

# **PENNDOT e-Notification**

Bureau of Business Solutions and Services  
Highway/Engineering Apps Division



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## **FBLRFD**

No. 002  
June 15, 2009

**Release of Version 1.2.0.0**

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The Department's Floorbeam Analysis and Rating Program (FBLRFD) has been revised as described on the attached Summary of April 2009 Revisions – Version 1.2.0.0.

The new program has been placed on PENNDOT servers for use by the Districts. Consultants and others, who have a current license agreement for FBLRFD Version 1.1.0.0, can obtain the updated version for a license update fee of \$500 for private organizations and \$50 for local governmental agencies and educational institutions. Updates for FBLRFD Version 1.0a require an additional fee documented on the FBLRFD update fee details page (<http://penndot.engrprograms.com/home/Ordering/FBLRFD.htm>). No update fee is required for Federal and State Transportation Agencies. The forms for Software Update Request and Request for PennDOT's Engineering Software License can be downloaded from the web site at <http://penndot.engrprograms.com>.

Please direct any questions concerning the above to:

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Attachment

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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."

# LRFD FLOORBEAM ANALYSIS AND RATING

## SUMMARY OF APRIL 2009 REVISIONS - VERSION 1.2.0.0

Since the release of FBLRFD Version 1.1.0.0 several revision requests and user requested enhancements have been received. This release of FBLRFD Version 1.2.0.0 contains the following revisions and enhancements.

### Users Manual Revisions

1. The User's Manual has been updated for issues with the sign convention for shear results and the loads included for composite beams when doing the dead load web checks (Request 195).
2. Information has been added to the User's Manual Section 6.16.8 to describe how to enter the web depth for a floorbeam that begins with a varying web depth (Request 220).
3. The sketch showing the correct sign for entering section loss on the top angles of a built-up section has been revised to show that vertically down should be entered as a positive value (Request 221).
4. A DM-4 reference about the entry of the haunch depth has been added to the User's Manual Section 6.15.9 (Request 237).
5. The User's Manual Figure 2.4-1 sketch of the axle loads for the ML-80 vehicle has been updated to show a first axle of 13.68 kips (Request 252).

### Input Revision

6. An input check has been added to the program to ensure that the web depth of a built-up section must be larger than twice the vertical leg length of the angles. This was done to avoid a possible endless loop in calculation of the plastic moment capacity of the section (Requests 130 and 211).
7. The program was revised so the number of points of contraflexure will always be set to two, to ensure that the effective slab width is computed properly (Request 144).
8. The program will now accept up to 80 axles for special live loads (Requests 147, 232 and 250).
9. Investigation reveals that a blank ARB record is not added to new input files when using EngAsst (Requests 207 and 245). **(NOTE: this will not appear in the User's Manual)**
10. A negative value for the distance to the first hole can now be entered on the SHO command through EngAsst. A negative value can also be entered for the distance parameter on the SLS command (Request 222).
11. On the FTG command, fatigue detail categories BP, CP and EP, equivalent to B', C' and E', have

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been added to work around an issue with Engineering Dataset Manager (Request 223).

12. The lower limit of the dynamic load allowance and fatigue dynamic load allowance has been changed to 1.0 (Requests 227 and 241).
13. The value of the multiple presence factor adjustment has been set equal to 1.0 for all runs of the program (Request 251).
14. Previously, incorrect interpretation and entry of the number of holes on SHO command could lead to program crashes. Checks have now been added to let the user know when the number of holes entered in SHO command fall outside the beam dimensions (Request 268).

### Specification Related Revisions

15. Design and analysis of the fillet weld between the flange and web plates for plate girder floorbeams has been added to the program (Request 092, 214). **NOTE: Because of the addition of a new parameter on the MAT command, input files that have more than one set of MAT parameters on a single line will need to be modified.**
16. Previously, the maximum moment and maximum shear effects were used together in all computations. Computations have now been revised to use concurrent shear and moment effects for shear capacity and shear rating factors (Requests 094, 186).
17. A precision problem with the calculation of points of contraflexure has been resolved. Previously, for certain input files the program would stop prematurely (Request 122).
18. DM-4 equation 6.10.11.2.3-2 for bearing stiffener capacity has been incorporated into the program (Request 163).
19. A request questioning low shear capacity near a support has been investigated and the program found to be working correctly (Request 209). **(NOTE: this will not appear in the User's Manual)**
20. The program now takes section loss on the web into account when performing the shear capacity and web buckling calculations (Request 219).
21. The flexure/shear interaction ratings have been removed from the program since the interaction is already covered when computing shear ratings (Request 277).

### Output Revisions

22. A new summary output report that provides a list of specification check warnings has been added to the output (Requests 110, 215, 216).

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23. The specification check failure field width has been increased in the SHEAR CONNECTOR DESIGN - PITCH output report (Request 218).
24. The longitudinal stiffness (Kg) is now printed in the section property output tables for the negative flexure condition (Request 275).

### **Girder Analysis Revisions**

25. CBA version 3.6.0.0 has been incorporated into the program (Requests 151, 267).
26. A problem error that considered a point at the end of one span to be different than a point at the beginning of the next span has been corrected. Previously, this problem could cause stringer distributed loads to be incorrectly applied (Request 142).

### **Cross Section Revisions**

27. The calculation of the moment of inertia for transverse stiffeners constructed with angles has been fixed to avoid double-counting the intersection of the legs as well as using the correct leg lengths (Request 140).
28. The calculation of the area of transverse stiffeners constructed with angles has been modified to avoid double-counting of the intersection of the legs as well as properly multiplying by the angle thickness (Request 141).
29. BSP version 1.5.0.0 has been incorporated into the program (Requests 151, 202).
30. The web depth for an analysis point in a varying depth range that falls entirely within a gross cross section range is now computed correctly. Previously, for certain input files, the program would compute incorrect web depths which could cause the program to stop prematurely (Request 236).

### **Programming Revisions**

31. The program will now print (unlicensed) in the program output when the program has not had a valid license number assigned (Request 198).
32. The program has been updated to use the FORTRAN compiler version 10.1.013. This revision includes increasing the "Fixed Form Line Length" to 132 characters (Request 273).

### **Rating Revisions**

33. The rating tonnage of SI special live load vehicles is now computed using the correct conversion factors (Request 235).

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34. The scale tolerance has been removed from the rating tonnages computed by the program for the TK527, ML80 and special live load vehicles (Request 239).