

PENNDOT e-Notification

Bureau of Information Systems
Application Development Division



ABLRFD

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Release of Version 1.5.0.0

The Department's LRFD Abutment and Retaining Wall Analysis and Design (ABLRFD) program has been revised as described in the attached "Summary of July 2006 Revisions – Version 1.5.0.0".

The new program has been placed on PENNDOT servers for use by the Districts. Consultants and others, who have a current license agreement for ABLRFD **Version 1.4 or later**, can obtain the updated version by submitting an Update request form along with the **update fee of \$500 for private organizations and \$50 for governmental agencies**. Updates for ABLRFD **Version 1.3 or earlier** will require an **update fee of \$1,000 for private organizations and \$100 for governmental agencies**. The Software Update Request form and Request for PENNDOT's Engineering Software License form can be downloaded from our software support web site at <http://penndot.engrprograms.com>.

Please direct any questions concerning the above to:

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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 2006 REVISIONS - VERSION 1.5.0.0

Since the release of ABLRFD Version 1.4.0.4 several revision requests and user requested enhancements have been received. This release of ABLRFD Version 1.5.0.0 contains the following revisions and enhancements.

General Revisions

1. The program now supports long file names (Request 125).
2. The program has been enhanced so temporary files are now created on the local drive for network compatibility (Request152).
3. The wind on live load and Extreme-I earthquake load factors have been modified to match DM-4 (Request 66,138,161,167).
4. The number of heel shear analysis points has been changed from a fixed number of 50 point to dynamic amount based on the footing geometry in an effort to reduce the program processing time (Request 200)

Input Revisions

5. Two new inputs for concrete density have been added to the program to store a density for self weight calculations and a second density for modulus of elasticity calculations (Request 45, 87).
6. A new friction force has been added to the program and is applied at the bearings (Request 84).
7. The Ductility, Redundancy and Operational Importance Limit State factors found on the LDC card have been modified so the default values are 1.0 as per DM4-2000 Section 1.3 (Request 88).

Output Revisions

8. The pile pattern output table has been relocated in the output to follow the footing geometry table (Request 86).
9. The footing volume units on the Pile Pattern output table have been changed to ft³ (m³) from piles/foot (piles/m) (Request 168).

10. The program has been modified to use more descriptive headers in the output tables for Factored Forces and Controlling Forces (Request 58).
11. The program has been modified to output an intermediate bearing resistance values output table (Request 77).

Reinforcement Revisions

12. The main stem bars entering the footing are now always considered as epoxy coated for design runs as per DM-4 2000 Section 5.4.3.6P (Request 44).
13. The backwall calculations have been modified to work properly when reinforcement is entered as areas per width (Request 79).
14. Temperature and Shrinkage reinforcement in the front face of the stem is now considered for moment resistance when the applied moment in the stem is negative (Request 80).
15. An informative error message is now shown when a stem reinforcement bar cannot be developed within the footing during a design run. Previously the program would crash. (Request 133,140).
16. The program has been modified so the minimum spacing check considers the clear spacing between bars (Request 164).
17. The program has been modified so the user may specify an allowable minimum spacing and bar spacing requirement (Request 186).
18. The #10 SI reinforcement bar is no longer considered during design runs (Request 187).

Development Length Revisions

19. The program has been enhanced to consider hooked bars for the perpendicular reinforcement in the footing during a design run if selected by the user (Request 185a).
20. The program has been enhanced to show development length information for perpendicular footing bars during analysis runs when a bar size and spacing are used. Previously analysis runs did not produce output for development length information (Request 185b).

21. The program has been enhanced to allow users to specify if hooked reinforcement bars are used in the perpendicular direction of a footing during analysis runs (Request 185c).
22. The 0.8 limitation on the Area of Steel Ratio factor used for development lengths has been removed (Request 185d).
23. The program has been enhanced to display a status code when the design spacing has been modified to meet development length requirements during a design run (Request 185g).
24. The program User's Manual has been enhanced to provide a more detailed description of the Development Length Correction factor on the MRD command for Chapter 5 (Request 185h).
25. The program has been modified to provide the area of steel required and the area of steel provided so the user can more easily verify the development length calculations (Request 185i).

Settlement Revisions

26. The length of the footing used for the second soil layer has been stored and is now used for settlement calculations (Request 72).

Footing Revisions

27. The footing volume units on the Lateral Loads / Pile Group Lateral Resistance Table have been changed to indicate the force is per unit width (Request 83).
28. The correct angle is now used in calculation of the partial EH-V force for footings. The angle is now based on the ratio of K_{av} over K_{ah} rather than the backfill slope angle. Also the top of rock layer height can now be set equal to the top of the footing. (Request 171).

Pile Revisions

29. The program has been modified so the minimum footing width for pile/caisson foundations is based on the minimum layout dimensions along with the normal footing minimum dimensions (Request 136,195).
30. The program has been modified so the lateral capacity of pile/caisson input is only required for an all vertical pile/caisson foundation (Request 177).

31. The program has been modified to correct an insufficient battered pile/caisson layout selection (Request 181)
32. The program has been modified to provide a warning message when over 50% of the piles/caissons in the last row of an analysis run have been specified as battered (Request 182).

Stem Cutoff Revisions

33. A note for the Reinforcement Design Details tables has been modified to clarify that the theoretical cutoff is when every other bar is no longer required (Request 184b).
34. The Reinforcement Design Details tables have been modified to include a code to indicate which extension length criteria controls (Request 184d).
35. The program has been modified to provide crack control information for each bars cutoff location (Request 184e).
36. The program was modified so factors shear resistance for the stem cutoff locations will now appear in the Shear Results table and rather than the Reinforcement Design Details table (Request 184g).

User Manual Revisions

37. The variable notation used for active earth pressure coefficients have been changed to match notation used in DM-4 (Request 47).
38. The default value for the Minimum Equivalent Fluid Pressure in Chapter 5 Section 5.17 has been changed to match the default value the program is currently using (Request 174).
39. The example input files have been modified so warning messages will not appear in the program output. Chapter 8 of the Users manual is now formatted to match the Input Summary table from the output (Request 175).
40. The program User's Manual has been modified to correct a typographical error in Section 3.6.1 (Request 170).

41. The program User's Manual has been modified to define delta as the rock/friction angle (Request 144).
42. The program User's Manual has been modified to indicate that a minimum water differential is still required when the water level is below the bottom of the footing for the Back Water Level input value on the AT1, AT2, AWB, and RWL cards (Request 213).

Engineering Assistant Revisions

43. The Engineering Assistant figures have been modified to include descriptive captions (Request 158).
44. The correct figures have been inserted for the LYD command in the Engineering Assistant configuration files (Request 183).

Programming Revisions

45. The program has been converted to be a Windows DLL (Request 126).
46. The program has been modified so blank information is returned as output if the ABLRFD DLL is used with the APRAS run option (Request 179).
47. The program has been converted to Intel Visual Fortran (Request 190).