Rigid Pavement Design

Part II
Large General Aviation Airport

Presented to: ACPA-SE Concrete Airport Pavement Workshop
By: Jeffrey S Gagnon, P.E.
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Rigid Design

• Example 1
  – K =100
  – P-304 6”
  – P-209 8”
  – Traffic 45-65k lbs
    • RJ-200
    • Challenger
    • SW-60
    • DW-50
    • DW-60

• Example 2
  – K=100
  – P-304 6”
  – P-209 8”
  – Traffic 65-95k lbs
    • RJ-700
    • Gulfstream G-II
    • Gulfstream G-III
    • Gulfstream G-IV
    • Gulfstream G-V
Rigid Design

Create a new section in job **PROJECT** by dragging section **NewRigid** in **Samples** to **PROJECT**.
Rename the 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.

NewRigidGA

OK Cancel
Change Pavement Structure

Double click on the job "PROJECT." (The section “NewRigidGA” is highlighted.) Click the “Structure” button to open the Structure window.
Modify Pavement Structure

Click “Modify Structure.” Make changes to the PCC, base, subbase and subgrade layer properties.
Rigid Design – Example 1 (45-65k)
Rigid Design – Example 1

PCC Surface Thickness = 9” (round-up)
Rigid Design – Example 1

Effect of K

PCC Surface Thickness = 9” (round-up)

k = 100 pci PCC Surface Thickness = 7.5” (round-down)

k = 200 pci PCC Surface Thickness = 6.5” (round-up)
Rigid Design – Example 1 CDF

Click on CDF Graph
Rigid Design – Example 1 CDF
Rigid Design – Example 2 (65-95k)
Rigid Design – Example 2

PCC Surface Thickness = 11” (round- down)
Rigid Design – Example 2
Effect of K

PCC Surface Thickness = 11” (round-down)

k = 150 pci PCC Surface Thickness = 10” (round-down)
k = 200 pci PCC Surface Thickness = 9” (round-down)
Click on CDF Graph
Rigid Design – Example 2 CDF
Rigid on HMA Overlay Example

• **Pavement Structure:**
  – Rigid Overlay (P-501), 700 psi
  – Asphalt Surface Course (P-401), 4 in.
  – Asphalt Base Course (P-403), 6 in.
  – Crushed Aggregate Base (P-209), 14 in.
  – Subgrade $CBR = 5.0$ converted to $k=83.9$ pci

• **Traffic Mix:**
  – Use the traffic mix from Example 2 (65-95k) but add a B737 BBJ2 to the mix.
Rigid on HMA Example Set-Up

Create a new section in job PROJECT by dragging section PCConFlex in Samples to PROJECT.
Change Pavement Structure

Double click on the job “PROJECT.” (The section “PCConFlex” is highlighted.) Click the “Structure” button to open the Structure window.
Change Pavement Structure

Click “Modify Structure.” Make changes to the PCC, base, subbase and subgrade layer properties.

Convert CBR to $k$ by equation

$$k = \left[ \frac{1500 \times CBR}{26} \right]^{0.7788}$$

or input Modulus value directly
Copy Airplane List

Click on Airplane
Copy Airplane List

Click “Clear List to remove the sample airplanes.

Then click “Add Float” to add the float airplanes.
Modify Airplane List

Double-click on the B737 BBJ2. This will add the airplane to the design list.

When done, click “Save List” then “Back.”
Run Design

Click “Design Structure” to run the overlay design.
HMA on Rigid Overlay – Final Design

PCC Overlay
Thickness = 14.5 in.
Rigid on HMA Overlay Design – %CDF

Click on CDF Graph
Rigid on HMA Overlay Design –%CDF
New Rigid on P-403 Base

PCC Thickness = 14.5 in.
Software Available at:

- [http://www.faa.gov/airports/engineering/design_software/](http://www.faa.gov/airports/engineering/design_software/)

Thank You
Questions?