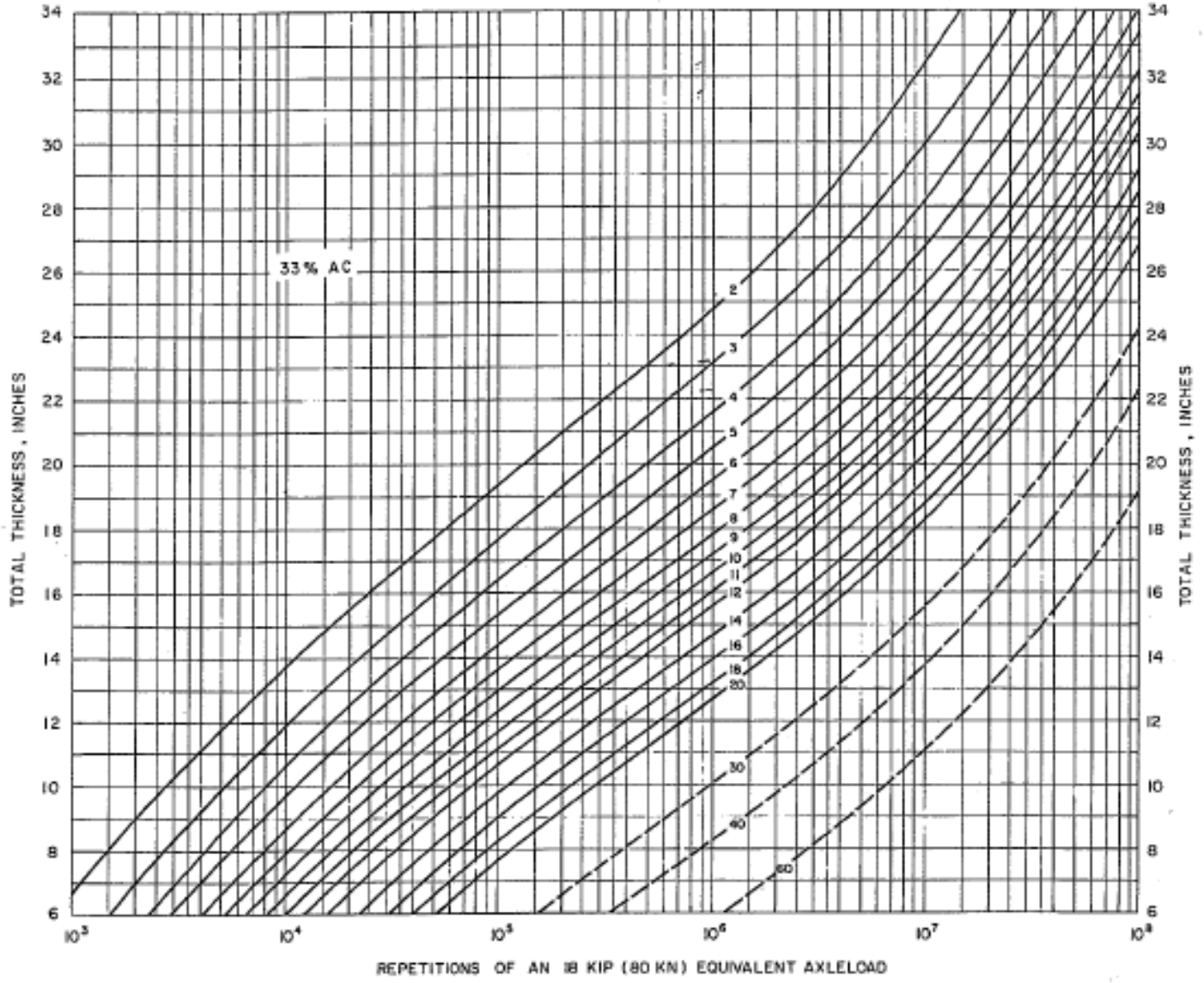
PAVEMENT DESIGN KYTC

LEO FRANK, PE

JOE TUCKER, PE

KENTUCKY CURVES

- KY Method - Empirical Observations and Mechanistic Analysis of those Observations
  - Designs Based On
    - Traffic
      - Damage caused by one 18,000 lb axle load (ESALs)
      - Damages not linear. One 36,000 lb axle does EIGHT times the damage of one 18,000 lb load.
    - Subgrade Strength (CBR)
      - River bottoms typically CBR of 1-3



Thickness Design Curves for Pavement Structures Having 33 Percent Asphaltic Concrete Thickness of the Total Pavement Thickness.

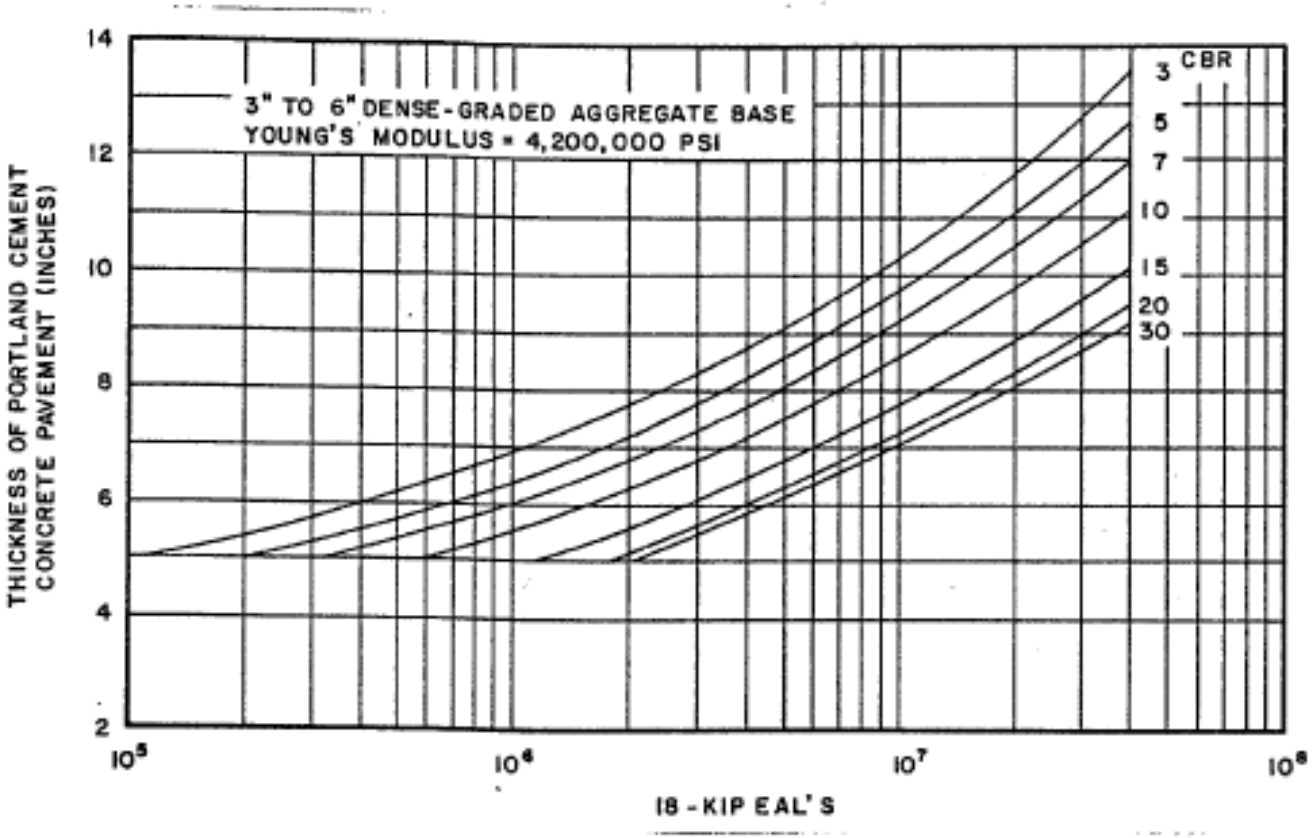


FIGURE 6. THICKNESS DESIGN CURVES FOR PORTLAND CEMENT CONCRETE PAVEMENT AS A FUNCTION OF CBR AND 18-KIP EQUIVALENT AXLELOADS.

SUBGRADE STABILIZATION

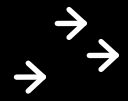
- Aggregate Wrapped in Fabric
- Geotextile Fabrics and Geogrids
- Chemical Stabilization
  - Lime Stabilization
  - Portland Cement Stabilization

Conservative Pavement Design Possibilities

- Car Parking Lot (occasional small delivery/garbage truck):
  - 6" DGA
  - 2" AB (up to 2 ¾")
  - 1 ¼" AS
- Modest Truck Parking Lot (say 5 Semi-Tractors/day):
  - 6" DGA (or 8")
  - 4 ¾" AB
  - 1 ¼" AS
- Possible aggregate truck parking lot:
  - 10" to 12" DGA on top of geogrid. (Might even place geogrid in middle of aggregate layer.)
- Roads that trucks use:
  - Probably match the Greenbelt Freeway:
  - 4" DGA (up to 6")
  - 9" JPC
- Loading Pads:
  - 6" DGA
  - 8" to 9" JPC ***or***
  - 12" Asphalt (10" plus or minus, might work as well)

Equivalent JPC/ Asphalt Structures

(Chart shows inches asphalt on inches DGA)
(There's about a 4" difference between JPC and Asphalt with Riverport conditions.)



JPC	ESAL's	CBR = 2	ESAL's	CBR = 3	ESAL's	CBR = 5
8"	2,100,000	12.25" on 4"	2,800,000	12.00" on 4"	4,200,000	11.25" on 4"
9"	4,000,000	13.25" on 4"	5,500,000	13.25" on 4"	8,000,000	12.75" on 4"
10"	7,000,000	14.25" on 4"	9,000,000	14.25" on 4"	13,000,000	13.75" on 4"
11"	10,500,000	15.25" on 4"	14,000,000	15.00" on 4"	21,000,000	14.75" on 4"
12"	16,000,000	16.25" on 4"	21,000,000	16.00" on 4"	31,000,000	15.75" on 4"

Note 14" to 15" is perpetual pavement on poor soils, so really no need to go beyond that thickness.
Subtract 2" from Asphalt amounts if using Subgrade Stabilization.

Contacts and References

- Joe Tucker – 502-782-4915
- Leo Frank – 502-782-4880
- Pavement Design Website
  - http://transportation.ky.gov/Highway-Design/Pages/Pavement-Design.aspx
    - Pavement Design Spreadsheet
    - Design Guide for Bituminous Pavement Structures
    - Thickness Design Curves for PCC Pavements