

FAARFIELD 2.1 README

FAARFIELD 2.1 is the standard thickness design software accompanying AC 150/5320-6G Airport Pavement Design and Evaluation. FAARFIELD 2.1 replaces all previous versions of FAARFIELD.

FAARFIELD stands for FAA Rigid and Flexible Iterative Elastic Layered Design. FAARFIELD 2.1 incorporates full 3D finite element responses to aircraft loads (for new rigid pavements and rigid overlays). The 3D finite element models used for rigid pavement designs are computationally intensive and may result in long run times, depending on the computer characteristics.

Point of contact: For questions, comments or further information concerning this program, please contact Dr. David R. Brill, FAA Airport Technology R&D Branch, ANG-E262, e-mail: david.brill@faa.gov.

Software Notes: FAARFIELD 2.1 makes use of the FAA-developed 3D finite element program FAASR3D, based on the NIKE3D finite element program developed by the U.S. Dept. of Energy Lawrence Livermore National Laboratory (LLNL). Minimum requirements to run FAARFIELD are Windows 10 or higher, 2 GHz processor (3 GHz recommended), 4GB of RAM (more recommended for better performance). At this time, FAARFIELD is not supported on Macintosh. FAARFIELD 2.1 can be installed alongside FAARFIELD 2.0 and FAARFIELD 1.42, and can open FAARFIELD 2.0 and FAARFIELD 1.42 files for further analysis.

Installation instructions:

1. Uninstall all previous versions of FAARFIELD. (This step is OPTIONAL. It will remove program files; however existing job files will not be affected.)
2. Click on FAARFIELD.Installer.msi and follow the on-screen instructions.
3. To complete the installation, restart your computer.

Version 2.1 (September 22, 2023)

Known bugs:

1. ACR-PCR analysis cannot be completed if “Non-Airplane Vehicles” are included in the traffic mix.
2. ACR-PCR analysis may encounter issues in specific situations when an aircraft with a Belly (e.g., B747-400) is part of the traffic mix. The error occurs when the aircraft with a Belly has the highest CDF contribution but is not the critical aircraft with the maximum ACR value.

Updates:

1. Fixed various small bugs in GUI.
2. Fixed user interface (UI) bugs regarding layer arrangement using Layer Property window.
3. Added advanced options for the non-default conversion formulas from E to k (e.g., PCA conversion formula) and from E to CBR.
4. Modernized the CDF graph look and feel.
5. Updated the CDF results for User Defined Aircraft (UDA).
6. Changed “Section” to “Structure” in user interface and reports.
7. Modified Pavement Type in dropdown menu and reports (e.g., changed “HMA on Flexible” to “HMA Overlay on Flexible”).
8. Restricted creating aircraft list with over 40 aircraft. Users are still able to load an old traffic mix with more than 40 aircraft, but a warning message will display.
9. Fixed issues related to editing a user defined aircraft (UDA) information.
10. Fixed issues related to adjusting aircraft screen when resizing the FAARFIELD window.
11. Added floating capability for Traffic and Structure screens.
12. Added ability to view Aircraft Gear prior to Pavement Type selection.
13. Updated gear display to accommodate A380 and B-52 aircraft.
14. Fixed issue that did not allow users to change thickness of a User Defined layer from the UI.
15. Changed “Form 5010” to “Airport Master Record”.

16. Fixed issue with displaying error message in the UDA screen about “Both X and Y coordinates should be defined”
17. Modified writing the UDA information into the UDA.xml file to include all wheel coordinates. Also, modified the value of <NumberWheels> tag to be half the number of wheels, matching the specifications in the aircraft library.
18. This version of the program can read UDA files created in the previous versions of FAARFIELD 2.0 without encountering compatibility issues. The program reads the negative wheel coordinates from the UDA files and generates mirrored wheels internally, incorporating them in the analysis. For other applications that require using the updated UDA.xml file, such as the ICAO-ACR program, users are required to recreate the old UDA files in FAARFIELD and subsequently employ them in other programs.
19. This program version is not compatible with reading and processing UDAs created in FAARFIELD 1.4. Users will need to recreate their previous UDAs within the updated program.
20. Modified information for numerous aircraft in the aircraft library. The modifications involved editing tire pressure, gross weight, percent gross weight on main gear and wheel coordinates based on the most updated aircraft characteristics manual.
21. Added A220-100 and A220-300 to the aircraft library.
22. Modified the B52 aircraft specifications in the aircraft library to align with the data provided in PCASE.
23. Revised percent gross weight of single wheel (SWL) for ACR-PCR analysis (<MgPercentPCN>) in the aircraft library.
24. Added all aircraft from older versions of FAARFIELD library to the current library. These aircraft are identified as Deprecated in the new library meaning that they are not displayed on the User Interface.
25. Modified the program’s functionality to correctly read information of job files from FAARFIELD 1.4 version and accurately process them. The modifications focused on the job files containing aircraft that do not exist in the current aircraft library.
26. Modified minimum required thickness for all material types in the library based on the analysis type and aircraft weight.
27. Allow users to define layer thickness less than the design minimum thickness for PCR and Life analysis.
28. Added new feature to the UI to display Slab Edge Stress and Slab Interior Stress for all aircraft in the Traffic mix. The UI also shows the Most Demanding Aircraft. These features are enabled when Slab Stress Displayed is changed to “yes” in Design Options. These features are enabled for Thickness Design and Life.
29. Added new feature to perform Reduced Cross Section for New Flexible and New Rigid. The feature is enabled when Reduced Cross Section is changed to “yes” in Design Options. The feature works only when in Thickness Design mode.
30. Structure Report functionality is enhanced to incorporate Reduced Cross Section and Slab Stress results. These results will now persist in the Structure Report even when running Life and PCR after completion of a thickness design.
31. Removed restrictions on “Sandwich” layer for an aggregate base layer over a high strength subgrade.
32. Fixed traffic mix file name association when loading a job file. This happens when user 1 shares a job file with user 2 and the job file contains a traffic mix name similar to a traffic mix name that already existed in user 2 traffic mix location (but with different aircraft)
33. Improved capabilities to save Traffic Mix in the job file.
34. Fixed issues related to having the same UDA in the traffic mix and the User Defined Aircraft folder. FAARFIELD gives priority to the UDA in the job file.
35. Resolved issues with assigning an aircraft index when having multiple aircraft with the same name in the mix. The program will assign an index to each aircraft by treating each aircraft as a separate object, not by matching the aircraft name.
36. Fixed issue with the pop-up message that appears when the user opens a job file containing a traffic mix. The message was revised to provide more clarity and information to the user. Additionally, the program now offers options to the user regarding the traffic mix: the user can choose to save the traffic mix in the traffic library (Yes) or opt not to save it (No).
37. Added version information to all xml files.
38. Fixed an issue related to creating a single wheel UDA. Previously, the UDA .xml file contained an additional (0,0) coordinate, which caused error in the ACR analysis. Additionally, the <MgPercentPCN> in the created xml file was 0.5, while it should have been 1.
39. Fixed messaging in the status window to match the analysis type in progress (e.g., Reduced Design Section message displays only when Reduced Design Section is selected “yes”).

40. Fixed messaging in the status window to show total elapsed time after completion of full and Reduced Cross Section design.
41. Added PAVEAIR Access to the main menu which allows users to access PAVEAIR database. Users can save a job file to a database in PAVEAIR and load a saved job file from PAVEAIR. Users must login to PAVEAIR.
42. Added feature that enables users to download the latest version of aircraft library from PAVEAIR.
43. Enabled the program to automatically download the most updated aircraft library to the *Documents\My FAARFIELD\Defaults\Aircraft folder* from PAVEAIR when users open the program. Users will be asked if they want to replace the existing library with the most updated library.
44. Resolved persistent small difference in ACR between ICAO-ACR and FAARFIELD in flexible pavement analysis. The modification involved changing the ACR calculation function in FAARFIELD to incorporate Select Wheel (SW) in the analysis.
45. Modified ACR-PCR reporting for “HMA overlay on Rigid” pavement type to match the thickness design method.
46. Fixed error in PCR calculation when traffic mix contains aircraft with belly. The error happened when the CDF contribution of a belly gear was greater than that for the wing gear.
47. Changed headers for calculated ACR thickness to “ACR Thickness”.
48. Fixed issue with changing tire dimensions on the UI when running PCR analysis.
49. Fixed convergence issues in PCR analysis when the number of aircraft operation is too low.
50. Fixed issue with displaying incorrect P/C ratio for the first aircraft in the list in PCR analysis.
51. Fixed issues with ACR-PCR analysis of the UDA files created in an earlier version of FAARFIELD 2.0. In the old UDA .xml files, the percent gross weight on the gear (<MgPercentPCN>) is twice the value of the (<MgPercentPCN>) in the UDA .xml files created in the new FAARFIELD 2.0 version.
52. Modified the display on “Percent GW on Gear” values on the UI both during the analysis and at the completion of the analysis to a) ensure consistency among the aircraft and b) align with the analysis type (i.e., PCR or Life/Thickness Design).
53. Enabled the program to modify the P-219-layer modulus in thickness design. The material type was changed from NRBase to NAgBase.
54. Fixed issues with calculating P/C ratio for C17-A and C-5 aircraft.

Version 2.0.18 (May 18, 2022)

1. Updated the Open Job functionality to handle Design Life other than 20.
2. Fixed pavement grade thickness update functionality.
3. Fixed the Copy to Clipboard functionality.
4. Fixed the PCR graph issue when having an aircraft more than once on traffic mix.
5. Updated the CDF Graph on PCR runs for thin PCC on Rigid pavements.
6. Updated the CDF Graph for PCR runs.
7. Fixed PCR run errors.
8. Updated Percent Gross Weight for PCR runs on PCR Report.
9. Updated Percent Gross Weight and Gear Orientation for several aircraft in Aircraft.xml file.
10. Updated the Percent Gross Weight for PCR runs.
11. Updated the installer package to have the output file written when selected by user.
12. Fixed the bug on Run button functionality before selecting the pavement type.
13. Updated aircraft.xml and Percent Gross Weight functionality. Percent GW on Gear represents the weight on an entire landing gear (both struts, all wheels shown in the gear image). Previously, for some aircraft Percent GW on Gear represented weight on a single strut of a landing gear.
14. Improved runtime by checking for symmetry in gear type X aircraft.
15. Added Gear orientation to the User Defined Aircraft module.
16. Added ability for users to change the User Defined Aircraft directory.
17. Added the FAASR3DPCC.OUT file containing design stresses and linked it to the Output File on the Design Options.
18. Fixed the copy-paste issue on sections with saved traffic file.
19. Fixed the Edit module on User define Aircraft to read the wheel coordinates correctly.
20. Fixed several unit and formatting issues in main screen and reports.
21. Addressed several P/C and CDF results issue resulted by X conversion.

22. Updated the functionality on Gear orientation.
23. Updated the UDA module to have its characteristics consistent with other aircraft on Traffic window.
24. consolidated functions that validate layer and structure properties into a single location that conforms to MVVM and OO principles.
25. Completed routines for communication between FAARFIELD and PAVEAIR and set up the public PAVEAIR web service on aratranweb.ara.com:8080.
26. Addressed several PCR calculation issues.
27. Allow subgrade layer to be added and correct the warning windows.
28. Fixed the Design Output option for flexible computation for thick overlays on PCC.
29. Removed PCR testing files from the MY FAARFIELD directory.
30. Fixed the Installer issues to include all parts of the software.
31. Updated the X gear aircraft engineering logic.
32. Updated the gear image functionality to handle X aircraft while on Metric unit.
33. Updated the mouse over functionality for the wheel coordinates box on gear image.
34. Updated the aircraft.xml file and converted aircraft gear to X.
35. Updated Form 5010 report (Graph and table).
36. Unified the format (decimals, thousand separators, unit abbreviations).
37. Fixed Sublayer and User Defined layer placement issues.
38. Updated the User Defined layer characteristics functionality.
39. Fixed Design Life repeated pop up when not set to 20 years.
40. Refactored images such that temporary files are not required.
41. Updated the UDA aircraft terminology.
42. Updated the aircraft.xml file to remove deprecated aircraft from the Aircraft list.
43. Updated Table 3 on the PCR report.
44. Fixed unit conversion issues in the ACR result cells of the Traffic grid.
45. Fixed PCR report formatting issues.
46. Fixed CDF Graph issues related to the Dual Tire Spacing and Category S aircraft.
47. Fixed infinite loop in Thickness Design run when the User Defined layer thickness reaches the minimum.
48. Fixed LEAF files not output when selected in Design Options.
49. Updated the pavement analysis type update in PCR Report when the section or job changes.
50. Fixed bug on interaction of P/TC with CDF results in PCR runs.
51. Updated the ACR results for Unbonded on Rigid pavement systems.
52. Added the P/TC input box for Run Type PCR
53. Updated the thickness limits for pavement layers to match Advisory Circular 150/5320-6G.
54. Fixed floating display issues.
55. Fixed summary report not updating properly.
56. Fixed updated terminology for button and table headers.
57. Fixed updated Poisson's Ratio for several materials.
58. Update pavement image and table between iterations.
59. Improved CDF graph.
60. Fixed CDF results for PCR runs.
61. Fixed PCR runs for HMA on Rigid pavement with very small aircraft traffic.
62. Updated several aircraft characteristics on Aircraft.xml file.
63. Enabled multiple aircraft selection.
64. Improved functionality of Reset.
65. Improved functionality of Run/Cancel button.
66. Open a job file by double click.
67. Scroll bar on Traffic Mix.
68. Copy pavement and gear image to clipboard.
69. Edit and Create UDA aircraft screens functionality.
70. Improved CDF graph by adding the CDF data to the Aircraft object.
71. Removing Debug files from the code.
72. Fixed CDF Graph Scale.
73. Fixed PCR run on thin HMA on PCC.

74. Fixed PCR Report formatting issues
75. Fixed Pavement layering provisions.
76. Summary report shows status of each section in a job.
77. Validation of annual departure values (all must be non-negative, at least one must be positive).
78. Improved batch mode status information display.
79. Fixed ACR and PCR results.
80. Fixed layer Property screen (E-k-CBR display and unable to replace a layer).
81. Fixed wheel coordinate display.
82. Fixed track spacing for generic aircraft.
83. Fixed tire pressure and gross weight on main gear for A-340.
84. Fixed CDF for PCC on Rigid Overlay.

Version 2.0.1 (March 01, 2021)

1. Added hooks for automated testing.
2. Added working directory path to FileOpen() calls in the solution so that files are written to "My FAARFIELD" directory by default.
3. Changed traffic grid to allow aircraft with zero annual departures but require at least aircraft to have a positive number of departures.
4. Check for and disallow negative annual departures.
5. Corrected display of A340, C17, and C5 evaluation points. (Prior to correction, calculation results were correct, but the points were displayed incorrectly in the interface.)
6. Corrected issue giving wrong thickness for unbonded PCC overlays on rigid pavement.

Version 2.0 (January 28, 2021)

Version 2.0 replaced all previous versions on January 28, 2021. Significant changes from the previous version include:

1. Updated the Graphical User Interface to provide a similar look-and-feel to other Windows Desktop applications.
2. Updated reports and graphs.
3. Upgraded the finite element library for rigid pavement calculations for FAASR3D, which provides modern memory management and reduces runtime errors.
4. Updated and re-organized the files used by FAARFIELD to allow sharing job data with other users.
5. Consolidated the vehicle library into a single file.
6. Re-organized and updated vehicle library.
7. Added a graphical interface to create and edit user-defined vehicles.
8. Added a Pavement Condition Rating calculation module that calculates the ACR/PCR according to the ICAO method.
9. Updated help file to reflect new interface and features.

Version 1.42.0003 (September 18, 2017):

1. Extended the modification of interior slab design stress to 95% of the layered elastic stress (item 1 in ver. 1.42.002 update) to include PCC-on-rigid overlays and HMA-on-rigid overlays in addition to new rigid pavements.
2. Revised design examples in the Help file.

Version 1.42.0002 (August 23, 2017):

1. Changed the value of the interior slab stress for rigid pavement design to 95% of the layered elastic stress as computed by LEAF. Previously it was 100%. Design stress for new rigid pavements is now the larger of:
 - a. 75% of the maximum free edge stress as computed by 3D-FE for an aircraft gear loading the slab edge;
 - or

- b. 95% of the layered elastic stress as computed by LEAF. The new interior stress value better represents the case of an aircraft gear loading the center of a finite-sized slab that is part of a system of jointed slabs (with nominal 20-ft. joint spacing). The edge stress computation remains unchanged. This change primarily affects traffic mixes dominated by 6-wheel (and certain 4-wheel) gear configurations where the interior stress tends to control the design.
- 2. Updated the internal formula for allocating aircraft weight to the wing and body gears of the Airbus A340 series aircraft. The percent of gross taxi weight on the main gear is taken as 95% in all cases for pavement design; however, the proportion of aircraft gross weight assigned to the body gear depends on the gross taxi weight. This change applies to all A340-200/300 and A340-500/600 series aircraft in the internal library.
- 3. Fixed a bug that caused FAARFIELD to generate an error message if it encountered external library aircraft where the text “B747” or “A380” is part of the airplane name.

Version 1.41.0115 (May 2, 2017):

- 1. Fixed a bug that prevented rigid pavement designs from executing correctly when the program is running on computers with non-U.S. regional Windows settings.
- 2. Simplified the program logic for HMA-on-Rigid overlay Life and Design computations, when the option “Allow Flexible Computation for Thick Overlays on PCC” is selected, as follows:
 - a. For HMA overlay thickness design:
 - (i) First, compute the overlay life assuming that the HMA overlay thickness is equal to the PCC thickness minus 0.01 in. This computation uses the conventional HMA-on-rigid overlay model based on deterioration of the existing PCC.
 - (ii) If the overlay life in (i) equals the design life (within the life tolerance), then end the procedure with the final design HMA thickness equal to the PCC thickness.
 - (iii) If the overlay life in (i) is greater than the design life, then perform the design computations using the conventional HMA-on-rigid overlay model based on deterioration of the existing PCC. The final HMA overlay thickness will be less than the existing PCC layer thickness.
 - (iv) If the overlay life in (i) is less than the design life, then compute the life using the alternate HMA-on-rigid overlay model based on CDF in the subgrade and treating the existing PCC as a stiff base layer.
 - (1) If the alternate life computed in this step is less than the overlay life in (i), then perform the design computations using the conventional HMA-on-rigid overlay model based on deterioration of the existing PCC. The final HMA overlay thickness will be greater than the existing PCC layer thickness.
 - (2) If the alternate life computed in this step is greater than or equal to the overlay life in (i), then perform the design computations using the alternate HMA-on-rigid overlay model. The final HMA overlay thickness will be equal to or greater than that of the existing PCC layer.
 - b. For HMA overlay life computation:
 - (i) If the thickness of the HMA overlay is equal to or greater than the thickness of the existing PCC, the life is computed by both the conventional and alternate methods. The higher value of life is selected as the final overlay life.
 - (ii) If the thickness of the HMA overlay is less than the thickness of the existing PCC, the life is computed by the conventional method only.
 - (1) Corrected the label on the Options screen to read correctly “Allow Flexible Computation for Thick Overlays on PCC.”
 - (2) Modified the Help file to change references from Ingrid.dll to FAAMesh.

Version 1.41.0113 (March 8, 2017):

- 1. Changed the default structures associated with starting sections in Samples to be consistent with minimum thickness requirements given in AC 150/5320-6F.
- 2. Changed default traffic for the ACAggregate starting section in Samples.

3. Added a semi-trailer truck load to the Non-Airplane Vehicles group in the internal library.
4. Minimum thicknesses of standard layers were changed to comply with Tables 3-3 and 3-4 in AC 150/5320-6F.
5. FAARFIELD no longer enforces additional 1 in. (2.54 mm) of HMA thickness when P-208 base is used.
6. FAARFIELD now displays a “Non-Standard Structure” message if a P-208 base layer is used and the maximum aircraft gross weight is greater than or equal to 60,000 lbs.(27 220 kg).
7. FAARFIELD now displays a “Non-Standard Structure” message if the user attempts to place a stronger layer under a weaker one (e.g., P-304 under P-209).
8. Fixed a bug that prevented FAARFIELD from automatically saving a copy of the pavement design report after computing Life/Compaction.
9. Modified the format of output file NikePCC.out for PCC-on-rigid overlay computations. The new format clarifies whether stresses belong to the top (overlay) slab or bottom (existing) slab, and clarifies that reduced SCI values and associated moduli apply to the bottom (existing) slab, although the reported stresses may apply to the top (overlay) slab.

Version 1.41.0112 (January 17, 2017):

1. Changed Note 5 under “Subgrade Compaction Notes” on the design report regarding swelling soils to reference the current version of AC 150/5320-6.
2. Changed the default structure in the NewFlexible section in Samples job to be consistent with minimum thicknesses as given in AC 150/5320-6F (4 in. P-401 surface and 5 in. P-403 base).
3. Added the Saab 340 to the internal aircraft library.
4. Fixed a bug that caused an “outside bounds of array” error to occur when the structure includes Item P-219.
5. Corrected program so that the lower minimum layer thicknesses in AC 150/5320-6F, Table 3-3, column 3, are enforced only when all aircraft gross weights are < 12,500 lbs. (Previously allowed lower minimums for some aircraft that have GW >12,500 lbs. but <30,000 lbs.).
6. Corrected program so that minimum thickness for P-209 is 6 inches for airplane gross weight < 100,000 lbs. and >12,500 lbs. in accordance with AC 150/5320-6F, Table 3-3.

Version 1.41.0111 (November 10, 2016):

1. Added Airbus A350-100 and Bombardier CS100, and modified A350-900 in the aircraft library.
2. Replaced Fortran-based Ingrid.dll mesh generation library with Visual Basic FAAMesh class library.
3. Corrected a bug that affected computation of rigid design stress for non-symmetric gear configurations such as the C17A.
4. Fixed a bug that affected reading of job files created by FAARFIELD 1.305 containing A380 or B747 aircraft types.
5. Corrected formatting errors in the FAARFIELD Help file.

FAARFIELD Version 1.41 replaced FAARFIELD 1.305 on Nov. 16, 2016.

Significant changes from FAARFIELD version 1.3 are as follows:

1. By default, user files (including job files) are stored in the working directory: C:\Users\[user name]\Documents\FAARFIELD. The default working directory can be changed within the program. It is recommended that a document directory be selected as the working directory.
2. Rigid and flexible failure models have been revised based on analysis of the latest full-scale test results from the FAA National Airport Pavement Test Facility (NAPTF). Users will notice that design thicknesses are different from previous versions.
3. By default, FAARFIELD generates a pdf design report that can be attached to Form 5100-1, Airport Pavement Design.
4. FAARFIELD 1.4 automatically generates design-specific compaction criteria. This feature computes a list of compaction control points for both flexible and rigid designs. The compaction tables are appended to the

pdf design report. For more information, refer to the relevant section of AC 150/5320-6F.

5. The automatic base layer thickness design feature has been extended to cover a wider variety of standard flexible pavement designs. FAARFIELD 1.4 now enforces a 5 in. (125 mm) minimum base thickness for stabilized base layers in flexible pavements, provided an improved subbase material (P-209 or better) is used. See the relevant sections of AC 150/5320-6F for details.
6. The 3D finite element mesh has been modified to provide greater accuracy in computing rigid pavement stresses.
7. The PCC-on-rigid and HMA-on-rigid overlay design procedures have been completely rewritten.
8. The aircraft library has been updated. The FAARFIELD aircraft library now includes newer aircraft types, including the Boeing 787 series, Airbus A350 series, Embraer, and others.
9. Treatment of certain multiple-gear aircraft has been changed. In version 1.3, when the Boeing B747 or Airbus A380 was selected, the strain was computed for all wheels in the main gear assembly, while pass-to-coverage (p/c) was computed for a single leg. In version 1.4, this has been changed so that when either the Boeing B747 or Airbus A380 is selected, FAARFIELD creates two separate entries in the design list (wing gear and body gear). The weights and numbers of departures are interlocked. This is similar to the treatment of other multiple-gear models (e.g., MD-11, A340).
10. Additional support has been added for user-defined aircraft gear configurations in the external aircraft library. For more details, see the FAARFIELD Help file.
11. A new category of non-airplane vehicles, including ARFF vehicles, has been added to the aircraft library.
12. The HMA fatigue model has been updated. The new model is based on the concept of Ratio of Dissipated Energy Change (RDEC) to determine asphalt fatigue failure. Fatigue damage (HMA CDF) is now computed at the bottom of all asphalt layers (surface, HMA base and overlay).
13. Implemented a new subbase sublayering and model (applicable to P-209 and P-154 layers) that eliminates discontinuities and improves convergence.
14. The Layer Type Selection dialog box has been reorganized.
15. The Undefined layer type is now designated as "User-Defined."
16. When operating in Metric units, the minimum allowable thickness for HMA is 100 mm (previously 101.6 mm). Similarly, the minimum thickness for base layers is 125 mm (previously 127 mm).
17. A new option for thick HMA-on-rigid overlay designs allows FAARFIELD to determine whether a flexible pavement design allows greater economy than a design based on deterioration of the existing PCC. By default, this option is on. See the relevant section of AC 150/5320-6F for more detail.
18. The method of computing interaction between wheels in tandem for flexible designs has been changed. Previously, the p/c ratio consisted of two components: one based on wander, and a tandem factor. In FAARFIELD 1.4, the p/c ratio displayed depends on wander only, which the effect of tandem gears is accounted for in the CDF by direct integration of the layered elastic strain response along a longitudinal profile through the point of maximum strain.