

# PennDOT e-Notification

Bureau of Solutions Management  
Highway Applications Division



---

## FBLRFD

No. 008  
March 4, 2024

## Release of Version 1.8.0.0

---

The Department's Floorbeam Analysis and Rating (FBLRFD) program has been revised as described in the attached "Summary of December 2023 Revisions – Version 1.8.0.0".

The new version has been placed on PENNDOT servers for use by the Districts. Consultants and others, who have a current license agreement for **FBLRFD Version 1.7.0.0**, can obtain the updated version by submitting an [Update Form](#) along with an **update fee of \$500 for private organizations and \$50 for governmental agencies**. Updates for **FBLRFD Version 1.6.0.0 or earlier** will require an **additional fee**. For FBLRFD update fee details, refer to the [FBLRFD Fee Schedule](#). The update fee is waived for federal and state transportation agencies.

Once payment is received, an e-mail will be sent with download instructions. A valid e-mail address must be provided on the Update Form to receive the download instructions.

If software is requested the first week of the release please be aware that it will take a week or two to process due to the increase in volume of requests.

Please direct any questions concerning the above to:

**Nicole Avalon** | AMS Highway Permit Admin (HPA) Engineer Business Analyst  
PA Office of Administration | Infrastructure and Economic Development  
Bureau of Solutions Management | CAI AMS Highway Admin Team  
400 North Street, 5<sup>th</sup> Floor | Harrisburg, PA 17120  
Mobile: 805.504.6848  
[www.oa.pa.gov](http://www.oa.pa.gov)

Attachment

---

Archived copies of all previously distributed e-Notifications can be obtained from the PennDOT LRFD and Engineering Programs website at <http://penndot.engrprograms.com/home> and clicking on "e-Notification" and then "Mailing List Archives."

## SUMMARY OF DECEMBER 2023 REVISIONS - VERSION 1.8.0.0

Since the release of FBLRFD Version 1.7.0.0, several revision requests and user requested enhancements have been received. This release of FBLRFD Version 1.8.0.0 contains the following revisions and enhancements.

### Program Input Revisions

1. Users can now input minimum load factors for Strength limit states for MC1 and MC2 loads on the LDF command. These minimum load factors are only used by the program to compute the minimum factored reaction for each limit state. If not entered by the user, the minimum load factors for MC1 and MC2 will default to 0.0. Any input files with MC1 or MC2 loads may need to be revised to provide minimum load factors other than 0.0 (Request 100).
2. The number of special live loads available in a single run has been increased from five to eight (Request 288).
3. The floorbeam concentrated loads (FCL), stringer concentrated loads (SCL), floorbeam distributed loads (FDL), and stringer distributed loads (SDL) commands have been revised to allow the user to specify non-composite and composite utility loads (UT1 and UT2). The DW load factor is applied to all these loads (Request 402).
4. The average of the floorbeam spacing has been reimplemented in the program as an absolute upper bound on the effective slab width, and the method used for calculating the effective slab width has been added to the ADDITIONAL SECTION PROPERTIES tables (Request 432).
5. On the MAT command, if the tensile strength is left blank, the program will attempt to set a default value of tensile strength based on the input yield strength. If the input yield strength is shown on Table 6.4.1-1 in the LRFD Specifications the program will set the tensile strength equal to the value shown on the table. If the input yield strength is not shown on the table, the program will stop with an error and the user must enter the tensile strength. If the input yield strength is greater than the input tensile strength, the tensile strength will be set to be equal to the yield strength (Request 457).
6. The lower limit of brace spacing (BRP command) has been increased to 1 foot. As a result, if the user enters a brace spacing of zero, the program will stop with an input error and stop rather than crashing (Request 460).
7. Output reports not directly related to rating factor calculations will no longer print with vehicles that are included in a program run for rating purposes only. For example, for analysis live load code A, the ML-80 vehicle is rating-only vehicle and previously had output reports and specification checks included in the output such as WEB SPECIFICATION CHECK which are not utilized to calculate a rating for the rating vehicles (Request 466).
8. Formatted output reports for the OUTPUT OF INPUT DATA (OIN), OUTPUT OF SECTION PROPERTIES (OSP), OUTPUT OF ANALYSIS RESULTS (OAN), OUTPUT OF SPECIFICATION CHECKS (OSC), and OUTPUT OF RATING FACTORS (ORF) commands have been added to the program to allow users to see which output reports have been turned on or off for a given run of the program (Request 468).

9. The section resistance corresponding to the controlling rating (Flexure or Shear) has been added as a new line on the BRIDGE LOAD RATINGS output report (Request 489).
10. An input for the classification strength of the weld metal has been added to the BST command for the weld size calculation for Bearing Stiffener analysis. (Request 492).
11. The User's Manual and program output have been revised to make clear that when DC2, FWS, MC2, sidewalk dead load, or additional FWS loads are entered for a beam that is non-composite in the final state, the loads are always applied to the non-composite, steel-only section. (Request 495).
12. Input parameters without a default value are now indicated as such in the Engineering Assistant configuration files (shown as "Default: None"). For the parameters that have a default value in UM and the FBLRFD.PD but not in the configuration files, the default values have been added to the configuration files. The mismatched default values have been updated in either the UM or the FBLRFD.PD to maintain consistency (Request 497).
13. The legend for bend-buckling coefficient has been added to the UNCURED SLAB FLANGE SPECIFICATION CHECK (NO LTB) (PART 1) output report and updated on the SERVICE LIMIT STATE - WEB BEND-BUCKLING output report (Request 500).
14. The web concentrated load checks, previously implemented for rolled beams only, are now also applied to plate girders and built-up sections (Request 502).
15. The program has been modified to use the depth between rivets/bolts for the web proportion check (Request 503).
16. The program has been revised to no longer attempt to recreate a PDF file from an existing OUT file when the program licensing check fails. Previously, the program would attempt to create a new PDF from an older OUT file in this situation, and to do the PDF creation with incorrect parameters for font size, resulting in improperly formatted PDFs from potentially out-of-date program output (Request 504). **NOTE: THIS WILL NOT APPEAR IN THE USER'S MANUAL.**
17. The program has been revised to print the proper column headings for the DEAD LOADS output when the DEAD LOADS output extends to more than one page. Previously the column headings would be incorrect for floorbeams with stringers when the report extended to more than one page (Request 506).
18. The program has been revised to use the built-up section effective flange dimensions described in the User's Manual section 3.3.4 for the flange proportion checks on the DUCTILITY AND WEB/FLANGE PROPORTION CHECK output report (Request 513).
19. A program crash during self-weight calculations has been resolved by internally combining adjacent ranges of self-weights with identical load magnitudes (Request 514).

20. A typographical error in the program source code has been resolved that now allows the minimum rating factors to be reported on the RATING FACTORS – MOMENT FLEXURAL CAPACITY table. An error in calculating rating factors due to net section fraction has been fixed for the RATING FACTORS – STRESS FLEXURAL CAPACITY table. (Request 515).
21. The program will print “N/A” for the unfactored flexural stresses due to pedestrian live load (PL) for limit states other than Strength-IP (Request 517).
22. The OAN, OIN, ORF, OSC, and OSP commands can now be entered as blank commands (i.e., just the command name and nothing else on the line) and the program will take all defaults for the command. This will only work with the specified output commands (Requests 501 and 519).
23. A Chief Bridge Engineer warning has been added to the input validation for floorbeams deeper than 14 ft, as per DM-4 Section 6.10.1. (Request 520).
24. The proposed reviewer’s changes to Chapter 2 have been made to the User Manual. Additionally, changes were made in Chapters 5 and 7 to correctly identify changes made for the current development. (Request 495b)  
**NOTE: THIS WILL NOT APPEAR IN THE USER’ MANUAL.**
25. The Resolution report was modified to include a procedure to create the original issue. (Request 504b) **NOTE: THIS WILL NOT APPEAR IN THE USER’S MANUAL.**
26. This change made the self-weight load processing in FBLRFD consistent with the processing method used by STLRFD. (Request 514b) **NOTE: THIS WILL NOT APPEAR IN THE USER’S MANUAL.**
27. Users can now input minimum load factors for Strength limit states for MC1 and MC2 loads on the LDF command. These minimum load factors are only used by the program to compute the minimum factored reaction for each limit state. If not entered by the user, the minimum load factors for MC1 and MC2 will default to 0.0. Any input files with MC1 or MC2 loads may need to be revised to provide minimum load factors other than 0.0 (Requests 100, 533).
28. The number of special live loads available in a single run has been increased from five to eight (Requests 288, 534).
29. The lower limit of brace spacing (BRP command) has been increased to 0.05 feet. As a result, if the user enters a brace spacing of zero, the program will stop with an input error and stop rather than crashing (Requests 460, 535).

30. On the MAT command, if the tensile strength is left blank, the program will set a default value of tensile strength based on the input yield strength. If the input yield strength is shown on Table 6.4.1-1 in the LRFD Specifications or on Table 6A.6.2.1-1 in the Manual for Bridge Evaluation, the program will set the tensile strength equal to the value shown on the table, otherwise the tensile strength will be set based on the values in the Table 5.13-1 of the User's Manual. If the input yield strength is greater than the input tensile strength, the tensile strength will be set to be equal to the yield strength. (Requests 457, 536).
31. The program has been revised to use the built-up section effective flange dimensions described in the User's Manual section 3.3.5 for the flange proportion checks on the DUCTILITY AND WEB/FLANGE PROPORTION CHECK output report. Section 3.3.5 of the User's Manual has been revised to clarify that the "b" dimensions are computed from the edge of bolt or rivet holes. (Request 513, 537)
32. The program now runs to completion for Multiple Live Load Placement runs that include the PHL-93 vehicle with a Special Live Load vehicle. Previously, Multiple Live Load Placement runs with PHL-93 and Special Live Load vehicles resulted in a program crash. (Request 538)

### **Program Output Revisions**

33. An output switch that provides the load ratings with and without FWS has been added to command ORF (Request 296).

### **Program Documentation Revisions**

34. There are 5 parameters that are no longer used by the program. The User's Manual, config files, the PD file, and some source codes for the parameters have been updated for FBREV480 and FBREV494, so that the users are informed that these parameters are no longer used. (Request 453).
35. The descriptions of the Special Live Loading (SLL) and Special Axle Load (SAL) commands have been revised to make sure the user is aware that they are able to enter revised load factors for each defined special live load (Request 498).
36. Additional text has been added to the transverse stiffener (TST) and bearing stiffener (BST) commands in the EngAsst configuration files and FBLRFD User's Manual to reiterate that the program does not consider a defined bearing stiffener to also act as a transverse stiffener. If a bearing stiffener is also to be considered as a transverse stiffener, it must be defined on both the BST and TST commands (Request 518).
37. The FAX number from Chapter 9 of the User's Manual and the revision request form has been removed as it is no longer monitored (Request 521).
38. Windows 8.1 operating system has been removed from the User's Manual as a supported operating system. (Request 532).

## User's Manual Revisions

39. The revisions for Chapter 5 now include all the pages for the Section 5.25 (SDL Command). Track changes for Chapter 7, Section 7.5.2, 7.5.7, 7.5.20, and 7.5.158, correctly indicate the revisions made. (Request 539)

**NOTE: THIS WILL NOT APPEAR IN THE USER'S MANUAL.**

40. The program has been revised to use the built-up section effective flange dimensions described in the User's Manual section 3.3.5 for the flange proportion checks on the DUCTILITY AND WEB/FLANGE PROPORTION CHECK output report. Section 3.3.5 of the User's Manual has been revised to clarify that the edge distances are measured from the center of the holes. (Requests 513, 537, 540)

## Requests Do Not Need Revision

41. With the implementation of "FBREV402 - Add UT1 and UT2 loads for noncomposite and composite utility loads", these User's Manual changes are no longer necessary (Request 401). **NOTE: THIS WILL NOT APPEAR IN THE USER'S MANUAL**

42. When all program output is turned off via the OIN, OSP, OAN, OSC, and ORF input commands, the only output should be the warning messages generated from input processing and the SPECIFICATION CHECK WARNINGS and SPECIFICATION CHECK FAILURES output reports. FBLRFD's behavior is as expected (Request 458). **NOTE: THIS WILL NOT APPEAR IN THE USER'S MANUAL.**

43. The two Chief Bridge Engineer warnings remaining in FBLRFD have not been changed to District Bridge Engineer (DBE) warnings because there is no corresponding DBE advisory in BC-753M or DM-4 (Request 485). **NOTE: THIS WILL NOT APPEAR IN THE USER'S MANUAL**

44. In SHCPRE.FOR, Q and I are calculated based on the state of flexure of the beam (positive or negative). Results using the composite "n" section properties over the entire length of the girder were found to be overly conservative. The program has not been changed. (Request 496) **NOTE: This will not appear in the User's Manual.**

45. This request is a duplicate of FBREV519. The OAN, OIN, ORF, OSC, and OSP commands can now be entered as blank commands (i.e., just the command name and nothing else on the line) and the program will take all defaults for the command. This will only work with the specified output commands (Request 501).

## Requests on Hold

46. A request regarding adding reaction summary tables is on hold because it is not clear that which reactions tables are helpful for engineers when they analyze and design floorbeams (Request 111).

47. A request regarding generating data for DBP.CSV database file is on hold because FBREV447 is not done. We will revisit this request when FBREV447 is done (Request 472).

48. A request regarding not producing DBT and CSV files for APRAS runs is on hold because FBREV447 is not done. We will revisit this request when FBREV447 is done and the FBLRFD program generates the DBT and CSV output files. We will need to make sure the DBT and CSV files are not created for APRAS runs (Request 476).