

FAA Pavement Design

Rigid Pavement FAARFIELD Design Example

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Federal Aviation
Administration



FAARFIELD Rigid Pavement Design

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

- GE example
- ACPA Workshop
- bob
- checkinbase
- DENPCN
- designsampleinGE
- fulldepthACC
- joplin
- lightdutydesign
- myrtlebeach
- rigid
- Samples
- schuler
- SegPistaAptoCancu
- TestASCE example

Organization

New Job

Delete Job

Dyp. Section

Copy Section

Delete Section

Data Input

Structure

Notes

Options

Exit

Accompanies Draft AC 150/5320-6E

FAARFIELD - Modify and Design Section NewRigid in Job rigid

Section Name: NewRigid, Pavement Type: New Rigid

rigid NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
Non-Standard Structure		
P-209 Cr Ag	10.00	
Subgrade		k = 180.0

Total thickness to the top of the subgrade

Design Stopped 1004.20;

Aircraft

Back Help Life Modify Structure Design Stopped

FAARFIELD - Create or Modify Aircraft for Section NewFlex in Job GE example

Aircraft Name (11)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	1 st Dep
A340-600 std ...	805,128	1,000	0.00	2
A380-800	1,239,000	300	0.00	1
B737-800	174,700	2,000	0.00	4
B747-400	877,000	400	0.00	1
B747-400ER	913,000	300	0.00	1
B757-300	271,000	1,200	0.00	2
B767-400 ER	451,000	800	0.00	1
B777-300 ER	777,000	1,000	0.00	2
B787-9	478,000	600	0.00	1

Aircraft Group

Generic

- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- SwL-50
- Sngl Wt-3
- Sngl Wt-5
- Sngl Wt-10
- Sngl Wt-12.5
- Sngl Wt-15
- Sngl Wt-20
- Sngl Wt-30
- Sngl Wt-45
- Sngl Wt-60
- Sngl Wt-75
- Dual Wt-10
- Dual Wt-20
- Dual Wt-30
- Dual Wt-45
- Dual Wt-60
- Dual Wt-75
- Dual Wt-100

Add Remove

Save List Clear List

Save to Float Add Float

Float Aircraft

Back Help View Gear

FAARFIELD Rigid Pavement Design

Starting Screen – No Job Files Created

Click on "New Job"

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Section Name	Pavement Type
ACAggregate	New Flexible
AConFlex	AC on Flexible
AConRigid	AC on Rigid
NewFlexible	New Flexible
NewRigid	New Rigid
PCConFlex	PCC on Flexible
PCConRigid	Unbonded on Rigid

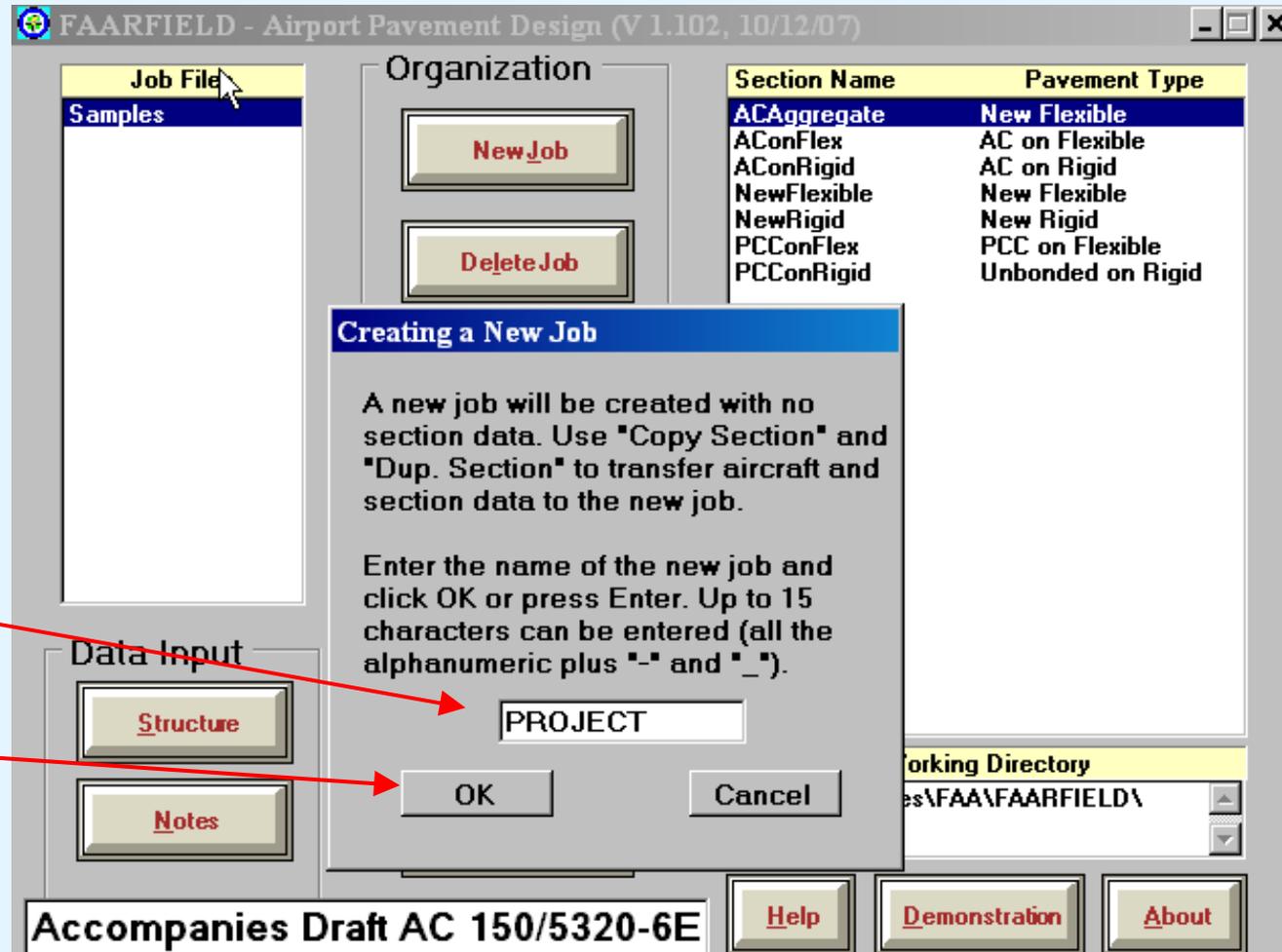
Working Directory
C:\Program Files\FAA\FAARFIELD\

Accompanies Draft AC 150/5320-6E

Help Demonstration About

FAARFIELD Rigid Pavement Design

Creating / Naming a Job File



Enter Job Title

Click OK

FAARFIELD Rigid Pavement Design

Copy Basic Section/Pavement Type From Samples

Click on "samples" →

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

- PROJECT
- Samples

Organization

- New Job
- Delete Job
- Dup. Section
- Copy Section
- Delete Section

Data Input

- Structure
- Notes

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help Demonstration About

Accompanies Draft AC 150/5320-6E

FAARFIELD Rigid Pavement Design

Copy Basic Section/Pavement Type From Samples

Default Basic Pavement Sections

Click on "Copy Section"

The screenshot shows the FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07) interface. It features a 'Job Files' panel on the left with 'PROJECT Samples' selected. A central 'Organization' panel contains buttons for 'New Job', 'Delete Job', 'Dup. Section', 'Copy Section', and 'Delete Section'. A 'Data Input' panel at the bottom left has 'Structure' and 'Notes' buttons. A 'Working Directory' panel at the bottom right shows 'C:\Program Files\FAA\FAARFIELD\'. At the bottom, there are 'Help', 'Demonstration', and 'About' buttons. A status bar at the very bottom reads 'Accompanies Draft AC 150/5320-6E'.

Section Name	Pavement Type
ACAggregate	New Flexible
AConFlex	AC on Flexible
AConRigid	AC on Rigid
NewFlexible	New Flexible
NewRigid	New Rigid
PCConFlex	PCC on Flexible
PCConRigid	Unbonded on Rigid

FAARFIELD Rigid Pavement Design

7 Basic Starting Structures in FAARFIELD

Section Name	Pavement Type
ACAggregate	New flexible on Aggregate base
AConFlex	Asphalt overlay on Flexible pavement
AConRigid	Asphalt overlay on Rigid pavement
NewFlexible	New Flexible on stabilized base
NewRigid	New Rigid on stabilized base
PCConFlex	PCC overlay on flexible
PCConRigid	Unbonded PCC on rigid

Be sure to select the pavement type that most correctly represents your pavement needs

FAARFIELD Rigid Pavement Design

Copy a Typical Pavement Section

Click on desired pavement section

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

PROJECT
Samples

Select a section to be copied from the right hand list box.

Then select the job to copy it to from the left hand list box.

Click End Copy when done or if you make a mistake selecting the section.

Section Name **Pavement Type**

ACAggregate	New Flexible
AConFlex	AC on Flexible
AConRigid	AC on Rigid
NewFlexible	New Flexible
NewRigid	New Rigid
PCConFlex	PCC on Flexible
PCConRigid	Unbonded on Rigid

End Copy

Delete Section

Options

Exit

Data Input

Structure

Notes

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help **Demonstration** **About**

Accompanies Draft AC 150/5320-6E

Then click on the project where the section will be saved

FAARFIELD Rigid Pavement Design

Create a New Job Title

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

- 6Eexample
- ACPA-Workshop
- bob
- checkminbase
- DENPCN
- designexamplein6E
- fulldepthACC
- joplin
- lightdutydesign
- myrtlebeach
- PROJECT**
- rigid
- Samples
- schuler
- SegPistaAeptoCanc
- TestASCEexample

Select a section to be copied from the right hand list box.

Then select the job to copy it to from the left hand list box.

Click End Copy when done

Section Name	Pavement Type
ACAggregate	New Flexible
AConFlex	AC on Flexible
AConRigid	AC on Rigid
NewFlexible	New Flexible
NewRigid	New Rigid
PCConFlex	PCC on Flexible
PCConRigid	Unbonded on Rigid

Copying a Section

To copy the section with the name unchanged, click OK or press Enter. Otherwise, enter a new name and click OK or press Enter.

Up to twelve alphanumeric characters can be entered.

Data Input

Accompanies Draft AC 150/5320-6E

ng Directory
AA\FAARFIELD\

Enter Section Title

Click OK

FAARFIELD Rigid Pavement Design

Create a New Job Title

The screenshot shows the FAARFIELD software interface. The title bar reads "FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)".

Job Files

- 6Eexample
- ACPA-Workshop
- bob
- checkminbase
- DENPCN
- designexamplein6E
- fulldepthACC
- joplin
- lightdutydesign
- myrtlebeach
- PROJECT
- rigid
- Samples**
- schuler
- SegPistaAeptoCanc
- TestASCEexample

Data Input

- Structure
- Notes

Section Name

Section Name	Pavement Type
ACAggregate	New Flexible
AConFlex	AC on Flexible
AConRigid	AC on Rigid
NewFlexible	New Flexible
NewRigid	New Rigid
PCConFlex	PCC on Flexible
PCConRigid	Unbonded on Rigid

Working Directory

C:\Program Files\FAA\FAARFIELD\

Accompanies Draft AC 150/5320-6E

Buttons: End Copy, Delete Section, Options, Exit, Help, Demonstration, About

Instructions:

- Select a section to be copied from the right hand list box.
- Then select the job to copy it to from the left hand list box.
- Click End Copy when done or if you make a mistake selecting the section.

Annotation: A red arrow points from the text "Click 'End Copy'" to the "End Copy" button.

FAARFIELD Rigid Pavement Design

Working with a Design Structure

The screenshot displays the FAARFIELD software interface. The title bar reads "FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)". The interface is divided into several sections:

- Job Files:** A list of job files including "6Eexample", "ACPA-Workshop", "bob", "checkminbase", "DENPCN", "designexamplein6E", "fulldepthACC", "joplin", "lightdutydesign", "myrtlebeach", "PROJECT" (highlighted in blue), "rigid", "Samples", "schuler", "SegPistaAeptoCanc", and "TestASCEexample".
- Organization:** A vertical column of buttons: "New Job", "Delete Job", "Dup. Section", "Copy Sections", "Delete Section", "Options", and "Exit".
- Data Input:** Buttons for "Structure" and "Notes".
- Table:** A table with two columns: "Section Name" and "Pavement Type". The "NewRigid" row is highlighted in blue.
- Working Directory:** A text box showing "C:\Program Files\FAA\FAARFIELD\".
- Footer:** A status bar with "Accompanies Draft AC 150/5320-6E" and three buttons: "Help", "Demonstration", and "About".

Section Name	Pavement Type
ACConPCC	AC on Rigid
NewFlexible	New Flexible
NewRigid	New Rigid
Overlay	AC on Flexible

Select the job and then select the section you want to analyze

Click on "Structure" To open the file

FAARFIELD Rigid Pavement Design

Working with a Pavement Section

The selected sample pavement will appear

The structure may be modified if desired

The screenshot displays the FAARFIELD software interface for modifying and designing a pavement section. The window title is "FAARFIELD - Modify and Design Section NewRigid in Job PROJECT".

Section Names:

- ACConPCC
- NewFlexible
- NewRigid** (selected)
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	75,000
Subgrade	k = 141.4	15,000

Total thickness to the top of the subgrade, t = 26.00 in

Buttons at the bottom: Back, Help, Life, **Modify Structure**, Design Structure, Save Structure.

FAARFIELD Rigid Pavement Design

Modifying a Pavement Section

Click on the box around the layer material you want to modify

FAARFIELD - Modify and Design Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

Design Stopped
1004.20;

Aircraft

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	75,000
Subgrade	k = 141.4	15,000

Total thickness to the top of the subgrade, t = 26.00 in

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Rigid Pavement Design

Modifying a Pavement Section

Select the layer type you want to include in your pavement section

No modification required for this example

Click OK

FAARFIELD - Modifying Section NewRigid in Job PROJECT

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
		700
		700,000
		75,000
		15,000

Total thickness to the top of the subgrade, t = 26.00 in

Layer Type Selection

- Undefined
- Subgrade
- Aggregate
 - P-208 (see Note)
 - P-209 Crushed
 - P-154 Uncrushed
- HMA: All P-401/P-403
 - Surface
 - Overlay
- Stabilized (flexible)
 - Variable
 - P-401/P-403 HMA
- PCC: All P-501
 - Surface
 - Overlay fully unbonded
 - Overlay partially bonded
 - Overlay on flexible
- Stabilized (rigid)
 - Variable
 - P-301 Soil Cement Base
 - P-304 Cement Treated Base
 - P-306 Econocrete Subbase
 - Rubblized PCC Base

OK Cancel

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Rigid Pavement Design

Limitations for Pavement Layers

The types of layers that may be used in FAARFIELD are limited to those shown.

Placement of layers may also be limited e.g. you couldn't put a P-501 surface layer at the bottom of a structure

The "Undefined" and "Variable" stabilized layers allow some customization of layers

Layer Type Selection

- Undefined
- Subgrade
- Aggregate
 - P-208 [\(see Note\)](#)
 - P-209 Crushed
 - P-154 Uncrushed
- HMA: All P-401/ P-403
 - Surface
 - Overlay
- Stabilized (flexible)
 - Variable
 - P-401/ P-403 HMA
- PCC: All P-501
 - Surface
 - Overlay fully unbonded
 - Overlay partially bonded
 - Overlay on flexible
- Stabilized (rigid)
 - Variable
 - P-301 Soil Cement Base
 - P-304 Cement Treated Base
 - P-306 Econocrete Subbase
 - Rubblized PCC Base

OK Cancel

FAARFIELD Rigid Pavement Design

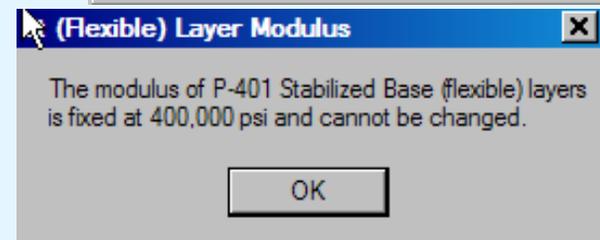
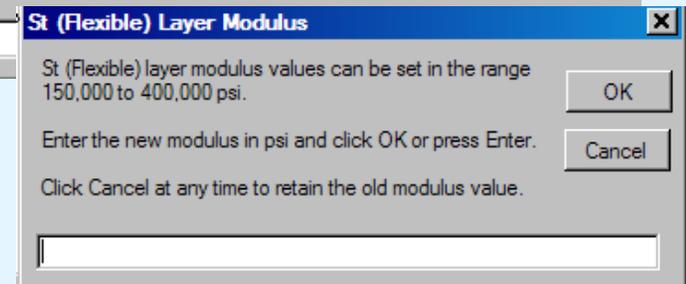
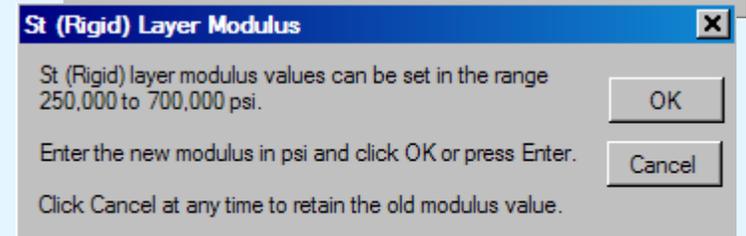
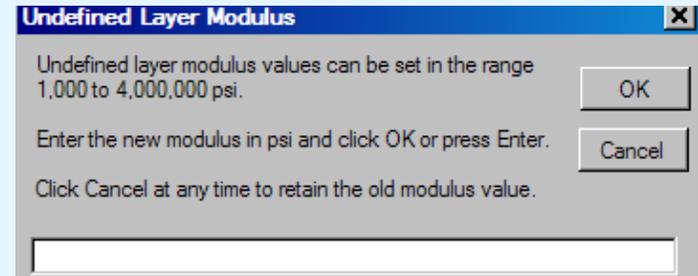
Undefined and Variable Pavement Layers

The “undefined” layer allows the modulus to range from 1,000 to 4,000,000 psi

The “Variable” (rigid) stabilized layer allows the modulus to range from 250,000 to 700,000

The “Variable” (flexible) stabilized layer allows the modulus to range from 150,000 to 400,000 psi

The “P-401 Asphalt” stabilized layer has a fixed modulus of 400,000 psi



FAARFIELD Rigid Pavement Design

Modifying a Pavement Section

Click on a property to modify any of the layer properties

Confirm the subgrade k-value for this example

FAARFIELD - Modifying Section NewRigid in Job PROJECT

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 Econcrete	6.00	700,000
P-209 Cr Ag	6.00	75,000
Subgrade	k = 141.4	15,000

Total thickness to the top of the subgrade, t = 26.00 in

Design Stopped 1004.20;

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Rigid Pavement Design

Modifying a Pavement Section

Enter the new value for the material property

*** some materials will have limits on property values*

use 141.4 for this example

Click OK

FAARFIELD - Modifying Section NewRigid in Job PROJECT

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
		10,000
		5,000
Subgrade	k = 141.4	15,000

Total thickness to the top of the subgrade, t = 26.00 in

Design Stopped 1004.20;

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Rigid Pavement Design

Modifying a Pavement Section

Note: PCC strength range 500 – 800 psi

Enter the desired flexural strength

Click "OK"

FAARFIELD - Modifying Section NewRigid in Job PROJECT

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC	18.15	700
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 28.15 in

PCC Flexural Strength

The modulus of PCC layers is fixed at 4,000,000 psi.

PCC flexural strength (R) can be set in the range 500 to 800 psi.

Enter the new R value in psi and click OK or press Enter.

700

OK Cancel

Modifying Structure

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Rigid Pavement Design

Using FAARFIELD – Layer Properties

P-306 Econocrete	6.00	700,000
P-209 Cr Ag	6.00	25,746
Subgrade	k = 10000	9.616

Note:

If you try to change the modulus value for an aggregate layer the program notifies you that these layers are set automatically.

Ag Crushed Layer Modulus

The modulus value of an aggregate layer is set automatically and cannot be adjusted.

Also, aggregate layers thicker than 8 inches, for uncrushed, or 10 inches, for crushed, are automatically subdivided into thinner layers

The displayed modulus value is the average of the sublayer modulus values.

OK

FAARFIELD Rigid Pavement Design

Modifying a Pavement Section

FAARFIELD - Modifying Section NewRigid in Job PROJECT

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	75,000
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 26.00 in

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay

Design Stopped 1004.20;

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

New values appear in the structure window

Click End Modify

FAARFIELD Rigid Pavement Design

Enter Traffic Mixture

FAARFIELD - Modify and Design Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 E concrete	6.00	700,000
P-209 CrAg	6.00	75,000
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 26.00 in

Design Stopped 1004.20;

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Click on "Aircraft"
To enter traffic mix

FAARFIELD Rigid Pavement Design

Enter Traffic Mixture

FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT

Aircraft Group	Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Generic	DC10-10	458,000	2,263	0.00	45,200
Airbus	B747-200B C...	833,000	832	0.00	16,600
Boeing	B777-200 ER	634,500	425	0.00	8,500
Other Commercial					
General Aviation					
Military					
External Library					

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

You may want to clear any existing aircraft

f

FAARFIELD Rigid Pavement Design

Enter Traffic Mixture

FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
DC10-10	458,000	2,263	0.00	45,200
B747-200B C...	833,000	832	0.00	16,600
B777-200 ER	634,500	425	0.00	8,500

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

Click on the aircraft group desired.

Then select the desired aircraft and click "Add"

Repeat for complete traffic mixture

FAARFIELD Rigid Pavement Design

Traffic Mix for this Example

Aircraft Name	Gross Taxi Weight, lb	Annual Departures	Annual Growth, %
Adv. B727-200 Option	210,000	1200	0.0
B747-400	877,000	800	0.0
B777-200 ER	657,000	1200	0.0

FAARFIELD Rigid Pavement Design

Enter Traffic Mixture

FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Adv. B727-20...	210,000	1,200	0.00	24,000
B747-400	877,000	1,200	0.00	24,000
B777-200 ER	657,000	1,200	0.00	24,000

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- B747-100 SF
- B747-200B Combi Mixd
- B747-300 Combi Mixed
- B747-400
- B747-400ER
- B747-SP
- B757-200
- B757-300
- B767-200
- B767-200 ER
- B767-300 ER
- B767-400 ER
- B777-200 Baseline
- B777-200 ER
- B777-200LR
- B777-300 Baseline
- B777-300 ER
- B787-8
- B787-9

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

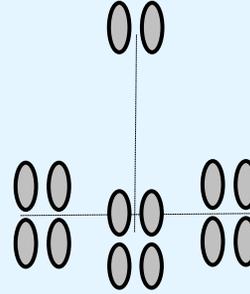
Float Aircraft

The user can modify:
Gross Weight
Annual Departures
% Annual Growth

Other necessary airplane information is stored internally and can not be modified

FAARFIELD Rigid Pavement Design

Enter Traffic Mixture



2D/2D1
A340-600

Certain aircraft may appear in the list twice. This is to address the presence of wing gears and belly gears

FAARFIELD treats these as two aircraft however the weight and departures are interlocked

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

Aircraft Group	Aircraft Name (11)	Gross Taxi Weight (lbs)	Annual Departures	% Annu Growth
Generic	A320-100	150,796	600	0.00
Generic	A340-600 std	805,128	1,000	0.00
Generic	A340-600 std Belly	805,128	1,000	0.00
Generic	A380-800	1,239,000	300	0.00
Generic	B737-800	174,700	2,000	0.00
Generic	B747-400	877,000	400	0.00
Generic	B747-400ER	913,000	300	0.00
Generic	B757-300	271,000	1,200	0.00
Generic	B767-400 ER	451,000	800	0.00
Generic	B777-300 ER	777,000	1,000	0.00
Library Aircraft	SWL-50			
Library Aircraft	Sngl Whl-3			
Library Aircraft	Sngl Whl-5			
Library Aircraft	Sngl Whl-10			
Library Aircraft	Sngl Whl-12.5			
Library Aircraft	Sngl Whl-15			
Library Aircraft	Sngl Whl-20			
Library Aircraft	Sngl Whl-30			
Library Aircraft	Sngl Whl-45			
Library Aircraft	Sngl Whl-60			

FAARFIELD Rigid Pavement Design

Adjusting Aircraft Information – Gross Weight

Click on the aircraft gross weight to change the weight

FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT

Aircraft Group	Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Generic	Adv. B727-20...	210,000	1,200	0.00	24,000
Airbus	B747-400	877,000	1,200	0.00	24,000
Boeing	B777-200 ER	657,000	1,200	0.00	24,000
Other Commercial					
General Aviation					
Military					
External Library					

Library Aircraft

- B747-100 SF
- B747-200B Combi Mixd
- B747-300 Combi Mixed
- B747-400
- B747-400ER
- B747-SP
- B757-200
- B757-300
- B767-200
- B767-200 ER
- B767-300 ER
- B767-400 ER
- B777-200 Baseline
- B777-200 ER**
- B777-200LR
- B777-300 Baseline
- B777-300 ER
- B787-8
- B787-9

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

FAARFIELD Rigid Pavement Design

Adjusting Aircraft Information – Gross Weight

Enter the new weight and click OK

The screenshot displays the FAARFIELD software interface for creating or modifying aircraft information. The main window is titled "FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT". It features a table of aircraft data and a dialog box for adjusting the gross load of a selected aircraft.

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Adv. B727-20...	210,000	1,200	0.00	24.0
B747-400	877,000	1,200	0.00	24.0
B777-200 ER	657,000	1,200	0.00	24.0

The dialog box, titled "Changing Aircraft Gross Load", provides the following information:

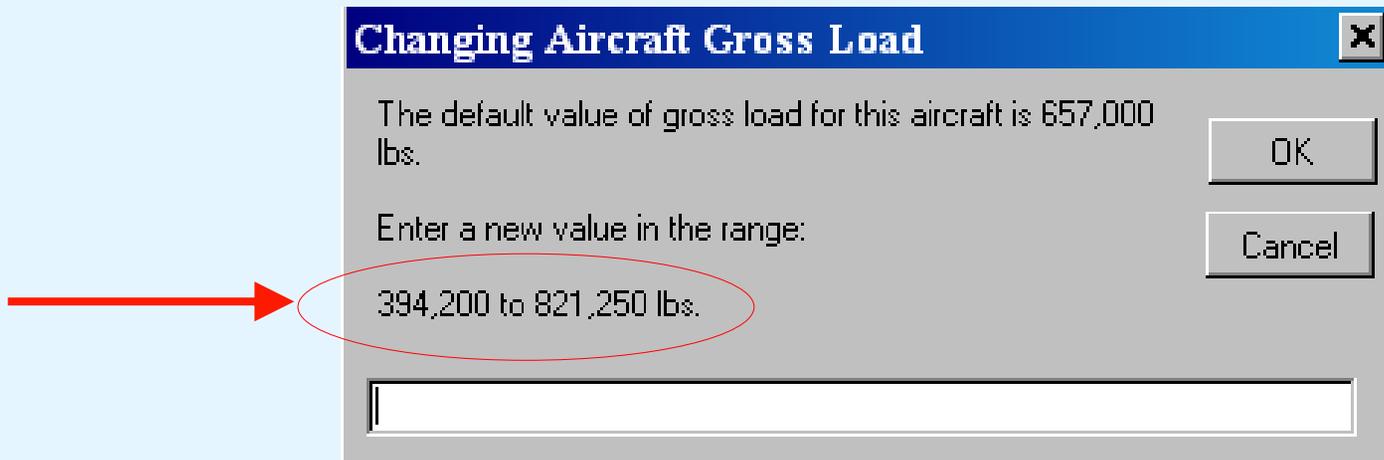
- The default value of gross load for this aircraft is 657,000 lbs.
- Enter a new value in the range: 394,200 to 821,250 lbs.
- The input field contains the value 657000.
- Buttons for "OK" and "Cancel" are present.

The main interface also includes a list of aircraft groups (Generic, Airbus, Boeing, Other Commercial, General Aviation, Military, External Library) and a list of library aircraft (B747-100 SF, B747-200B Combi Mixd, B747-300 Combi Mixed, B747-400, B747-400ER, B747-SP, B757-200, B757-300, B767-200, B767-200 ER, B767-300 ER, B767-400 ER, B777-200 Baseline, B777-200 ER, B777-200LR, B777-300 Baseline, B777-300 ER, B787-8, B787-9). At the bottom, there are buttons for "Back", "Help", and "View Gear".

FAARFIELD Rigid Pavement Design

Airplane Information – Gross Weight Limitations

There are limitations on changes to aircraft gross weights. A range is provided for each aircraft which represents reasonable weights for the aircraft



FAARFIELD Rigid Pavement Design

Adjusting Aircraft Information – Annual Departures

Click on “Annual Departures” to change departures for an aircraft

FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT

Aircraft Group	Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Generic	Adv. B727-20...	210,000	1,200	0.00	24,000
Airbus	B747-400	877,000	1,200	0.00	24,000
Boeing	B777-200 ER	657,000	1,200	0.00	24,000
Other Commercial					
General Aviation					
Military					
External Library					

Library Aircraft

- B747-100 SF
- B747-200B Combi Mixd
- B747-300 Combi Mixed
- B747-400
- B747-400ER
- B747-SP
- B757-200
- B757-300
- B767-200
- B767-200 ER
- B767-300 ER
- B767-400 ER
- B777-200 Baseline
- B777-200 ER**
- B777-200LR
- B777-300 Baseline
- B777-300 ER
- B787-8
- B787-9

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

FAARFIELD Rigid Pavement Design

Adjusting Aircraft Information – Annual Departures

Enter the annual departures of the aircraft
Click OK

Current program limits on annual departures:
0 to 100,000

The screenshot shows the FAARFIELD software interface. The main window is titled "FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT". It features a table of aircraft information and a dialog box for adjusting annual departures.

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Adv. B727-20...	210,000	1,200	0.00	24,000
B747-400	877,000	1,200	0.00	24,000
B777-200 ER	657,000	1,200	0.00	24,000

The dialog box, titled "Changing Annual Departures", prompts the user to enter a new value for annual departures in the range of 0 to 100,000. The current value is 800. The dialog box includes "OK" and "Cancel" buttons.

Buttons at the bottom of the interface include: Back, Help, View Gear, Save List, Clear List, Save to Float, and Add Float.

FAARFIELD Rigid Pavement Design

Annual Departures in FAARFIELD

- **Annual departures has the same meaning as the previous design procedure.**
- **Arrivals are ignored.**
- **For design purposes FAARFIELD uses the total annual departures, adjusted for growth, multiplied by the total design period in years**

e.g. 1200 annual departures X 20 years = 24,000
departures

FAARFIELD Rigid Pavement Design

Adjusting Airplane Information –

% Annual Growth of Annual Departures

Click on the annual growth value to bring up the pop-up box.

Enter the percent annual growth and click OK

The screenshot displays the FAARFIELD software interface. The main window title is "FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT". The interface is divided into several sections:

- Aircraft Group:** A list of aircraft groups including Generic, Airbus, Boeing, Other Commercial, General Aviation, Military, and External Library. "Boeing" is selected.
- Library Aircraft:** A list of specific aircraft models including B747-100 SF, B747-200B Combi Mixd, B747-300 Combi Mixed, B747-400, B747-400ER, B747-SP, B757-200, B757-300, B767-200, B767-200 ER, B767-300 ER, B767-400 ER, B777-200 Baseline, B777-200 ER (selected), B777-200LR, B777-300 Baseline, B777-300 ER, B787-8, and B787-9.
- Aircraft Data Table:** A table with columns: Aircraft Name (3), Gross Taxi Weight (lbs), Annual Departures, % Annual Growth, and Total Departures. The data is as follows:

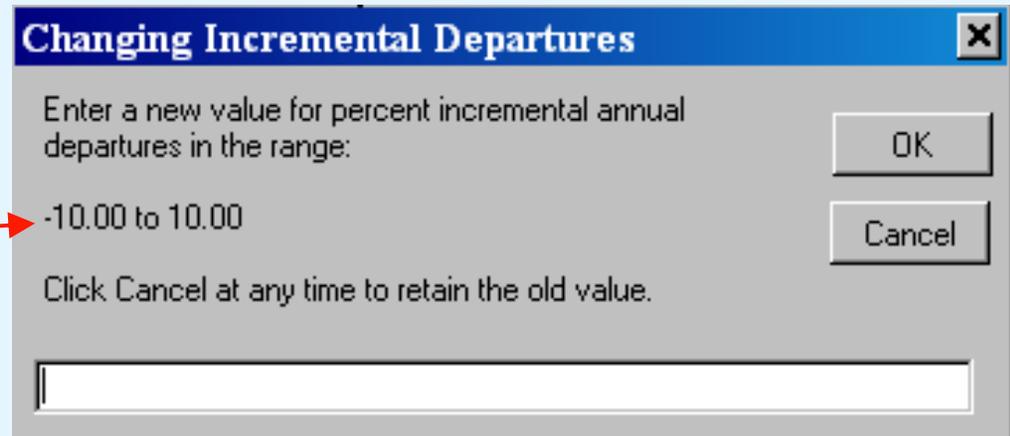
Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Adv. B727-20...	210,000	1,200	0.00	24,000
B747-400	877,000	800	0.00	16,000
B777-200 ER	657,000	1,200	0.00	24,000
- Changing Incremental Departures Dialog Box:** A pop-up dialog box with the title "Changing Incremental Departures". It contains the text: "Enter a new value for percent incremental annual departures in the range: -10.00 to 10.00. Click Cancel at any time to retain the old value." There are "OK" and "Cancel" buttons.
- Buttons:** At the bottom of the interface, there are buttons for "Save List", "Clear List", "Save to Float", "Add Float", "Back", "Help", and "View Gear".

FAARFIELD Rigid Pavement Design

Adjusting Aircraft Information –

% Annual Growth of Annual Departures

Allowable range of
percent annual growth is
+/- 10%



You can create the same effect by modifying the annual departures such that the total annual departures results in the desired total.

FAARFIELD Rigid Pavement Design

Viewing Aircraft Information

FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT

Aircraft Group

- Generic
- Airbus
- Boeing**
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- B747-100 SF
- B747-200B Combi Mixd
- B747-300 Combi Mixed
- B747-400
- B747-400ER
- B747-SP
- B757-200
- B757-300
- B767-200
- B767-200 ER
- B767-300 ER
- B767-400 ER
- B777-200 Baseline
- B777-200 ER**
- B777-200LR
- B777-300 Baseline
- B777-300 ER
- B787-8
- B787-9

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Adv. B727-20...	210,000	1,200	0.00	24,000
B747-400	877,000	800	0.00	16,000
B777-200 ER	657,000	1,200	0.00	24,000

Float Aircraft

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Scroll over to reveal additional columns of information

FAARFIELD Rigid Pavement Design

Aircraft Information

Available in FAARFIELD aircraft screen

User can modify

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth
Adv. B727-20...	210,000	1,200	0.00
B747-400	877,000	800	0.00
B777-200 ER	657,000	1,200	0.00

Calculated values

Total Departures	CDF Contribution	CDF Max for Aircraft	P/C Ratio
24,000	0.00	0.00	0.00
16,000	0.00	0.00	0.00
24,000	0.00	0.00	0.00

Airplane information stored in FAARFIELD

Tire Press. (psi)	Percent GW on Gear	Dual Spacing (in)	Tandem Spacing (in)	Tire Contact Width (in)	Tire Contact Length (in)
173	47.5	34.00	0.00	15.15	24.23
200	95.0	44.00	58.00	14.39	23.03
205	47.5	55.00	57.00	14.21	22.73

FAARFIELD Rigid Pavement Design

Viewing Aircraft Information

The screenshot displays the FAARFIELD software interface. The window title is "FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT". The interface is divided into several sections:

- Aircraft Group:** A list of categories including Generic, Airbus, Boeing (highlighted), Other Commercial, General Aviation, Military, and External Library.
- Library Aircraft:** A scrollable list of aircraft models such as B737-600, B737-700, B737-800, B737-900 ER, B737 BBJ2, B747-100 SF, B747-200B Combi Mixd, B747-300 Combi Mixed, B747-400, B747-400ER, B747-SP, B757-200, B757-300, B767-200, B767-200 ER, B767-300 ER, B767-400 ER, B777-200 Baseline, and B777-200 ER (highlighted).
- Aircraft Table:** A table with columns for Aircraft Name (3), CDF Contribution, CDF Max for Aircraft, P/C Ratio, and Tire Press. The table contains three rows of data, all with zero values for CDF Contribution and CDF Max for Aircraft, and zero for P/C Ratio. The aircraft names are Adv. B727-20..., B747-400, and B777-200 ER.
- Buttons:** A set of control buttons including Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, and View Gear.
- Float Aircraft:** A section labeled "Float Aircraft" with a large empty white box.

Red arrows and text annotations provide instructions:

- "CDF columns and P/C ratio will be zero when aircraft are first entered" points to the zero values in the table.
- "Save the list when finished entering airplanes then click the back button" points to the Save List and Back buttons.

FAARFIELD Rigid Pavement Design

Performing the Pavement Design

The layer with the small arrow is the layer that will be adjusted to provide the structural design

The location of the arrow is determined by the type of pavement structure

FAARFIELD - Modify and Design Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	75,000
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 26.00 in

Status

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Rigid Pavement Design

Layer Adjusted During Design

PAVEMENT TYPE	LAYER ADJUSTED
ACAggregate	P-154 Subbase
AConFlex	P-401 AC Overlay
AConRigid	P-401 AC Overlay
NewFlexible	P-209 subbase
NewRigid	PCC Surface
PCConFlex	PCC Overlay on Flex
PCConRigid	PCC Overlay Unbond

For New flexible sections the arrow can be moved by double clicking next to the desired base or subbase layer during “modify design” mode.

FAARFIELD Rigid Pavement Design

Design Life

Click on the "des. Life" to change number of years for the design period.

FAARFIELD - Modifying Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
		100,000
		5,000
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 26.00 in

Modifying Structure

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

When the pop-up box appears, enter the desired number of years.

NOTE: the standard FAA design is for 20 years

FAARFIELD Flexible Pavement Design

Performing the Pavement Design

You are now ready to design the structure. Simply click on "Design Structure"

The program will keep you informed about the status of the design

FAARFIELD - Modify and Design Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	14.00	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	75,000
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 26.00 in

Design Running 00:00:00

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Rigid Pavement Design

Result of the Pavement Design

FAARFIELD - Modify and Design Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	16.15	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	35,432
Subgrade	k = 141.4	15,002

Design Stopped
86.85; 85.96

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

N = 2, PCC CDF = 1.00; t = 28.15 in

The program will adjust the design layer until a CDF of 1.0 is achieved

FAARFIELD Rigid Pavement Design

Reviewing Aircraft Data After Completing the Design

The screenshot displays the FAARFIELD software interface. The title bar reads "FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job PROJECT". The interface is divided into several sections:

- Aircraft Group:** A list of aircraft groups including Generic, Airbus, Boeing, Other Commercial, General Aviation, Military, and External Library. "Generic" is selected.
- Library Aircraft:** A list of aircraft models including SWL-50, Sngl Whl-3, Sngl Whl-5, Sngl Whl-10, Sngl Whl-12.5, Sngl Whl-15, Sngl Whl-20, Sngl Whl-30, Sngl Whl-45, Sngl Whl-60, Sngl Whl-75, Dual Whl-10, Dual Whl-20, Dual Whl-30, Dual Whl-45, Dual Whl-50, Dual Whl-60, Dual Whl-75, and Dual Whl-100. "SWL-50" is selected.
- Aircraft Data Table:** A table with 5 columns: Aircraft Name (3), Total Departures, CDF Contribution, CDF Max for Aircraft, and P/C Ratio. The data is as follows:

Aircraft Name (3)	Total Departures	CDF Contribution	CDF Max for Aircraft	P/C Ratio
Adv. B727-20...	24,000	0.84	0.84	2.9
B747-400	16,000	0.16	0.27	3.0
B777-200 ER	24,000	0.01	0.28	4.0
- Controls:** A set of buttons including "Add", "Remove", "Save List", "Clear List", "Save to Float", "Add Float", "Back", "Help", and "View Gear".
- Float Aircraft:** A section labeled "Float Aircraft" with a large empty box below it.

CDF and P/C ratio information is now available

This information allows you to see which aircraft have the largest impact on the pavement structure

FAARFIELD Rigid Pavement Design

Saving and Reviewing the Pavement Design Data

FAARFIELD - Modify and Design Section NewRigid in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid**
- Overlay

PROJECT NewRigid Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
		100
		1,000
		432
Subgrade	k = 141.4	15,002

Design Stopped
86.85; 85.96

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Saving Structure Data

The data for the current pavement structure has changed.

Do you want to save the new data in section NewRigid?

All the changes will be lost if not saved.

Yes No Cancel

N = 2; PCC CDF = 1.00; t = 28.15 in

When finished with the design, click the "Back" button and select whether you want to save the data

FAARFIELD Rigid Pavement Design

Reviewing Design Information

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

- 6Eexample
- ACPA-Workshop
- bob
- checkminbase
- DENPCN
- designexamplein6E
- fulldepthACC
- joplin
- lightdutydesign
- myrtlebeach
- PROJECT**
- rigid
- Samples
- schuler
- SegPistaAeptoCanc
- TestASCEexample

Organization

- New Job
- Delete Job
- Dup. Section
- Copy Section
- Delete Section
- Options
- Exit

Data Input

- Structure
- Notes

Section Name	Pavement Type
AC on Rigid	AC on Rigid
New Flexible	New Flexible
New Rigid	New Rigid
Overlay	AC on Flexible

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help **Demonstration** **About**

Accompanies Draft AC 150/5320-6E

To view a summary of the design click the "Notes" button

FAARFIELD Rigid Pavement Design

Reviewing Design Information

You can view the summary data or copy it to other electronic media

Data can also be exported in XML to allow automated entry into FAA Form 5100

The screenshot shows the 'FAARFIELD - Notes and Information for Job PROJECT' window. On the left, a 'Section Names' list includes 'ACConPCC', 'NewFlexible', 'NewRigid' (selected), and 'Overlay'. The main area displays 'Design Information for Section NewRigid' with the following text:

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Section NewRigid in Job PROJECT.
Working directory is C:\Program Files\FAA\FAARFIELD\
The structure is New Rigid.
Design Life = 20 years.
A design for this section was completed on 01/25/08 at 10:02:40.

Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	PCC Surface	16.15	4,000,000	0.15	700
2	P-306 Econcrete	6.00	700,000	0.20	0
3	P-209 Cr Ag	6.00	35,432	0.35	0
4	Subgrade	0.00	15,002	0.40	0

Total thickness to the top of the subgrade = 28.15 in

Aircraft Information

	Gross Wt	Annual	% Annual

At the bottom, there are several buttons: 'Help', 'Back', 'SaveXML', 'Save', 'Print', 'Design Info', 'Notes', and 'Copy'. Red arrows point from the text on the left to these buttons: one to 'Help', one to 'SaveXML', and one to 'Copy'.

FAARFIELD Rigid Pavement Design

Reviewing Design Information

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Section NewRigid in Job PROJECT.

Working directory is C:\Program Files\FAA\FAARFIELD\

The structure is New Rigid.

Design Life = 20 years.

A design for this section was completed on 01/25/08 at 10:02:40.

Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	PCC Surface	16.15	4,000,000	0.15	700
2	P-306 Econocrete	6.00	700,000	0.20	0
3	P-209 Cr Ag	6.00	35,432	0.35	0
4	Subgrade	0.00	15,002	0.40	0

Total thickness to the top of the subgrade = 28.15 in

Aircraft Information

No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth	CDF Contribution	CDF Max for Aircraft	P/C Ratio
1	Adv. B727-200 Option	210,000	1,200	0.00	0.84	0.84	2.97
2	B747-400	877,000	800	0.00	0.16	0.27	3.46
3	B777-200 ER	657,000	1,200	0.00	0.01	0.28	4.04

FAARFIELD - Sample PCC Overlay Design

Overlay design is very similar to new pavement design except that the design is only allowed to iterate on the overlay layer

The steps and options are similar to that of a new flexible design



FAARFIELD - Sample PCC Overlay Design

There are 4 basic overlay structures in FAARFIELD

Section Name Pavement Type

AConFlex	Asphalt overlay on Flexible pavement
AConRigid	Asphalt overlay on Rigid pavement
PCConFlex	PCC overlay on flexible
PCConRigid	Unbonded PCC on rigid

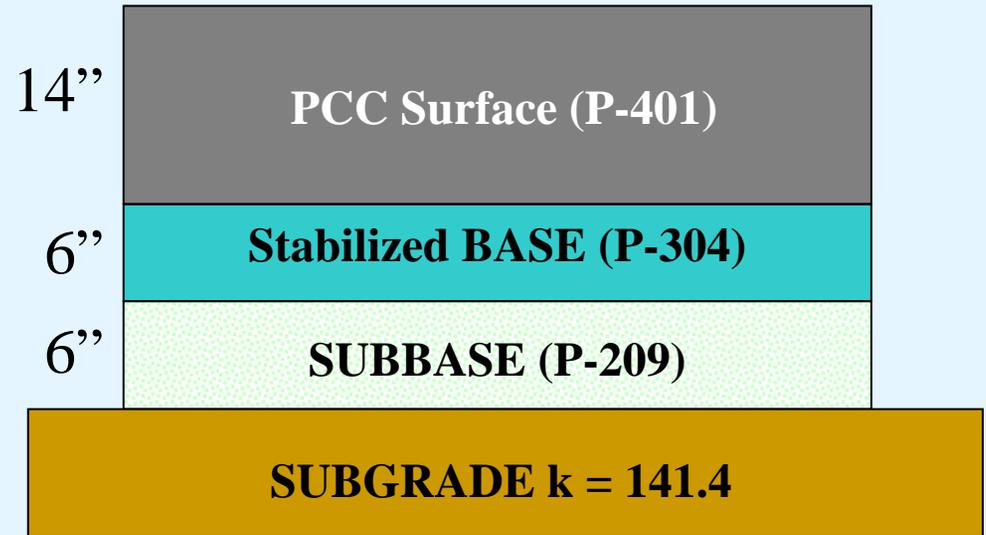
FAARFIELD – PCC Unbonded Overlay Design

For this example, assume the pavement section is to be strengthened for a new traffic mix.

PCC flexural strength = 700 psi

Current SCI = 40

Existing Pavement Section



FAARFIELD – PCC Unbonded Overlay Design

Create Existing Pavement Section for Overlay Design

Copy a similar pavement section or create a new section to represent the existing pavement

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files	Organization	Section Name	Pavement Type
6Eexample	New Job	ACConPCC	AC on Rigid
ACPA-Workshop	Delete Job	NewFlexible	New Flexible
bob	Dup. Section	NewRigid	New Rigid
checkminbase	Copy Section	Overlay	AC on Flexible
DENPCN	Delete Section		
designexamplein6E	Options		
fulldepthACC	Exit		
joplin			
lightdutydesign			
myrtlebeach			
PROJECT			
rigid			
Samples			
schuler			
SegPistaAeptoCanc			
TestASCEexample			

Data Input

Structure

Notes

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help Demonstration About

Accompanies Draft AC 150/5320-6E

FAARFIELD – PCC Unbonded Overlay Design

Create Existing Pavement Section for Overlay Design

Start with the original pavement section – go to “Modify Structure”

FAARFIELD - Modify and Design Section PCCunbonded in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCCunbonded**

PROJECT PCCunbonded Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	16.15	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	35,432
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 28.15 in

Design Stopped
86.85; 85.96

Aircraft

Back Help Life **Modify Structure** Design Structure Save Structure

FAARFIELD – PCC Unbonded Overlay Design

Create Existing Pavement Section for Overlay Design

Click on the subbase layers to adjust thickness to match the existing pavement structure

FAARFIELD - Modifying Section PCCunbonded in Job PROJECT

PROJECT PCCunbonded Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Unbonded	18.15	700
Ag Crushed Layer	10.00	100,000
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 28.15 in

Modifying Structure

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Then click on "Add/Delete Layer"

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

Click on the P501 surface layer to add a section layer

FAARFIELD - Modifying Section PCCunbonded in Job PROJECT

Section Names
ACConPCC
NewFlexible

Select the layer to be added or deleted by clicking the mouse on the layer. The bottom layer cannot be selected.

PROJECT PCCunbonded Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Surface	16.15	700
P-306 Econcrete	6.00	700,000
P-209 CrAg	6.00	35,432
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 28.15 in

Design Stopped
86.85; 85.96

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

Click on the top layer and change its properties to PCC P501
“Overlay fully unbonded”

Then click on “End Modify” to return to design mode

FAARFIELD - Modifying Section PCCunbonded in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCCunb

PROJECT PCCunbonded Des. Life = 20

Layer	Thickness	Modulus or R (psi)
		700
Structure		700
		700,000
		35,432
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 44.29 in

Design 86.85; 85.96

Aircraft

Back Help Life **End Modify** Add/Delete Layer Save Structure

Layer Type Selection

- Undefined
- Subgrade
- Aggregate
 - P-208 (see Note)
 - P-209 Crushed
 - P-154 Uncrushed
- HMA: All P-401 / P-403
 - Surface
 - Overlay
- Stabilized (flexible)
 - Variable
 - P-401 / P-403 HMA
- PCC: All P-501
 - Surface
 - Overlay fully unbonded
 - Overlay partially bonded
 - Overlay on flexible
- Stabilized (rigid)
 - Variable
 - P-301 Soil Cement Base
 - P-304 Cement Treated Base
 - P-306 Econocrete Subbase
 - Rubblized PCC Base

OK Cancel

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

FAARFIELD - Modify and Design Section PCCunbonded in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCCunbonded**

PROJECT PCCunbonded Des. Life = 20 SCI = 40 %CDFU = 100

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay Unbond	16.15	700
PCC Surface	14.00	700
P-306 E concrete	6.00	700,000
P-209 CrAg	6.00	35,432
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 42.15 in

Design Stopped 86.85; 85.96

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Confirm the SCI and CDFU values – adjust as necessary

Note: FAARFIELD does not show or include the debonding layer in thickness calculations

FAARFIELD – PCC Unbonded Overlay Design

Structural Condition Index (SCI)

- SCI derived from the Pavement Condition Index as determined by ASTM D 5340 Airport Pavement Condition Index Surveys
- SCI is computed using only structural components from the PCI survey (6 of 15 distress types)
 - SCI will always be less than or equal to the PCI
- SCI = 80 – FAA definition of structural failure
 - 50% of slabs with structural crack

FAARFIELD – PCC Unbonded Overlay Design

Structural Condition Index (SCI)

TABLE 4-1. RIGID PAVEMENT DISTRESS TYPES USED TO CALCULATE THE STRUCTURAL CONDITION INDEX, (SCI)

Distress	Severity Level
Corner Break	Low, Medium, High
Longitudinal/Transverse/Diagonal Cracking	Low, Medium, High
Shattered Slab	Low, Medium, High
Shrinkage Cracks (cracking partial width of slab)*	Low
Spalling–Joint	Low, Medium, High
Spalling–Corner	Low, Medium, High

FAARFIELD – PCC Unbonded Overlay Design

Cumulative Damage Factor Used (CDFU)

SCI = 100 when there is no visible distress contributing to reduction in SCI (no structural distress types)

Condition of existing pavement described by CDFU

FAARFIELD – PCC Unbonded Overlay Design

Cumulative Damage Factor Used (CDFU)

**CDFU defines amount of structural life used
For structures with aggregate base**

$$\begin{aligned} CDFU &= \frac{L_U}{0.75 L_D} && \text{when } L_U < 0.75 L_D \\ &= 1 && \text{when } L_U \geq 0.75 L_D \end{aligned}$$

L_U = number of years of operation of the existing pavement until overlay

L_D = design life of the existing pavement in years

FAARFIELD modifies this relationship for stabilized subbase to reflect improved performance

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

With the overlay layer in place you can now adjust the thickness of the existing PCC

FAARFIELD - Modifying Section PCCunbonded in Job PROJECT

PROJECT PCCunbonded Des. Life = 20 SCI = 40 %CDFU = 100

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay Unbond	16.15	700
PCC Surface	16.15	700

PCC Layer Thickness

Enter the new thickness in in and click OK or press the Enter key on the keyboard.

Click Cancel at any time to retain the old value of thickness.

14.0

OK Cancel

700,000
35,432
15,002
t = 44.30 in

Design Stopp 86.85; 85.9

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Then click on “End Modify” to return to design mode

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

FAARFIELD - Modify and Design Section PCCunbonded in Job PROJECT

PROJECT PCCunbonded Des. Life = 20 SCI = 40 %CDFU = 100

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay Unbond	16.15	700
PCC Surface	14.00	700
P-306 E concrete	6.00	700,000
P-209 Cr Ag	6.00	35,432
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 42.15 in

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCCunbonded**

Design Stopped
86.85; 85.96

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Notice the arrow has relocated to the overlay layer

Confirm or modify the aircraft information

FAARFIELD Rigid Pavement Design

Traffic Mix for Unbonded Overlay Example

Aircraft Name	Gross Taxi Weight, lb	Annual Departures	Annual Growth, %
DC 10-10	458,000	2.263	0.0
B747-200B Combi	873,000	823	0.0
B777-200 ER	634,500	425	0.0

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer – Traffic Mixture

The screenshot displays the 'FAARFIELD - Create or Modify Aircraft for Section NewRigid in Job 6Example' window. It features a left-hand menu with 'Aircraft Group' and 'Library Aircraft' sections. The 'Aircraft Group' list includes Generic, Airbus, Boeing, Other Commercial, General Aviation, Military, and External Library. The 'Library Aircraft' list includes various Boeing models such as B737-600, B737-700, B737-800, B737-900 ER, B737 BBJ2, B747-100 SF, B747-200B Combi Mixd, B747-300 Combi Mixed, B747-400, B747-400ER, B747-SP, B757-200, B757-300, B767-200, B767-200 ER, B767-300 ER, B767-400 ER, B777-200 Baseline, and B777-200 ER. A table on the right lists aircraft with columns for Name, Gross Taxi Weight (lbs), Annual Departures, % Annual Growth, and Total Departures. The table contains three rows: DC10-10, B747-200B C..., and B777-200 ER. Below the table are buttons for 'Add', 'Remove', 'Save List', 'Clear List', 'Save to Float', and 'Add Float'. A 'Float Aircraft' box on the right contains 'Adv. B727-200 Option', 'B747-400', and 'B777-200 ER'. At the bottom are 'Back', 'Help', and 'View Gear' buttons.

Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
DC10-10	458,000	2,263	0.00	45,2
B747-200B C...	873,000	832	0.00	16,6
B777-200 ER	634,500	425	0.00	8,5

Enter aircraft and modify properties as required

Then click "Save List" and return to the structure screen

Back

Help

View Gear

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

FAARFIELD - Modify and Design Section PCCunbonded in Job PROJECT

Section Names
ACConPCC
NewFlexible
NewRigid
Overlay
PCCunbonded

PROJECT PCCunbonded Des. Life = 20 SCI = 40 %CDFU = 100

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay Unbond	14.28	700
PCC Surface	14.00	700
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	35,432
Subgrade	k = 141.4	15,002

Total thickness to the top of the subgrade, t = 40.28 in

Status

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

When finished modifying layer properties and traffic mixture select "Design Structure"

FAARFIELD – PCC Unbonded Overlay Design

Create Overlay Layer

FAARFIELD - Modify and Design Section PCCunbonded in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCCunbonded**

PROJECT PCCunbonded Des. Life = 20 SCI = 40 %CDFU = 100

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay Unbond	13.52	700
PCC Surface	14.00	700
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	35,432
Subgrade	k = 141.4	15,002

N = 3; Str Life = 20.0 yrs; t = 39.52 in

Design Stopped
425.58; 425.14

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

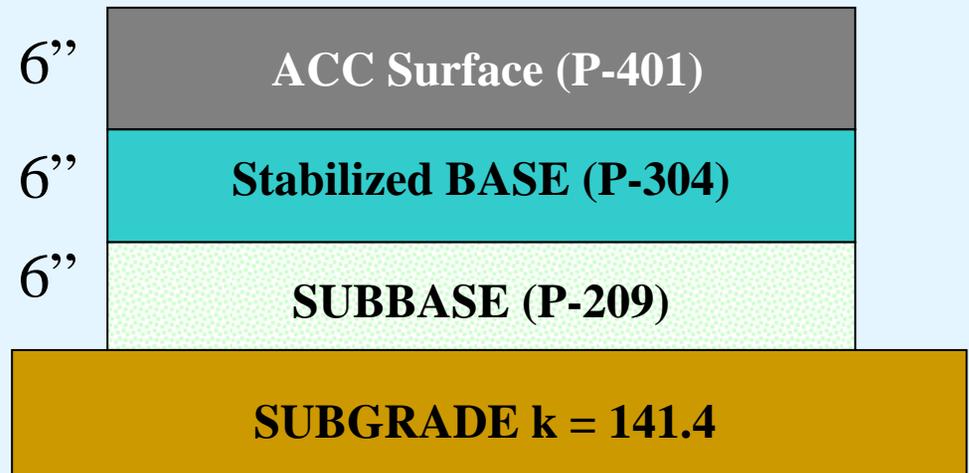
The final overlay thickness is 13.52 inches

This would be rounded to 13.5 (nearest half inch)

FAARFIELD – PCC Over Existing Flexible

Assume the pavement section is to be strengthened by a placing a PCC overlay on the existing flexible pavement

Existing Pavement Section



FAARFIELD – PCC Over Existing Flexible

Create Existing Pavement Section

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
P-401/P-403 HMA Surface	6.00	200,000
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	50,515
Subgrade	CBR = 10.0	15,000

Design Stopped 1.17; 0.99

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Create the existing pavement section prior to the overlay

Adjust layer properties as required

Click "Add/Delete Layer" to add the PCC Overlay

FAARFIELD – PCC Over Existing Flexible

Add Overlay Section

FAARFIELD - Modifying Section PCConFlex in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
P-401/P-403 HMA Surface	6.00	200,000
Non-Standard Structure		
P-401/P-403 HMA Surface	6.00	200,000
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	50,515
Subgrade	CBR = 10.0	15,000

N = 4; Sublayers; Subgrade CDF = 1.00; t = 24.00 in

Design Stopped
1.17; 0.99

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Click on the New layer to change it to a PCC overlay

FAARFIELD – PCC Over Existing Flexible

Modify Overlay Selection

Select “Overlay on flexible”

FAARFIELD - Modifying Section PCConFlex in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
P-401/P-403 HMA Surface	6.00	200,000

Non-Standard Structure

Design Stopped 1.17; 0.99

Aircraft

Back Help

OK Cancel

Save Structure

Layer Type Selection

- Undefined
- Subgrade
- Aggregate
 - P-208 (see Note)
 - P-209 Crushed
 - P-154 Uncrushed
- HMA: All P-401/P-403
 - Surface
 - Overlay
- Stabilized (flexible)
 - Variable
 - P-401/P-403 HMA
- PCC: All P-501
 - Surface
 - Overlay fully unbonded
 - Overlay partially bonded
 - Overlay on flexible
- Stabilized (rigid)
 - Variable
 - P-301 Soil Cement Base
 - P-304 Cement Treated Base
 - P-306 Econocrete Subbase
 - Rubblized PCC Base

FAARFIELD – PCC Over Existing Flexible

Modify Overlay Selection

FAARFIELD - Modify and Design Section PCConFlex in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay on Flex	6.00	700
P-401/P-403 HMA Surface	6.00	200,000
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	50,515
Subgrade	k = 141.4	15,000

N = 4; Sublayers; PCC CDF = 1.00; t = 24.00 in

Design Stopped
1.17; 0.99

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Note that the subgrade strength parameter has switch to k-value

FAARFIELD – PCC Over Existing Flexible

Confirm Airplanes in Traffic Model

FAARFIELD - Modify and Design Section PCConFlex in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay on Flex	6.00	700
P-401/P-403 HMA Surface	6.00	200,000
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	50,515
Subgrade	k = 141.4	15,000

N = 4; Sublayers; PCC CDF = 1.00; t = 24.00 in

Design Stopped
1.17; 0.99

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Check to make sure you have the desired traffic for the overlay design

FAARFIELD – PCC Over Existing Flexible

Traffic Mix for this PCC Overlay on Flexible Example

Aircraft Name	Gross Taxi Weight, lb	Annual Departures	Annual Growth, %
DC 10-10	458,000	2.263	0.0
B747-200B Combi	873,000	823	0.0
B777-200 ER	634.500	425	0.0

FAARFIELD – PCC Over Existing Flexible

Enter Traffic

FAARFIELD - Create or Modify Aircraft for Section PCConFlex in Job PROJECT

Aircraft Group	Aircraft Name (3)	Gross Taxi Weight (lbs)	Annual Departures	% Annual Growth	Total Departures
Generic	DC10-10	458,000	2,263	0.00	45,2
Airbus	B747-200B C...	873,000	832	0.00	16,6
Boeing	B777-200 ER	634,500	425	0.00	8,5
Other Commercial					
General Aviation					
Military					
External Library					

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft
A300-B4 std
B737-400
B737-400
A380-800
B727-100C Alternate
B737-400
B747-400
B757-200

Input desired traffic

FAARFIELD – PCC Over Existing Flexible

Design Overlay Pavement Section

FAARFIELD - Modify and Design Section PCConFlex in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

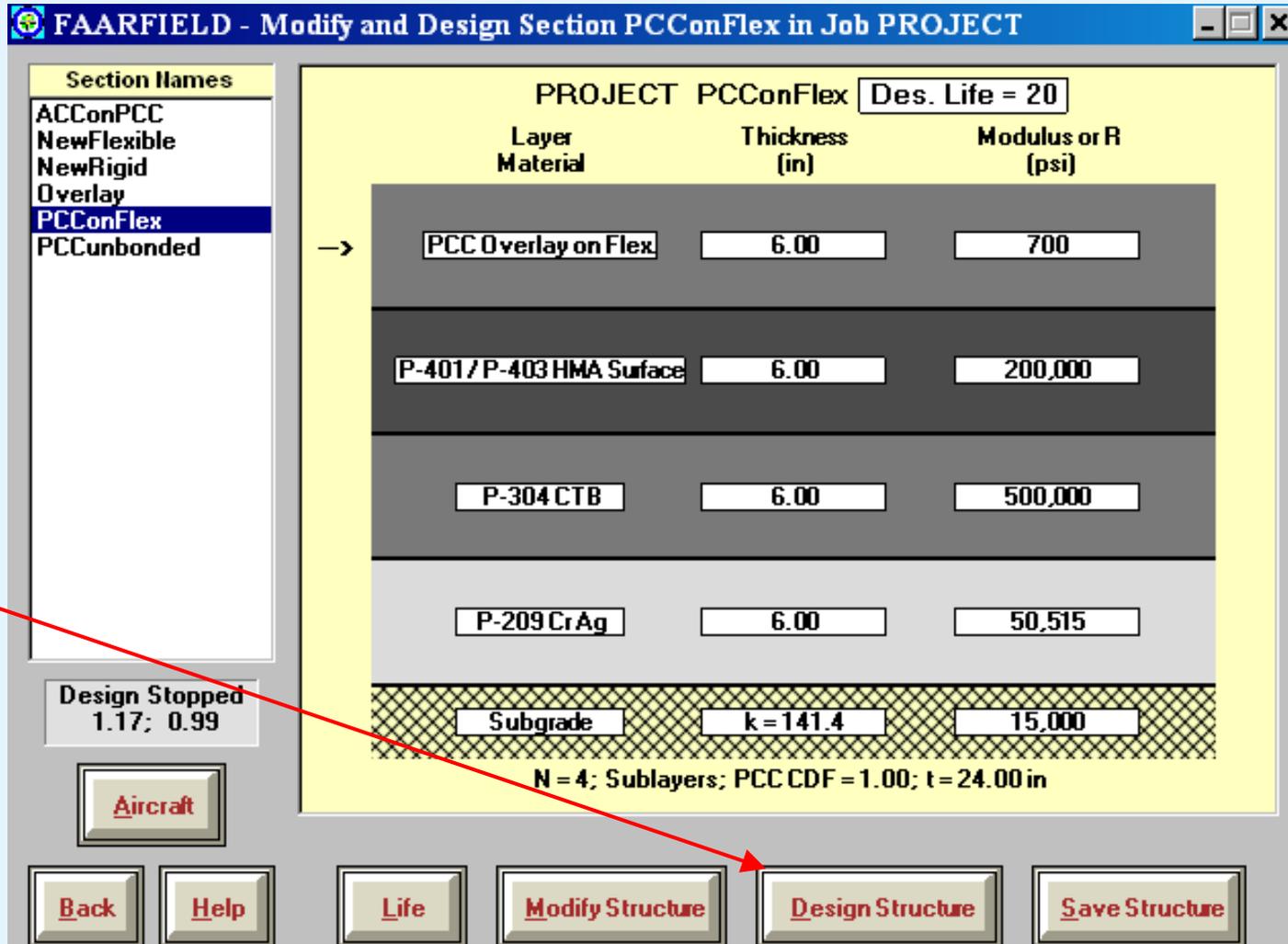
Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay on Flex	6.00	700
P-401/P-403 HMA Surface	6.00	200,000
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	50,515
Subgrade	k = 141.4	15,000

N = 4; Sublayers; PCC CDF = 1.00; t = 24.00 in

Design Stopped
1.17; 0.99

Aircraft

Back Help Life Modify Structure Design Structure Save Structure



Select "Design Structure"

FAARFIELD – PCC Over Existing Flexible

Create Existing Pavement Section

FAARFIELD - Modify and Design Section PCConFlex in Job PROJECT

Section Names

- ACConPCC
- NewFlexible
- NewRigid
- Overlay
- PCConFlex**
- PCCunbonded

PROJECT PCConFlex Des. Life = 20

Layer Material	Thickness (in)	Modulus or R (psi)
PCC Overlay on Flex	14.45	700
P-401/P-403 HMA Surface	6.00	200,000
P-304 CTB	6.00	500,000
P-209 CrAg	6.00	35,429
Subgrade	k=141.4	15,000

N = 4; PCC CDF = 1.00; t = 32.45 in

Design Stopped
272.67; 271.53

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Final thickness of overlay = 14.5 inches

FAARFIELD - Help Manual

Interactive User's Manual / Help File

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

- 6E example
- ACPA-Workshop
- bob
- checkminbase
- DENPCN
- designexamplein6E
- fulldepthACC
- joplin
- lightdutydesign
- myrtlebeach
- PROJECT**
- rigid
- Samples
- schuler
- SegPistaAeptoCanc
- TestASCEexample

Organization

- New Job
- Delete Job
- Dup. Section
- Copy Section
- Delete Section
- Options
- Exit

Data Input

- Structure
- Notes

Section Name	Pavement Type
ACConPCC	AC on Rigid
NewFlexible Overlay	New Flexible AC on Flexible

Working Directory

C:\Program Files\FAA\FAARFIELD\

Accompanies Draft AC 150/5320-6E

Help Demonstration About

For assistance with the program click the Help key

FAARFIELD - Help Manual

Interactive User's Manual / Help File

Search by Contents/chapters, Index, or word search

FAARFIELD

Hide Back Print Options

Contents Index Search

- INTRODUCTION
 - Introduction to FAARFIELD**
- INSTALLATION
- OVERVIEW
- STARTUP WINDOW
- STRUCTURE WINDOW
- AIRCRAFT WINDOW
- OPTIONS WINDOW
- NOTES WINDOW
- AIRCRAFT DATA WINDOW
- CUMULATIVE DAMAGE FACTOR
- LAYER TYPES
- PAVEMENT THICKNESS DESIGN
- RUNNING THE PROGRAM
- DATA FILES
- DESIGN EXAMPLES

Introduction to FAARFIELD

[Previous](#) [Next](#)

FAARFIELD is a computer program for airport pavement thickness design. It implements both layered elastic based and three-dimensional finite element-based design procedures developed by the Federal Aviation Administration (FAA) for new and overlay design of flexible and rigid pavements. The thickness design procedures implemented in the program are the FAA airport pavement thickness design standards referenced in Advisory Circular (AC) 150/5320-6E.

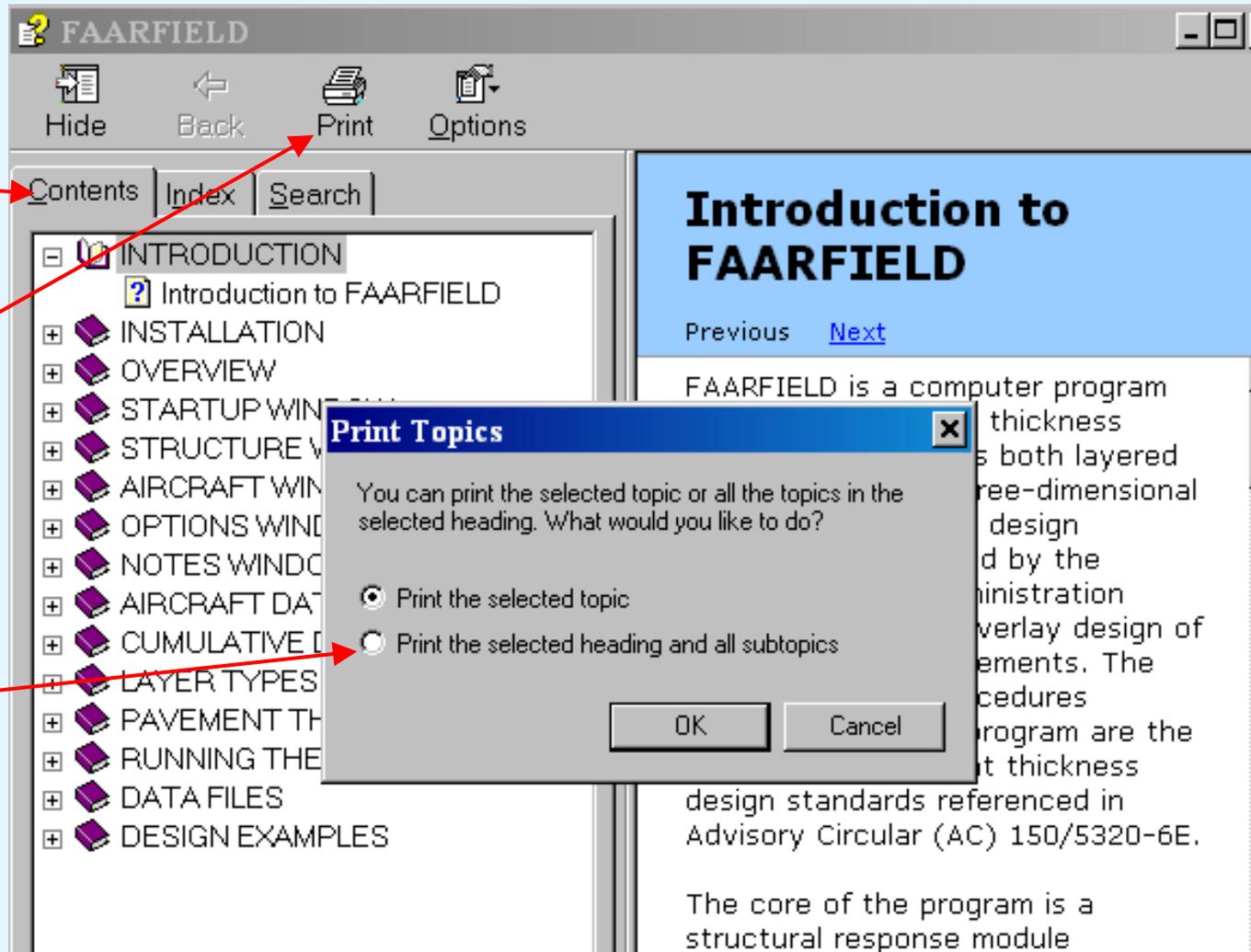
The core of the program is a structural response module consisting of two programs, LEAF and NIKE3D (version 3.3.2.FAA.1.0). LEAF is a layered elastic computational program implemented, in this case, as a Microsoft Windows™ dynamic link

FAARFIELD - Help Manual

Print Help Manuals

To print the manual move to the "Contents" tab and click Print

Select "Print the selected heading and all subtopic"
Do this for each heading



- Job Files**
- 6E example
 - ACPA-Workshop
 - bob
 - checkminbase
 - DENPCN
 - designexamplein6E
 - fulldepthACC
 - joplin
 - lightdutydesign
 - myrtlebeach
 - rigid
 - Samples
 - schuler
 - SegPistaAeptCancu
 - TestASCEexample

Organization

New Job

Delete Job

Dup. Section

Copy Section

Delete Section

Options

Exit

Section Name	Pavement Type
NewFlex	New Flexible
NewRigid	New Rigid

Software Available at:

http://www.faa.gov/airports_airtraffic/airports/construction/design_software/

Data Input

Structure

Notes

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help Demonstration About

- Job Files**
- 6E example
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 - Samples
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 - SegPistaAeptoCancu
 - TestASCEexample

Organization

New Job

Test Job

Dup. Section

Opp Section

Delete Section

Section Name	Pavement Type
NewFlex	New Flexible
NewRigid	New Rigid

Thank You

Questions?

Data Input

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Working Directory
 C:\Program Files\FAA\FAARFIELD\

Help Demonstration About