

# Rigid Pavement Design

## FAARFIELD 1.305 Hands-On Training

Presented to: X ALACPA Seminar on Airport Pavements  
Ciudad de México, México

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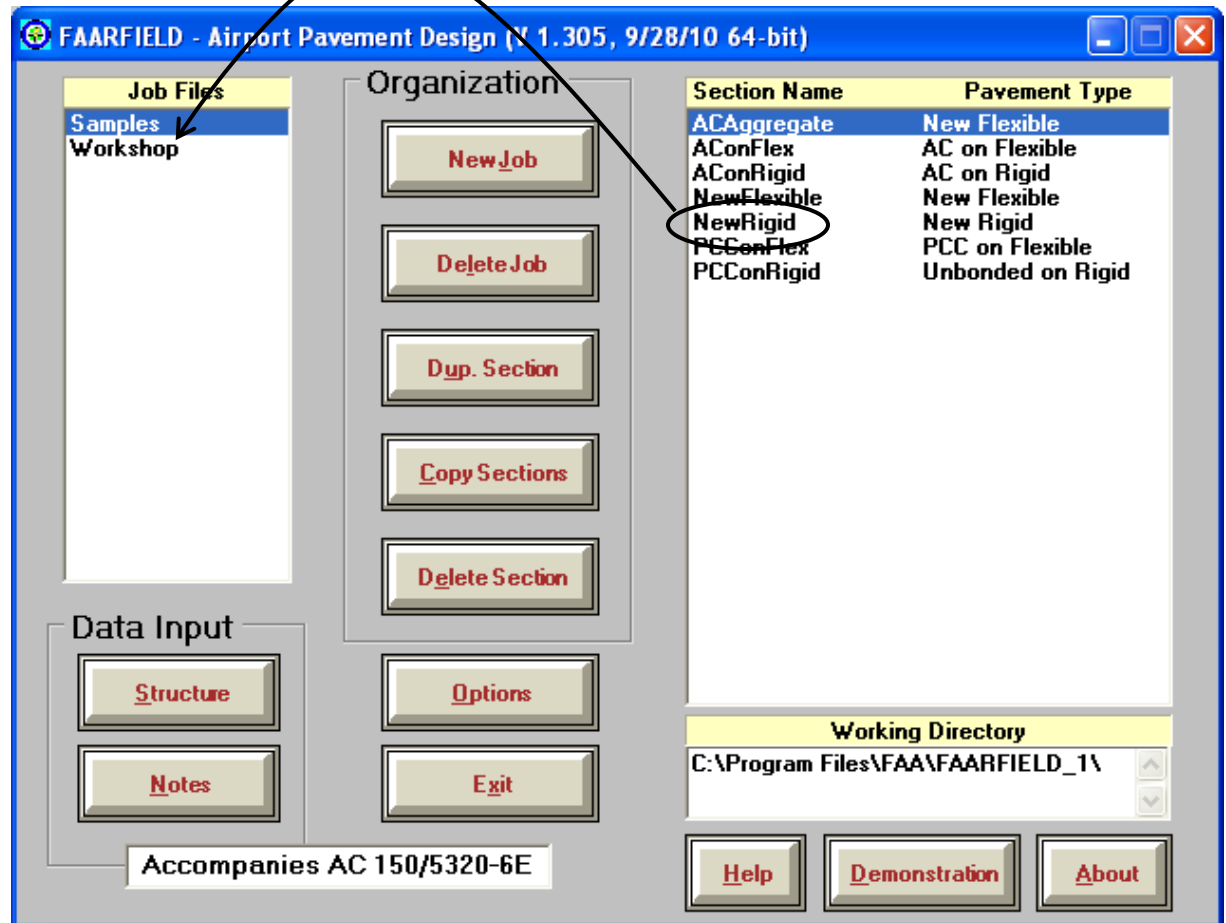


Federal Aviation  
Administration



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

# Change Pavement 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

In Structure window,  
click on Modify  
Structure

# Change Pavement Structure

Change R to 4.85 MPa

The screenshot shows the FAARFIELD software interface for modifying a pavement section. The window title is "FAARFIELD - Modifying Section NewRigid in Job Workshop". The main area displays a table of pavement layers with the following data:

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

Additional information shown in the interface includes: "Workshop NewRigid Des. Life = 20", "Design Stopped 1.13; 0.70", and "Total thickness to the top of the subgrade, t = 660.4 mm". The interface also features a "Section Names" list on the left (AConFlex, NewFlexible, NewRigid) and a bottom toolbar with buttons for "Back", "Help", "Life", "End Modify", "Add/Delete Layer", and "Save Structure".

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"

# Change Pavement 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

Click "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  
1.13; 0.70

Airplane

Back Help Life Modify Structure Design Structure Save Structure

# Enter Traffic Mixture

Use “Clear List” to clear the existing airplanes

Airplane Name (3)	Gross Taxi Weight (tns)	Annual Departures	% Annual Growth	De
DC10-10	207.745	2,263	0.00	45
B747-200B Combi Mixed	377.842	832	0.00	10
B777-200 ER	287.804	425	0.00	8

**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

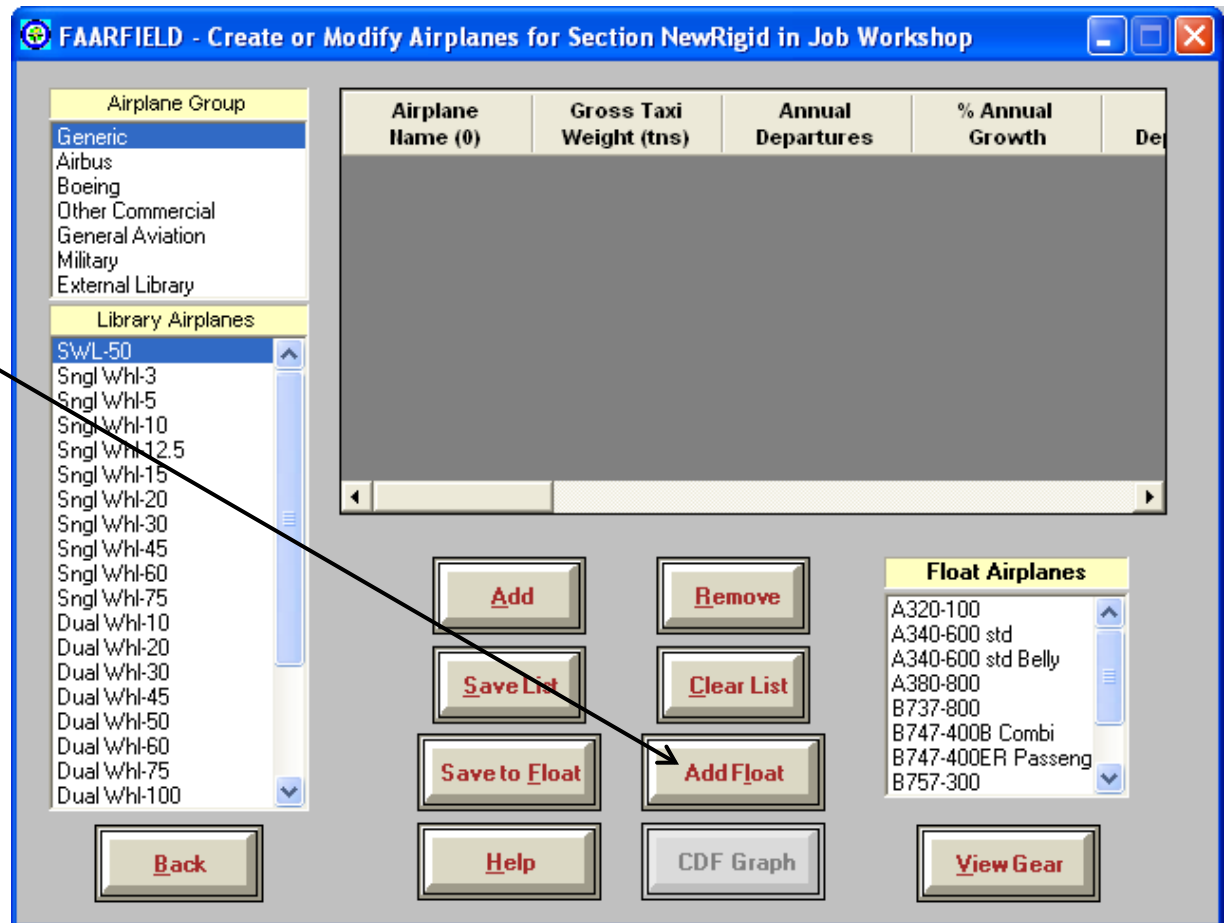
**Float Airplanes**

- 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.



# 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.

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

- Airplane Group:** A list of categories including Generic, Airbus, Boeing, Other Commercial, General Aviation, Military, and External Library.
- Library Airplanes:** A scrollable list of airplane models such as 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.
- Table:** A table with four columns: Airplane Name (11), Gross Taxi Weight (tns), Annual Departures, and % Annual Growth. The table contains the following data:

Airplane Name (11)	Gross Taxi Weight (tns)	Annual Departures	% Annual Growth
A320-100	68.400	600	0.00
A340-600 std	365.200	1,000	0.00
A340-600 std Belly	365.200	1,000	0.00
A380-800	562.001	300	0.00
B737-800	79.243	2,000	0.00
B747-400B Combi	397.801	400	0.00
B747-400ER Passenger	414.130	300	0.00
- Buttons:** A set of control buttons including Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, CDF Graph, and View Gear.
- Float Airplanes:** A list of airplanes currently in the float state, including A320-100, A340-600 std, A340-600 std Belly, A380-800, B737-800, B747-400B Combi, B747-400ER Passeng, and 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 following components:

- Window Title:** FAARFIELD - Create or Modify Airplanes for Section NewRigid in Job Workshop
- Airplane Group List:**
  - Generic
  - Airbus
  - Boeing
  - Other Commercial
  - General Aviation
  - Military
  - External Library
- Library Airplanes List:**
  - 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
- Airplane Information Table:**

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
- Buttons:** Add, Remove, Save List, Clear List, Save to Float, Add Float, Help, CDF Graph, View Gear, Back.
- Float Airplanes List:**
  - A320-100
  - A340-600 std
  - A340-600 std Belly
  - A380-800
  - B737-800
  - B747-400B Combi
  - B747-400ER Passeng
  - B757-300

# 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.

Layer	Material	Thickness (mm)	Modulus or R (MPa)
	PCC Surface	484.3	4.85
	P-304 CTB	150.0	3,447.38
	P-209 Cr Ag	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  
Dup Job  
New Section  
Delete Section

Section Name	Pavement Type
AConRigid	AC on Rigid
NewFlexible	New Flexible
NewRigid	Unbonded on Rigid

# Thank You Questions?

Data Input  
Structure  
Notes

Options  
Exit

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

Accompanies AC 150/5320-6E

Help Demonstration About

