PennDOT e-Notification

Bureau of Business Solutions and Services
Highway/Engineering Applications Division

pennsylvania
DEPARTMENT OF TRANSPORTATION

BXLRFD

No. 016
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Release of Version 2.7.0.0

The Department's LRFD Box Culvert Design and Rating (BXLRFD) program has been revised as described in the attached "Summary of July 2016 Revisions – Version 2.7.0.0".

The new program has been placed on PennDOT servers for use by the Districts. Consultants and others, who have a current license agreement for **BXLRFD Version 2.6.0.0**, can obtain the updated version by submitting an Update Request form along with the **update fee of $300 for private organizations and $50 for governmental agencies**. Updates for **BXLRFD Version 2.5.0.0 or earlier** will require an **additional fee**. For BXLRFD update fee details, refer to the following link: http://penndot.engrprograms.com/home/Ordering/BXLRFD.htm. The update fee is waived for federal and state transportation agencies.

The Software Update Request form can be obtained on the PennDOT Engineering Software Support website at http://penndot.engrprograms.com by clicking on "Ordering/Updating" and, then on "Update Form".

Please note that the software will no longer be provided on a CD. Once payment is received, an e-mail will be sent with download instructions. The new installation will require a License Key that will be provided in the e-mail. A valid e-mail address must be provided on the Update Form in order to receive the download instructions.

Please direct any questions concerning the above to:

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Attachment

SUMMARY OF JULY 2016 REVISIONS - VERSION 2.7.0.0

Since the release of BXLRFD Version 2.6.0.0 several revision requests and user requested enhancements have been received. This release of BXLRFD Version 2.7.0.0 contains the following revisions and enhancements.

Input Revisions

1. The Lower Limit for the LDC command "Minimum Equivalent Fluid Pressure" parameter has been changed from 0 to 1 to prevent a divide-by-zero error. The Lower Limit for the LDC command "Maximum Equivalent Fluid Pressure" parameter has also been changed from 0 to 1 for consistency. (Request 246)

Output Revisions

2. The format of the COMBINED RATING SUMMARY table has been revised to the program to report rating information similar to DM-4 Part A Table 1.8.3-1. (Request 228)

3. For certain input files using the minimum required reinforcement (#4 @ 12"), the LIVE LOAD RATING output table displays an incorrect warning indicating that the provided reinforcement is less than the required minimum when the values are actually equal. The program has been revised so the provided reinforcement can be equal to the minimum required reinforcement which prevents this erroneous warning from appearing. (Request 234)

4. The page layout of the output file has been enhanced to allow for more characters per page width and more lines per page in the PDF output file. The new layout has 102 characters per page width and 83 lines per page. (Request 240)

5. The column headings have been corrected for the three Load Modification Factor parameters which appear in the Input Summary output table for the LDC command. The headings are now correctly labelled in order of, Ductility Factor, Redundancy Factor and Importance Factor. (Request 248)

Specification Revisions

6. A fix has been made to the Crack Control Spacing value displayed in the SERVICEABILITY SPACING CHECK output table to prevent the Crack Control Spacing column from displaying "99.99" when the actual Crack Control Spacing is computed as a negative number. The program will now display the Crack Control Spacing as 0.00 when the calculated value is negative. (Request 233)

7. The program has been revised to allow the user to enter the number of precast segments that provide shear transfer as defined in DM-4 Section 4.6.2.10.4. The program uses this new input to compute the lateral

distribution width. Previously, the program always assumed that 2 precast segments provided shear transfer. (Request 235B)

8. The program has been revised to follow the 2014 AASHTO Section 3.6.1.2.6 for the distribution of wheel loads through fill by always using a 2:1.15 slope (approximately 60 degree angle) regardless of the backfill type. See User Manual Section 3.3.17.2 for details. Previously, the program would use 2:1.15 slope for granular backfill and 2:1 slope for other backfill types. (Request 238)

9. The calculation of Cracking Moment has been revised to use a new equation from the 2015 DM-4 Section 5.7.3.3.2 which applies multiple factors. Previously, the program would calculate the Cracking Moment using a constant 1.2 factor. (Request 242)

10. The Crack Control spacing calculation has been revised to limit the calculated tensile stress in the reinforcement to be no greater than 0.6*fy based on the 2014 AASHTO LRFD A5.7.3.4. Previously, the program would use the computed tensile stress in the calculation of the Crack Control spacing without limitation. (Request 243)

General Program Revisions

11. The program is now compatible with APRAS NextGen. The CTL Type of Run “AP” has been removed from the program for consistency with the STLRFD and PSLRFD programs. (Request 164)

12. A problem has been fixed for certain input files, representing symmetrical two cell box culverts with no live load, which would stop with an error while writing the Interior Wall results for the SHEAR DESIGN output table. (Request 236)

13. The concrete quantity that appears in the output for the strip footing has been corrected to use the correct footing thickness. (Request 245)

14. The program has been revised to provide a new WVA input command to allow for the definition of shear reinforcement areas in the walls when performing an Analysis (Type AR) run. This new command enables the user to take the required wall shear reinforcement calculated from a Design run and enter it into an Analysis run input file for processing. (Request 237)

User Manual Revisions

15. The BXLRFD User Manual title page has been revised to use a new format and a new logo.(Request 235A)

The following is a list of enhancements from the 2014 AASHTO LRFD Specifications that are not included in this version but will be implemented in a later version:

1. The 2014 AASHTO LRFD Specifications include the variation of the resistance factor, φ, for sections in the transition zone between tension-controlled and compression-controlled defined by the net tensile strain in the extreme tension steel and the compression-controlled and tension-controlled strain limits. Previously, the variation in the resistance factor was expressed in terms of the ratio dt/c. (Request 244)