PENNDOT e-Notification

Bureau of Information Systems
Application Development Division

FBLRFD No. 001 April 23, 2007	**Release of Version 1.1.0.0**

The Department's Floorbeam Analysis and Rating Program (FBLRFD) has been revised as described on the attached Summary of April 2007 Revisions – Version 1.1.0.0.

The new program has been placed on PENNDOT servers for use by the Districts. Consultants and others, who have a current license agreement for the FBLRFD Version 1.0a, can obtain FBLRFD Version 1.1.0.0 by paying the license update fee of $500 for private organizations and $50 for local governmental agencies and educational institutions. No update fee is required for Federal and State Transportation Agencies. Use the Update Form located on the Ordering/Updating section. 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

LRFD FLOORBEAM ANALYSIS AND RATING

SUMMARY OF APRIL 2007 REVISIONS–VERSION 1.1.0.0

Since the release of FBLRFD Version 1.0a several revision requests and user requested enhancements have been received. This release of FBLRFD Version 1.1.0.0 corrects the following known problems and provides enhancements.

Input Revisions

1. Up to five special live load vehicles can now be analyzed and rated in a single run of the program. See the updated User's Manual pages for the new required input on the SLL and SAL commands. (Request 004)
   NOTE: this change requires that any previously existing input files using special live loads be updated because of additional input now required.

2. The default reinforcement grade has been changed to 420 MPa for SI units. (Request 015)

3. Short spans (less than 25') without BRP commands now have correctly defined brace points. (Request 035)

4. Recent count, previous count, and future count ADTTs on the FTL command must now be greater than zero. (Request 036)

5. User input load factors for special live load are now used. Previously, the default load factors could not be overridden. (Request 045)

6. On the SLL command, the program was ignoring the "PERCENT INCREASE" parameter. The program now increases all axle loads by that percentage when computing the effects due to that vehicle. (Request 058)

7. The program now uses the load factors entered on the LDF command to determine limit state applicability for rating of special live loads. If the user does not enter an LDF command, the default limit states as defined in DM-4 are used for special live loads. (Request 046)

8. When the user enters more than the maximum number of concentrated loads allowed, a more descriptive warning will now appear. (Request 047)

9. The lower limit for span length has been changed to be a warning, rather than an error to allow girders with span lengths less than 5.2 m or 18 ft to run. (Request 059)

10. Fatigue points can now be defined on the left overhang and the allowable number of fatigue points has been increased to 30. (Request 072, 075, 139)

11. The "Distance", "Location", and "Width" parameters of the SLS command are now correctly read by the input processor. (Requests 118, 134, 136)

12. Successive girder ranges of straight-line increasing web depth can now be entered. (Request 120)

13. The program will no longer crash when 18 stringers are entered. (Request 129)

14. The lower limit for transverse stiffener spacing has been changed to 0.2 m (0.65 ft) and has been changed to generate a warning if this limit is violated. (Request 247)

15. The maximum length of a command line has been increased from 256 characters to 512 characters. (Request 249)

16. The program has been modified to complete processing of an entire input command before halting for errors. (Request 254)

17. The number of allowed concentrated loads has been increased to 200 from 50. An input check has also been added which will inform the user if the number of user entered concentrated loads on a floorbeam will exceed the maximum limit the program can handle. In addition the Future Wearing Surface load has been added to the “Floorbeam Concentrated Loads Output” Table. (Request 255)

18. The stringer symmetry function of the program has been corrected to allow correct symmetry when a stringer is placed at the center of the floorbeam. Previously this would cause the program to crash. (Request 264)

Output Revisions

19. The "web leg length" column of the transverse stiffener program output now prints the values correctly. (Request 049)

20. When the LRFD compression flange buckling check fails, the program will now report the stress which will cause buckling of the section as the flexural capacity of the section, and the “RESISTANCE CALCULATION” as being governed by the compression flange buckling. (Request 050, 056)

21. The error codes and comments have been rearranged on the UNCURED SLAB WEB SPECIFICATION CHECK output report. (Request 051)

22. Codes specifying the type of stress resistance calculations have been added to the UNCURED SLAB FLANGE SPECIFICATION CHECKS and CONSTRUCTION STAGE FLANGE SPECIFICATION CHECKS output reports. (Request 069)
23. When the values D_c and r_t are required for computing the flexural capacity of the section, they are now reported on the "FLEXURAL CAPACITY" output reports. The r' value in the Additional Section Properties Table has been changed to r_t to be consistent with the 1998 AASHTO notation. (Request 053, 257)

Distribution Factor Revisions

24. The US Units distribution factor for floorbeams less than 6 feet apart has been corrected. (Request 030)

Live Load Reaction Revisions

25. The program has been modified so impact is now applied to the live load reactions when floorbeam spacing is less than 6 feet (1.8 meters). (Request 256)

26. The program has been modified so the percent increase for Special Live Loads is now applied when the floorbeam spacing is less than 6 feet (1.8 meters). (Request 261)

27. The program has been modified so impact is now applied to the live load reactions when floorbeam spacing is less than 6 feet (1.8 meters). (Request 256)

28. The program has been modified so the percent increase for Special Live Loads is now applied when the floorbeam spacing is less than 6 feet (1.8 meters). (Request 261)

Rating Factor Revisions

29. Corrections have been made to the shear rating factor calculations. (Requests 032)

Transverse Stiffener Revisions

30. When the first defined transverse stiffener range does not start at the left end of the floorbeam, the program will now run to completion. (Requests 013, 054, 124)

31. Built-up sections with transverse stiffeners are now analyzed as stiffened sections. (Requests 031, 038, 125)

32. A column has been added to the transverse stiffener check output reports to indicate whether the section should be treated as stiffened or unstiffened, based on the stiffener spacing. (Request 037)

33. Consistent criteria are now applied when determining if a given point is to be considered stiffened or not. Previously, there was a difference between the criteria on the SHEAR CAPACITY and TRANSVERSE STIFFENERS CHECK tables. (Requests 040, 146)
34. Transverse stiffeners can now be defined on the left overhang of the floorbeam. (Request 132)

Section Property Revisions

35. The program will now run to completion and process section holes correctly. (Request 014)

36. The program now analyzes built-up sections without flange plates properly. Also, the horizontal angle legs are now considered in strength calculations and b/t ratio checks. (Request 034)

Flexural Capacity Revisions

37. The program has been modified to check the factored stress in the bottom flange to determine if a section is in positive or negative flexure. Previously, the program was using the stress in the slab, leading to contradictory results near dead load contraflexure points. The User's Manual has been modified to describe the use of the bottom flange stress when determining moment direction in floorbeams. Previously the program was using the stress in the top slab. (Requests 044,, 259)

38. Stress resistances throughout the program are now limited to a maximum value equal to the yield stress of the component. (Request 052)

39. The program was not computing the total factored dead load moment correctly when computing the flexural capacity for the uncured slab or construction staging specification checks. The value now includes the proper dead load components. (Request 057)

40. The case of a noncomposite section in negative bending where the alternate formula for Mn applies will no longer cause an abnormal termination of the program. (Request 082)

Shear Revisions

41. Small changes have been made to the shear stud clearance and spacing calculations to bring the program into compliance with the current version of BC-753M. (Request 043)

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Fatigue Revisions

42. If the fatigue life remaining calculations indicate a negative fatigue life, the fatigue life is now reported as 0 years. (Request 070)

User Manual Revisions

43. Chapter 9 of the User's Manual has been updated with new contact information. (Request 007)

44. The User's Manual has been clarified to indicate that bearing stiffeners are not considered along with the transverse stiffeners when performing transverse stiffener checks. (Request 041)

45. The User's Manual has been clarified and an example added concerning entry of variable-depth webs. (Request 042)

46. The User's Manual and EngAsst configuration files have been updated to reflect that FWS and PFWS are acceptable load codes for the FCL (floorbeam concentrated load) command. (Request 243)

47. The User's Manual has been changed to reflect the programs capability of accepting 200 floorbeam cross section ranges versus the 40 that were previously indicated. (Request 260)

Engineering Assistant Revisions

48. Negative values can now be entered for the FCL command through Engineering Assistant. (Request 126)

49. The program has been updated for the FCL, SCL, FDL and SDL commands to allow more combinations of number loads and number of commands when run using Engineering Assistant. (Request 135)

Programming Revisions

50. The program input file can now be located in a different directory than the program executable. (Request 008)

51. CBA Version 3.5.0.7 has been incorporated into the program. (Requests 003, 005, 016, 238)

52. The program is now compatible with APRAS. (Request 066)

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53. The example input files have been modified to eliminate all input warnings. (Request 148)

54. The program has been converted to the Intel Visual Fortran Compiler Version 9.1.034. (Request 262)