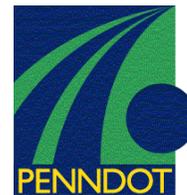


PENNDOT e-Notification

Bureau of Design
Bridge Quality Assurance Division



STLFRD

No. 001
August 23, 2004

Release of Version 1.3.0.0

The Department's LRFD Steel Girder Design and Rating Program (STLFRD) has been revised as described on the attached Summary of July 2004 Revisions – Version 1.3.0.0.

The new program has been placed on PENNDOT servers for use by the Districts. Consultants and others, who have a current license agreement for STLFRD Version 1.2, can obtain the updated version for a license update fee of \$500 for private organizations and \$50 for governmental agencies. Updates for STLFRD Version 1.1 and Version 1.0 will required an update fee of \$1000 for private organizations and \$100 for governmental 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:

Robert F. Yashinsky, P.E.

PENNDOT Bureau of Information Systems

Application Development Division

Phone: (717) 787-8407 | Fax: (717) 705-5529

e-mail: ryashinsky@state.pa.us

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 JULY 2004 REVISIONS—VERSION 1.3.0.0

Since the release of STLRFD Version 1.2, several error reports and user requested enhancements have been received. This release of STLRFD Version 1.3.0.0 contains the following error corrections and enhancements:

STLRFD Version 1.3.0.0 contains the following revisions:

1. The WIN command has been replaced by two new commands, WPD and WUD, which allow the user to enter wind conditions that are different for the construction/ uncured slab limit state checks and the permanent condition limit state checks. Having two separate input commands breaks up the options for program-defined and user-defined wind conditions. The WIN command is an obsolete command that is still recognized by the program for backwards compatibility, but existing input files should be migrated to use WPD or WUD instead. (Requests 021/048/050/191/223)
2. The Department's Continuous Beam Analysis program, CBA version 3.4 is incorporated as an analysis module. (Request 035)
3. A warning is reported when the factored stress in the slab exceeds $0.85 * f'_c$. (Request 060)
4. The method used to compute the distribution factors (AASHTO equations, pile load approximation, lever rule, etc.) is now indicated on the output. (Request 071)
5. The ML-80 load has been added to the design load options. (Request 076)
6. The user can now enter the web depths for the intermediate ranges for linearly varying web depths. (Request 078)
7. The stress required to cause web buckling is computed and is used for web buckling check. If the web buckling controls then the corresponding stress is reported as the capacity of the section. (Request 079)
8. Longitudinally stiffened sections were incorrectly tagged with a failure code while doing transverse stiffener checks. Incorrect transverse stiffener failure tags are now eliminated by considering the state of flexure of the beam considered, while doing the transverse stiffener checks, to interpret the location of the longitudinal stiffeners correctly. (Request 081)
9. References to the LRFD Specifications and DM-4 have been updated to the sections and equations in the 1998 LRFD Specifications and 2000 DM-4. See Table 2.7-1 for a list of some Article and Equation changes that will be incorporated in a future version of STLRFD. (Request 084)

10. SI limits on the longitudinal stiffness parameter (K_g) are changed to match the April 2001 DM-4 revisions. (Request 087)
11. Dead load flexural stress limits reported were incorrect when longitudinal stiffeners were provided both at the top and the bottom. Maximum compressive stress in one flange and the corresponding stress in the other flange are used to compute D_c for the check. The final stress in the flanges is compared to the "uncured" slab stress (i.e. all slab placed at the same time). (Request 088)
12. Reactions at the supports for the cases with sidewalk were incorrectly reported. Incorrect distribution factors were used for live load reactions with sidewalks for the last support. Appropriate distribution factors are now used to compute live load reactions with sidewalks. (Request 089)
13. Explanation of computation of weighted K_g (longitudinal stiffness parameter) has been added to the chapter 3 of the user manual. (Request 090)
14. The Department's Continuous Beam Analysis program, CBA version 3.4a is incorporated as an analysis module. (Request 091)
15. The default value for the reinforcement strength is updated to 420 MPa to reflect current practice in DM-4. (Request 094)
16. Incorrect section properties were used to compute girder flexural stresses at plate transition locations and at locations where the web depth was not constant. Section properties were reported for ranges in the section property output report. The section properties are now computed to the right and left of transverse section point. The smaller moment of inertia to the left or right of the section is now used for specification checks. In a varying depth range, the section properties on each side of the transverse section point are now computed using the same web depth, but different flange plates if they happen to change at the transverse section point. The section property output report now reports the section properties at each analysis point that are used for specification checking. (Request 095)
17. The ductility factors (and the other system settings) are reported in a formatted output table. (Request 097)
18. A legend is added to the beam properties table to indicate that the properties on each row of the table are to the LEFT of the span and distance given. (Request 099)
19. Some of the locations were incorrectly identified as composite sections during construction stage computations. A computational error has been corrected while determining if an analysis point is composite for a symmetrical beam where the construction stage at the symmetrical point is not the same as the beam end point. (Request 102)

20. The program was aborting for the specific case of a noncomposite section in negative bending, where compression flange failed under buckling and the alternate formula for M_n was applicable. Modifications have been made to eliminate the program abort. (Request 106/139)
21. Section 3.8.3 (Rating Factor for Flexure-Shear Interaction) of the user manual has been updated. (Request 107)
22. The flexural stresses on the FACTORED ANALYSIS RESULTS output report are reported only for sections where flexural capacity is reported in terms of stress. For sections where flexural capacity is returned in terms of moment, " N/A* " is reported in the output with a legend explaining the reason why the stresses are not printed. (Request 108)
23. Incorrect interpretation and entry of the number of holes on SHO command were causing the program to crash. Checks are now added to let the user know when the number of holes entered in SHO command fall outside the beam dimensions. Sections 5.25 and 6.25 of the user manual have been updated to provide additional information. (Request 109/192/201)
24. STLRFD analysis point tolerances are updated to 0.1 inches and 2.54 mm to match with tolerances set in Department's Continuous Beam Analysis (CBA) program. (Request 110)
25. Multiple presence adjustment factors are applied to the factored results. (Request 111)
26. Results for SERVICE-II, SERVICE-IIA and SERVICE-IIB limits states have been removed from the "SHEAR CAPACITY" output report. (Request 112)
27. User manual section 7.1.6 has been updated to clarify the shear sign convention. (Request 113/151)
28. Designs and analysis of the fillet weld between the flange and web plates for plate girders is added. (Request 116)
29. The maximum moment and maximum shear effects were used together in all computations. Computations are now modified to use concurrent shear and moment effects for shear capacity, shear rating factors and flexure/shear interaction rating factors. (Request 118)
30. Rolled beam section properties were reported incorrectly when section losses were entered. Computation of rolled beam section properties when section losses are entered has been modified. (Request 119)
31. A separate input for impact for P82 vehicle has been added as per SOL 431-01-07. (Request 120)

32. The limitation on the number of transverse stiffener inputs has been increased from 50 to 100. (Request 121)
33. Span length limits (for spans over 240 ft long, use $L = 240$ ft) have been incorporated for the computation of shear distribution correction factor as per the April 2000 DM-4. (Request 123)
34. Several fixes have been made to prevent the program from crashing. (Requests 124/128/188/219/264)
35. Rating factors less than 1.0 are now flagged in the output report. (Request 129)
36. Shear connector specification checks have been updated to handle the scenarios of no contraflexure points in the interior span as well as some cases where locations of zero dead load moment are different than the user-entered contraflexure locations. (Request 130)
37. For the cases where flanges had different strengths unexpected results were observed. A correction has been made to eliminate the erroneous results for the cases where flanges have different strengths. (Request 131)
38. The SID command has been updated for APRAS requirements. The State Route field has been changed to a numeric field and the Span Identification field has been changed to an alphanumeric field. (Request 132)
39. The Department's Beam Section Properties program, BSP version 1.4 is incorporated as an analysis module. (Request 133)
40. The transverse stiffener constructability spacing requirement of 1.0D was enforced to classify the section as "stiffened" versus "unstiffened" for an exterior girder for the purpose of computing shear capacity. The enforcement has been removed and the classification now is based solely on the 1.5D criterion. A warning is generated on the TRANSVERSE STIFFENERS CHECK output report whenever the transverse stiffener spacing for an exterior girder exceeds the 1.0D constructability spacing requirement. (Request 134,149)
41. The user is not allowed to enter all the six parameters on WIN command. The user is allowed to enter specified combination of parameters on WIN command as per the user manual section 5.36. (Request 135/220)
42. The method of computing the minimum factored reactions has been revised. The factored reactions are computed by component. If a component (DC1, DC2, DW, etc.) is positive (downward), then the reaction component is multiplied by the minimum load factor and then is divided by the eta (η) factor to compute the minimum factored reaction. If the component is negative (upward), then the reaction component is multiplied by the maximum load factor and eta (η) factor to compute the minimum factored reaction. (Request 136)

43. Noncontributing axles were included for P-82 loading. Noncontributing axles are now neglected for P-82 loading. (Request 140)
44. The K_g computational procedure for both noncomposite and composite beams is made identical to ensure the noncomposite distribution factor is not less than the composite distribution factor. (Request 141)
45. Loads due to the instantaneous deck placement were used in the computations of total dead load stresses, all the time, irrespective of construction staging. Now the maximum of, the construction stage load and the instantaneous deck placement load, is used in the computation of total dead load stresses provided in the output report "RATING FACTORS - STRESS FLEXURAL CAPACITY". (Request 143)
46. A new summary output report that provides a list of specification check warnings has been added to the output. (Request 144)
47. New reaction output reports that summarize the reactions required for bearing pad, abutment and pier designs have been added to the output. (Request 145)
48. Concentrated loads at the end supports were not considered in the computations. A tolerance has been added when checking the location of concentrated dead loads so that concentrated loads at supports are no longer ignored. (Request 147)
49. For a particular case, a girder was failing the fatigue check at a point away from the location of maximum factored moment causing a specification check failure. The point of maximum fatigue range is now passed to the design routines to overcome the unwarranted specification check failure. (Request 148)
50. Deck pour and construction stage reaction output reports have been added to the output. (Request 150)
51. Modifications made to the Department's Continuous Beam Analysis (CBA) and Beam Section Properties (BSP) modules are incorporated. The modifications correct a load case problem for interpolated analysis results near points of zero moment. (Request 152)
52. Distribution factors for exterior beams for lane widths less than 12 feet were incorrectly computed. Computations of lane eccentricities used to compute distribution factors for exterior beams have been modified. (Request 153)
53. The live load distribution factor for an exterior beam was not allowed to be lower than the live load distribution factor for an interior beam. The live load distribution factor calculation for exterior girders has been revised to eliminate the requirement that the 'e' modification factor be greater than or equal to 1.0. By eliminating the

restriction the live load distribution factor for an exterior girder can now be less than the live load distribution factor for an interior girder. (Request 156)

54. Bearing resistance calculations have been revised as per DM-4 revision 6.10.8.2.3. (Request 175)
55. An inconsistency when redistributing moments for the scenario where the symmetry option is specified for the girder but not for the deck pour, has been eliminated. User Manual section 6.5.8 is updated providing additional information. (Request 194)
56. The User Manual description of the CTL command, parameter 9, "ADTT for single lane", has been updated as per AASHTO 3.6.1.4.2. (Request 198)
57. When the bearing stiffeners were entered out of order, bearing stiffeners were not displayed in locations where they were supposed to be. Bearing stiffeners are now sorted and displayed even when the bearing stiffeners are entered out of order. (Request 199)
58. SERV-IIA limit state is now checked for uplift. An uplift flag is displayed in the output report indicating no uplift is permitted under service limit state. However, uplift is allowed for strength limit states. (Request 202)
59. Under certain circumstances, incorrect fatigue resistance was reported for spans other than the span one. A tolerance has been added to correctly compute the fatigue resistance for spans other than the span one. (Request 203)
60. The upper, lower and default values of the parameters in the user manual have been updated to be consistent with the corresponding values in the program. (Request 204)
61. In Chapter 5 of the User's Manual, the ORF command parameter name LIVE LOAD RATING SUMMARY has been renamed VEHICLE RATING SUMMARY to match the program. (Request 209)
62. The parameter descriptions in several STLRFD Engineering Assistant configuration files have been updated to match the parameter descriptions in the User's Manual. (Request 210/212)
63. The program was fixed to prevent it from crashing under certain circumstances when computing the section properties for a girder in the construction condition. (Request 219)
64. A blank ARB input record is no longer added for new input files created with Engineering Assistant. (Request 234)

65. Further information has been added to the User's Manual Section 6.5.5 documenting the calculation of slab loads for girder-floorbeam-stringer systems. (Request 237)
66. An input value exceeding the upper limit of "Distance 2" on the FTG command will now result in a warning being issued and the program continuing. Previously, the program would stop with an error message. (Request 249)
67. The User's Manual has been updated to specify that the user should enter 0.0 for the Strength IP load factor on the LDF command when there is no pedestrian load present on the bridge. (Request 263)
68. Additional sketches have been added to the User's Manual for the CDF command to clarify input values for the right fascia beam. (Request 269)
69. 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 positive. (Request 275)