

Rigid Pavement Design

FAARFIELD 1.305 Hands-On Training

Presented to: IX ALACPA Seminar on Airport Pavements
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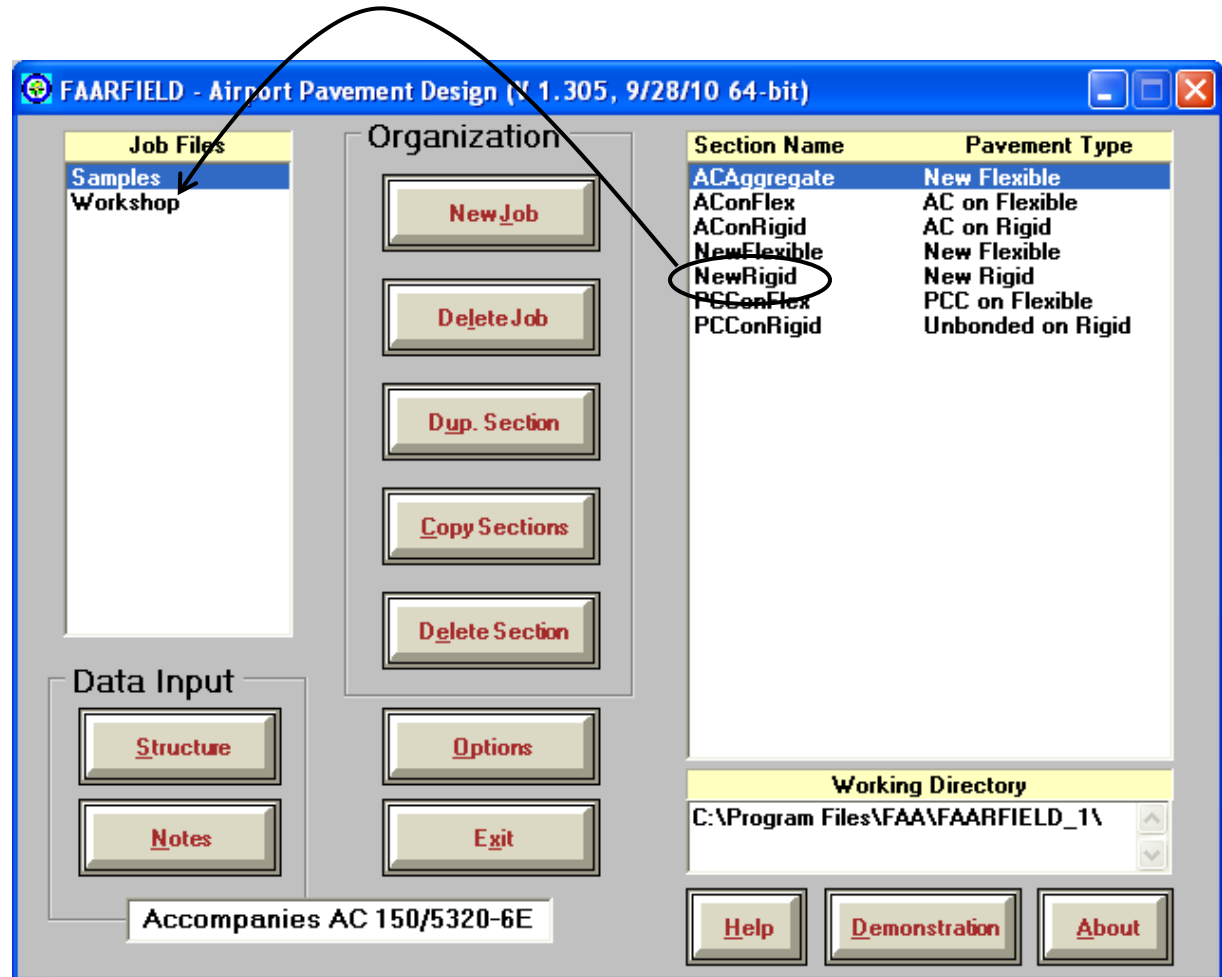


Federal Aviation
Administration



New Rigid Example Set-Up

Create a new section in job WORKSHOP by dragging section NewRigid in Samples to WORKSHOP.



New Rigid Pavement Design Example

- **Pavement Structure:**
 - PCC Slab, P-501, $R = 4.85 \text{ MPa psi}$
 - Cement-Treated Base, P-304, 150 mm thick
 - Crushed Aggregate Base, P-209, 200 mm thick
 - Subgrade $k = 27 \text{ MPa/m}$
- **Traffic Mix:**
 - 10-Aircraft Mix includes B777, A340, A380
 - Found in job file: *Workshop.JOB.xml*

Change Pavement Structure

In Structure window,
click on Modify
Structure

FAARFIELD - Modify and Design Section NewRigid in Job Workshop

Section Names
AConFlex
NewFlexible
NewRigid

Workshop NewRigid Des. Life = 20

Layer Material	Thickness (mm)	Modulus or R (MPa)
PCC Surface	355.6	4.83
P-306 Econcrete	1524	4,826.33
P-209 CrAg	1524	517.11
Subgrade	k = 38.4	103.42

Total thickness to the top of the subgrade, t = 660.4 mm

Design Stopped
1.13; 0.70

Airplane

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

Change Pavement Structure

Change R to 4.85 MPa

Change base layer to
150 mm CTB, P-304

Change P-209 layer
thickness to 200 mm.

Change subgrade k to
27 Mpa/m

Click “End Modify”

FAARFIELD - Modifying Section NewRigid in Job Workshop

Section Names
AConFlex
NewFlexible
NewRigid

Workshop NewRigid Des. Life = 20

Layer Material	Thickness (mm)	Modulus or R (MPa)
PCC Surface	355.6	4.83
P-306 Econcrete	152.4	4,826.33
P-209 CrAg	152.4	517.11
Subgrade	k = 38.4	103.42

Total thickness to the top of the subgrade, t = 660.4 mm

Design Stopped
1.13; 0.70

Airplane

Back Help Life End Modify Add/Delete Layer Save Structure

Change Pavement Structure

Click “Save Structure”

FAARFIELD - Modify and Design Section NewRigid in Job Workshop

Section Names
AConFlex
NewFlexible
NewRigid

Workshop NewRigid Des. Life = 20

Layer Material	Thickness (mm)	Modulus or R (MPa)
PCC Surface	355.6	4.85
P-304 CTB	150.0	3,447.38
P-209 CrAg	200.0	517.11
Subgrade	k = 27.0	65.84

Total thickness to the top of the subgrade, t = 705.6 mm

Design Stopped
1.13; 0.70

Airplane

Back Help Life Modify Structure Design Structure Save Structure

Enter Traffic Mixture

Click on “Airplane”
to enter traffic mix

FAARFIELD - Modify and Design Section NewRigid in Job Workshop

Section Names
AConFlex
NewFlexible
NewRigid

Workshop NewRigid Des. Life = 20

Layer Material	Thickness (mm)	Modulus or R (MPa)
PCC Surface	355.6	4.85
P-304 CTB	150.0	3,447.38
P-209 CrAg	200.0	517.11
Subgrade	k = 27.0	65.84

Total thickness to the top of the subgrade, t = 705.6 mm

Design Stopped
t.13; 0.70

Airplane

Back Help Life Modify Structure Design Structure Save Structure

Enter Traffic Mixture

Use “Clear List” to clear the existing airplanes

FAARFIELD - Create or Modify Airplanes for Section NewRigid in Job Workshop

Airplane Group	Airplane Name (3)	Gross Taxi Weight (tns)	Annual Departures	% Annual Growth	De
Generic	DC10-10	207.745	2,263	0.00	45
Airbus	B747-200B	377.842	832	0.00	10
Boeing	Combi Mixed				
Other Commercial	B777-200 ER	287.804	425	0.00	8
General Aviation					
Military					
External Library					

Library Airplanes

- 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, CDF Graph, View Gear

Float Airplanes

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400B Combi
- B747-400ER Passeng
- B757-300

Enter Traffic Mixture

Click on “Add Float” to add the float airplanes to the traffic list.

The screenshot shows the FAARFIELD software interface with the title bar 'FAARFIELD - Create or Modify Airplanes for Section NewRigid in Job Workshop'. The interface includes a left sidebar with 'Airplane Group' and 'Library Airplanes' lists, a central table for airplane data, and a bottom section with various action buttons. An arrow points from the text 'Click on “Add Float” to add the float airplanes to the traffic list.' to the 'Add Float' button.

Airplane Name (0)	Gross Taxi Weight (tns)	Annual Departures	% Annual Growth	De
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Library Airplanes

- 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, CDF Graph, View Gear

Float Airplanes

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400B Combi
- B747-400ER Passeng
- B757-300

Traffic Mix for This Example

(same as flexible design example)

No.	Name	Gross Wt., tns.	Annual Departures	Annual Growth, %
1	A320-100	68.400	600	0.00
2	A340-600 std	365.200	1,000	0.00
3	A340-600 std Belly	365.200	1,000	0.00
4	A380-800	562.001	300	0.00
5	B737-800	79.243	2,000	0.00
6	B747-400B Combi	397.801	400	0.00
7	B747-400 ER Pass.	414.130	300	0.00
8	B757-300	124.058	1,200	0.00
9	B767-400 ER	204.570	800	0.00
10	B777-300 ER	352.441	1,000	0.00
11	B787-8 (Preliminary)	220.446	600	0.00

Viewing Airplane Information

Scroll over to reveal additional columns of information.

FAARFIELD - Create or Modify Airplanes for Section NewRigid in Job Workshop

Airplane Group	Airplane Name (11)	Gross Taxi Weight (tns)	Annual Departures	% Annual Growth
Generic	A320-100	68.400	600	0.00
Airbus	A340-600 std	365.200	1,000	0.00
Boeing	A340-600 std Belly	365.200	1,000	0.00
Other Commercial	A380-800	562.001	300	0.00
General Aviation	B737-800	79.243	2,000	0.00
Military	B747-400B Combi	397.801	400	0.00
External Library	B747-400ER Passenger	414.130	300	0.00

Library Airplanes

- 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, CDF Graph, View Gear

Float Airplanes

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400B Combi
- B747-400ER Passeng
- B757-300

Viewing Airplane Information

Values in CDF and P/C ratio columns will be zero when airplanes are first entered.

Save the list when finished entering, then click the Back button.

The screenshot shows the FAARFIELD software interface with the title bar "FAARFIELD - Create or Modify Airplanes for Section NewRigid in Job Workshop". The interface is divided into several sections:

- Airplane Group:** A list box containing "Generic", "Airbus", "Boeing", "Other Commercial", "General Aviation", "Military", and "External Library".
- Library Airplanes:** A list box containing various aircraft models like "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".
- Airplane Table:** A table with columns "Airplane Name (11)", "CDF Contribution", "CDF Max for Airplane", and "P/C Ratio". It lists several aircraft models with their respective CDF and P/C values.
- Buttons:** A set of buttons including "Add", "Remove", "Save List", "Clear List", "Save to Float", "Add Float", "Help", "CDF Graph", and "View Gear".
- Float Airplanes:** A list box showing the currently selected aircraft models.

Airplane Name (11)	CDF Contribution	CDF Max for Airplane	P/C Ratio
A320-100	0.00	0.00	0.00
A340-600 std	0.00	0.00	0.00
A340-600 std Belly	0.00	0.00	0.00
A380-800	0.00	0.00	0.00
B737-800	0.00	0.00	0.00
B747-400B Combi	0.00	0.00	0.00
B747-400ER Passenger	0.00	0.00	0.00

Run Design

- During the design process, the “Design Running” clock will appear.
- For rigid designs, the design will normally take a few minutes. Don’t interrupt the process.
- The screen display will change with each iteration.

The screenshot shows the FAARFIELD software interface. The title bar reads 'FAARFIELD - Designing Section NewRigid in Job Workshop'. On the left, a 'Section Names' list includes 'AConFlex', 'NewFlexible', and 'NewRigid'. Below this, a 'Design Running' clock shows '00:01:31'. A red arrow points from the text 'Design Running' in the list to the clock. Below the clock is an 'Airplane' button. At the bottom are buttons for 'Back', 'Help', 'Life', 'Modify Structure', 'Design Structure', and 'Interrupt Design'. The main area displays a table of pavement layers with columns for 'Layer Material', 'Thickness (mm)', and 'Modulus or R (MPa)'. The table includes a 'PCC Surface' layer, a 'P-304 CTB' layer, a 'P-209 CrAg' layer, and a 'Subgrade' layer. Below the table, the text 'N = 0; PCC CDF = 0.37; t = 834.3 mm' is displayed.

Layer Material	Thickness (mm)	Modulus or R (MPa)
PCC Surface	484.3	4.85
P-304 CTB	150.0	3,447.38
P-209 CrAg	200.0	193.42
Subgrade	k = 27.0	65.84

N = 0; PCC CDF = 0.37; t = 834.3 mm

New Rigid Pavement - Final Design

FAARFIELD - Modify and Design Section NewRigid in Job Worksh

Section Names
AConFlex
NewFlexible
NewRigid

Workshop NewRigid

Layer	Material	Thickness (mm)	(MPa)
→	PCC Surface	465.9	4.85
	P-304 CTB	150.0	3,447.38
	P-209 CrAg	200.0	193.42
	Subgrade	k = 27.0	65.84

N = 2; PCC CDF = 1.00; t = 815.9 mm

Design Stopped
229.17; 228.20

Airplane

Back Help Life Modify Structure Design Structure Save Structure

Thickness should be rounded to nearest 1 cm (470 mm).

CDF Contribution

No.	Name	CDF Contribution	CDF Max for Aircraft	P/C Ratio
1	A320-100	0.00	0.00	3.84
2	A340-600 std	0.24	0.24	1.91
3	A340-600 std Belly	0.00	0.14	2.47
4	A380-800	0.01	0.01	3.61
5	B737-800	0.00	0.01	3.52
6	B747-400 Combi	0.02	0.02	3.46
7	B747-400 ER Passenger	0.04	0.04	3.62
8	B757-300	0.00	0.00	3.95
9	B767-400 ER	0.06	0.07	3.65
10	B777-300 ER	0.59	0.59	3.86
11	B787-8 (Preliminary)	0.04	0.05	3.78



Job Files

PROJECT
Samples

Organization

New Job

Delete Job

Duplicate Section

Create Section

Delete Section

Data Input

Structure

Notes

Options

Exit

Section Name

Pavement Type

AConRigid

AC on Rigid

NewFlexible

New Flexible

NewRigid

Unbonded on Rigid

Thank You
Questions?

Working Directory

C:\Program Files\FAA\FAARFIELD\

Accompanies AC 150/5320-6E

Help

Demonstration

About

