FAARFIELD 2.0
Update

Presented to: REDAC Briefing to Sub-committee on Airports
By: David R. Brill, P.E., Ph.D.
Date: March 3, 2021
Advisory Circular Status

  – Completed FAA legal review – final step.

• New AC 150/5335-5D, *Standardized Method of Reporting Airport Pavement Strength - PCR*.
  – Also in FAA legal review.

• Both ACs incorporate FAARFIELD 2.0 for design & PCR computations.
FAARFIELD 2.0

- **Major update from version 1.4:**
  - Completely redesigned GUI with improved screen flow and explorer-based navigation.
  - A new 3D finite element computational library, FAASR3D.
  - Support for the new ICAO ACR-PCR system.
  - Ability to add, save and edit user-defined vehicles.
  - Ability to work with multiple jobs/sections at once.
  - Updated aircraft library.
- **No change to thickness design requirements at this time.**
FAARFIELD 2.0 Organization

Aircraft Library

Aircraft Traffic Mix

Pavement Structure

INPUT

LEAF
Layered Elastic Analysis

FAAMesh
3D Mesh Generation

3D FEM Analysis

FAARFIELD LIBRARIES

OUTPUT

FAARFIELD MAIN PROGRAM

• Thickness Design
• Life
• Compaction
• PCR

ICAO-ACR
ACR Numbers

Federal Aviation Administration
March 3, 2021
FAARFIELD Update
FAASR3D –
FAA Structural Analysis in 3D

• Visual Basic.NET library.
• Replaces obsolete NIKE3D Fortran program.
  – Managed Code - compatible with Microsoft .NET memory management services.
  – Improves performance. Old code was subject to memory conflicts and crashing.
  – Freely distributable code.
• Continued updates to improve speed & efficiency.
GUI Modernization

Major improvements:
• Easier job and section entry.
• Explorer-based navigation.
• Improved screen re-sizing and appearance.
• Improved flow between screens.
• Ability to store traffic mixes.
• Rationalized data file structure.
• On-demand report generation.
• Remove program logic from GUI controls.
• Etc.
Explorer Navigation

- **FAARFIELD 2.0** supports multiple jobs open at the same time.
- Use the Explorer to navigate between jobs, and display:
  - Sections
  - Section Reports
  - PCR Reports/Graphs
  - 5010 Reports
  - Summary Reports (All sections in a job)
Four Functions in FAARFIELD 2.0

- **THICKNESS DESIGN** – Compute required thickness per AC 150/5320-6.
- **LIFE** – Compute structural life for a given structure and traffic mix.
- **COMPACATION** – Compute subgrade compaction requirements per AC 150/5320-6 for a given structure and traffic mix. (Applies to completed designs.)
- **PCR** – Compute Pavement Classification Rating (PCR) for the structure and traffic mix.
Select a pavement type from drop-down list
In Options, select preferred unit system.
You can change the structure in the table, or by clicking directly on the image.
Aircraft Selection

Aircraft library has been completely reorganized and updated for the FAARFIELD 2.0 release!
Aircraft Selection

Gear data displayed on screen (mouse over wheel to display coordinates)

Save aircraft mix to file (replaces “float aircraft”)
Run Thickness Design
Design Complete

Run time status displays here.

Computed CDF and P/C ratio for each aircraft.
Design Complete
Cumulative Damage Factor (CDF)
User-Defined Aircraft Mode

Create, edit and save user-defined aircraft within the program.
User-Defined Aircraft

- FAARFIELD treats UDA just like other library aircraft, except they have (UDA) appended to the aircraft name.
- UDA data are stored in files in: 
  \[C:\Users[\user]\Documents\My FAARFIELD\User Defined Aircraft\]
- UDA data are also saved to the job file – useful if a job is sent to another user.
FAARFIELD 2.0.e RC is the evaluation version of the FAARFIELD 2.0 airport pavement thickness design software accompanying DRAFT AC 150/5320-6G, Airport Pavement Design and Evaluation.

FAARFIELD 2.0.e RC features:
- A completely redesigned graphical user interface (GUI) with improved screen flow and explorer-based navigation.
- Support for the new ICAO ACR-PCR system (planned to replace ACN-PCN).
- New graphical vehicle editor provides the ability to add, save and edit user-defined vehicles.
- Updated aircraft library.
- Ability to work with multiple jobs/sections at once.

Notes:
- FAARFIELD stands for FAA Rigid and Flexible Iterative Elastic Layered Design. FAARFIELD 2.0 incorporates full 3D finite element responses to aircraft loads (for new rigid pavements and rigid overlays). The 3D finite element model used for rigid pavement design is computationally intensive and may result in long run times, depending on the computer characteristics. We would appreciate your comments concerning this program and your suggestions on how it could be improved.
- FAARFIELD 2.0 runs on Windows™ operating systems. Windows 7 or higher is recommended. Please follow installation instructions in the readme file.
- Point of contact: For questions, comments or further information concerning this program, please contact Dr. David R. Brill, FAA Airport Technology Branch, ANG-E262.

FAARFIELD 2.0.e RC is an evaluation version and is not currently an FAA design standard. To download the current standard software FAARFIELD 1.42, use the following link: FAARFIELD 1.42.
Thank You!

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Acknowledgments:

FAA Airport Technology R&D Branch:
Dr. Michel Hovan, Branch Manager;
Jeff Gagnon, Airport Pavement Section Manager

FAA Airport Engineering Division:
Doug Johnson (retired); Harold Honey

GDIT International:
Dr. Izydor Kawa; Dr. Qiang Wang; Dr. Yuanguo Chen; Dr. Kairat Tuleubekov; Shawn Hershman

ARA:
Tim Parsons; Richard Speir; Aliasghar Dormohammadi; Maoyun Li