PENNDOT e-Notification

Bureau of Business Solutions and Services
Highway/Engineering Application Division

pennsylvania
DEPARTMENT OF TRANSPORTATION

STLRFD No. 006 June 6, 2011	**Release of Version 2.0.0.0**

The Department's LRFD Steel Girder Design and Rating Program (STLRFD) has been revised as described on the attached Summary of April 2011 Revisions – Version 2.0.0.0.

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 1.7.0.0, 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 STLRFD Version 1.6.0.0 or earlier require an additional fee documented on the STLRFD update fee details page (http://penndot.engrprograms.com/home/Ordering/STLRFD.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:

Shyh-hann Ji, P.E.
PENNDOT Bureau of Business Solutions and Services
Highway/Engineering Apps Division
Phone: (717)783-8822 | Fax: (717) 705-5529
e-mail: sji@state.pa.us

Attachment

Since the release of STLRFD Version 1.7.0.0 several revision requests and user requested enhancements have been received. This release of STLRFD Version 2.0.0.0 contains the following revisions and enhancements.

Specification Related Revisions

1. The program has been updated to the 2004 LRFD Bridge Design Specifications, Third Edition and PennDOT Design Manual Part 4, September 2007 Edition (Includes Change No. 1). Exceptions to these specifications have been listed in Table 2.7-1 and Table 3.7-1 of the User's Manual (Request 384).
2. The effective slab width calculation has been updated to the 2008 AASHTO Interims Article 4.6.2.6. The ECP input command has been removed, as the effective points of contraflexure are no longer required to compute the effective slab width (Request 404).
3. The upper bound for K_g (longitudinal stiffness parameter) has been updated per 2007 DM-4 Specifications (Request 407).
4. The calculations for the hybrid factor, R_h, now use the short-term composite neutral axis when the section is in positive bending and the composite neutral axis for negative bending (Requests 423 and 429).
5. The primary design or analysis vehicle live load moments are used to determine the limits of the shear connector design regions for multi-span girders. Simple span girders will always have two shear connector design regions centered on midspan (Request 430).
6. At each analysis point, the stress in the deck reinforcement due to the fatigue load combination is used to determine the state of flexure when computing the maximum allowed pitch for the shear connectors (Request 431).
7. All analysis points within a field splice definition will be treated as noncompact (Request 450).
8. Under some circumstances, the calculation for the minimum radius of gyration of a longitudinal stiffener results in the program attempting to find the square root of a negative number. For these situations, the program now returns a large value for the required minimum radius of gyration (Request 454).
9. A cross section with holes in the tension flange (entered with the SHO command) will always be treated as noncompact for flexural resistance calculations. In addition, if the net section fracture capacity is less than the stress flexural capacity calculated by other expressions, the net section fracture capacity will be reported as the flexural capacity for the tension flange and also be used to compute the rating factor for the tension flange (Request 462).

10. If a longitudinal stiffener is entered without transverse stiffeners being defined along the length of the stiffener, a warning will appear on the LONGITUDINAL STIFFENERS CHECK (PART 1) output report stating that transverse stiffeners are required in conjunction with a longitudinal stiffener (Request 469).

11. The program now correctly computes the actual moment of inertia and radius of gyration for pairs of longitudinal stiffeners (Request 473).

Input Revisions

12. The lower limit of the DEFLECTION DF (parameter 5) on the GEO command has been increased from 0 to 0.1 (Request 406).

13. As a result of a decision by the AASHTO Subcommittee on Bridges and Structures to no longer publish SI unit specifications, the program only supports US customary (US) units. The only acceptable entry for the CTL command parameter 1, System of Units, is "US" (Request 416).

14. The lower limit of the shear connector diameter (SCS command) has been increased to 0.75". Diameters less than 0.75" will result in a warning printing in the program output (Request 439).

15. A chief bridge engineer warning will now result if the input girder has a varying-depth web or any locations where the web yield strength is greater than the flange yield strength. In addition, a warning will result if the web yield strength is less than 36 ksi or 70 percent of the flange yield strength (Request 443).

Output Revisions

16. The BEAM GEOMETRY input summary report now prints a blank for the deflection distribution factor if this parameter is to be calculated by the program (the value is left blank by the user). If the user has entered a deflection distribution factor, this value will be displayed in the BEAM GEOMETRY input summary report. The program has been modified for both pedestrian and non-pedestrian loading (Request 177).

17. Output reports now print all analysis points that contain a warning or failure, regardless of the user input for parameter 20 ("OUTPUT POINTS") on the CTL command (Request 371).

18. STLRFD will now produce PDF versions of all output in addition to the text-only files (Request 401).

19. The HL-93 LL ANALYSIS reports and all of the OVERALL REACTIONS output reports (HL-93) have been modified to now print Loading Code 4 as "4 - 90% (TRUCK PAIR + LANE) GOVERNS". Previously, Loading Code 4 printed as "4 - 90% TRUCK PAIR + LANE GOVERNS" (Request 409).

20. The DECK REINFORCEMENT AREA value on the SPLRFD INPUT INFORMATION now prints with the correct magnitude and units (Request 422).

21. The intermediate results for the compactness criteria calculations in AASHTO and DM-4 Articles 6.10.6.2.2 and 6.10.6.2.3 are included in a new output report (Request 432).

22. If the user enters a value for the centerline of exterior beam to curb that results in a de bounds violation when computing the distribution factor, a Chief Bridge Engineer warning will print, even if the cross frame or lever rule methods were used to compute the governing distribution factor (Request 437).

23. The hybrid (R_h) and load shedding (R_b) factors have been added to relevant program output reports. To make room for these values, the flange lateral capacity values have been moved to a new output report, FLANGE LATERAL CAPACITY (Request 438).

24. The depth of web in compression (D_c) has been added to the program output on the SERVICE LIMIT STATE output report (Request 441).

25. The actual wind load applied to each flange is now reported on the WIND EFFECTS and UNCURED SLAB WIND EFFECTS output reports (Request 458).

26. When appropriate, the second order lateral load stresses due to wind are now reported by the program (Request 459).

27. A program crash resulting from printing SPLRFD information for a run with only a special live load vehicle has been resolved (Request 482).

Girder Analysis/Design Revisions

28. The program was using the user defined minimum depth of the section for certain design run checks instead of the actual depth of the trial section. The depth has been correctly set for rolled beam and plate girder design runs of the program (Request 364).

29. For plate girders, the web depth is now correctly computed using only the depth of the web instead of the web depth minus the top and bottom flange thicknesses (Request 393).

30. The program automatically computes the number of bolt holes in the tension flange cross section for design runs containing field splices for both rolled beam (FSL command is now valid) and plate girder designs, so that the section may be appropriately designed for Net Section Fracture checks. In addition, the total length of the field splice has been incorporated into both analysis and design runs that contain a FSL command. The flexural resistance is now limited to that of a noncompact section for all points along that range as defined by parameter 3 ("FIELD SPLICE FLANGE PLATE LENGTH") of the FSL command. <u>NOTE:</u> t<u>hese changes will require revisions to all existing design and analysis input files to include valid entries for parameter 3. In addition, all existing design input files will be required to provide valid entries for parameters 4 through 7</u> (Requests 395, 397 and 398).

31. The program now correctly considers non-integer values for upper and lower bounds of flange width during the design process. The user must also always enter a maximum flange width for the top flange that is less than or equal to the maximum bottom flange width (Request 474).

Documentation Revisions

32. The User's Manual has been revised to state that the shear connector height entered on the SCS or SCC command is only compared to the effective deck thickness and print a warning if the connector height exceeds the effective deck thickness. No other specification checks are done with this input value (Request 440).

33. The Engineering Assistant help files for the WPD command now provide the correct help definition for the Permanent Wind Speed parameter (Request 456).

34. Section holes entered via the SHO or FSL commands are not considered when calculating the net section properties reported by the program. Sections 7.4.2 and 7.4.3 of the User's Manual have been revised to reflect this. If section holes are to be considered as part of the net section properties, they must be entered as section loss. Section 3.3.3 of the User's Manual has been updated to reflect this (Requests 460, 461 and 478).