles to be evaluated for simple and continuous spans, including Advanced settings where required. Information on archived (voided) VDOT practices and vehicles can be found starting on page 11.

When LFR is used to determine the Safe Posting Load, all vehicles shown below shall be rated except the HL-93 (US) vehicle. However, when LFR is used to determine the Safe Posting Load, the Default rating method shall be set to LRFR in the final .xml file submitted to VDOT for each Member Alternative.

Ratings shall be performed using the AASHTO engines (AASHTO LRFR and AASHTO LFD) exclusively using the System Defaults unless approved by VDOT.

Note the following:

1. Users may need to split the vehicle templates shown below into multiple analysis runs for large structures and/or complex bridge types (i.e. large number of girders/spans and/or units of multiple bridge types) where virtual memory problems are encountered.

2. As per VDOT’s current IIM-S&B-86, fatigue analysis and fatigue evaluation are not required when performing load rating analysis.

3. NRL, SU4, SU5, SU6 and SU7 in the Standard library are the exact same vehicles as NRLv, SU4v, SU5v, SU6v and SU7v in the Agency library. The Specialized Hauling Vehicles (SHVs) in the Standard library are marked for LRFR only and cannot be edited. The SHVs in the Agency library are marked for LRFR and LFR.

4. As per FHWA Memorandum titled “Load Rating for the FAST Act’s Emergency Vehicles” dated Nov. 3, 2016, two FAST Act vehicles (EV2 and EV3) have been added to VDOT load rating templates.
Creating VDOT LRFR Vehicle Analysis Templates:

1. Highlight a structure in the Bridge Explorer and click on the Analysis Setting icon (paper sheet with down arrow circled in red below).
2. The Analysis Settings window opens with the default Rating Method set to LFD. Using the drop down menu, change the selection to LRFR.
3. Note that the Vehicle Summary Tree changes to LRFR options.
4. Using the Add to Rating and Remove from Analysis buttons, make the selections in the Vehicle Summary shown below.

For inclusion of EV vehicles under Agency, refer to FAST ACT VEHICLES EV2 AND EV3 SETUP document.
5. Click the **Advanced** button. VDOT’s BP-115 and BP-90 are blanket permit vehicle configurations, change the frequency from **Single Trip** to **Unlimited Crossings** for both.

Note: By changing the frequency to Unlimited Crossing BrR will not consider the adjacent vehicle (SU7v) for BP-115 and BP-90 under LRFR permit analysis.
6. For all FAST Act vehicles, mark the box for **Override**, and enter the factors as shown for **Permit Live Load Factor**. For adjacent vehicle to be included in the analysis, a live load factor must be entered in a vehicle properties window. Enter 1.3 for **Adjacent vehicle live load factor**.

For explanation of the Permit Live Load Factors, refer to FAST ACT VEHICLES EV2 AND EV3 SETUP document.

Click **OK**. In the Analysis Settings window, click the **Save Template** button.

7. Call this template “VDOT LRFR EV Simple < 200 ft” and click **Save**.
8. To make the second LRFR template, add **Lane-Type Legal Load** to the Routine Legal Load Rating folder as shown below. The previous changes made to the Vehicle Properties for VDOT's blanket permit vehicles using the Advanced button are still active and no additional Advanced changes are required.

Click the **Save Template** button.
9. Call this template “VDOT LRFR EV Simple > 200 ft” and click **Save**.

10. To make the third LRFR template, no additional vehicles need to be added. Click the **Advanced** button and check the **Legal Pair** box for the **Lane-Type Legal Load**.

Click **OK** to save the selection. In the Analysis Settings window, click the **Save Template** button.
11. Call this template “VDOT LRFR EV Continuous” and click Save.

12. These LRFR templates can be selected from the Analysis Settings window by clicking on the Open template button, selecting the template required and clicking Open.
Archived (Voided) VDOT Practices and Vehicles:

The changes noted below resulted from software enhancements and/or changes to VDOT practices.

1. The AASHTO engines do not limit the number of vehicles that can be included in a rating analysis. The past practice (prior to Version 6.3) of splitting a rating for continuous spans into two analysis runs is no longer necessary.

2. **VA Single** and **VA Semi** vehicles were renamed to **VA Type 3** and **VA Type 3S2** to match VDOT’s current IIM-S&B-86.1.

3. **Blanket Permit 90 (BP-90)** and **Blanket Permit 115 (BP-115)** were renamed **BP-90** and **BP-115** to match VDOT’s current IIM-S&B-86.1. The Frequency for both these permit vehicles must be changed to **Unlimited Crossings** using the **Advanced** button.

4. The **HL-93 – Negative Moments** vehicle was removed from VDOT’s current library import. This Live Load Type is included in the **HL-93 (US)** vehicle found in the Standard library, 90%(Truck Pair + Lane). Rating results for structures run from the Bridge Explorer, will display the controlling inventory and operating rating for the **HL-93 (US)** vehicle only. Rating results for structures/members run from the Bridge Workspace will display the results for the various Live Load Types comprising the **HL-93 (US)** vehicle as seen below.
5. The HS-20-Lane Load Only, HS-20-Truck Only and HS-20-Tandem vehicles were removed from VDOT’s current library import. The first two vehicles were previously rated for informational purposes, but are no longer required. The HS-20-Tandem is a required vehicle for VDOT design, but not for load rating. The first two vehicles are included in the HS 20-44 vehicle found in the Standard library, Lane and Axle Load. Rating results for structures run from the Bridge Explorer, will display the controlling inventory and operating rating for the HS 20-44 vehicle only. Rating results for structures/members run from the Bridge Workspace will display the results for the various Live Load Types comprising the HS 20-44 vehicle.

6. Lane Legal Load-Negative Moment vehicle was removed from VDOT’s current library import. Lane-Type Legal Load in the Standard library shall be rated for a simple span over 200 feet in length. Lane-Type Legal Load in the Standard library shall be rated for all continuous spans using the Advanced button to check the box for Legal Pair. Rating results for structures run from the Bridge Explorer, will display the controlling inventory and operating rating for the Lane-Type Legal Load vehicle only. Rating results for structures/members run from the Bridge Workspace will display the results for the various Live Load Types comprising the Lane-Type Legal Load vehicle.
<table>
<thead>
<tr>
<th>Lane Type Level Load</th>
<th>Live Load Type</th>
<th>Rating Method</th>
<th>Rating Level</th>
<th>Load Rating (Ton)</th>
<th>Rating Factor</th>
<th>Location (ft)</th>
<th>Location Span (%</th>
<th>Limit State</th>
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</thead>
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<td>1.0</td>
<td>0 (0.0)</td>
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