Rigid Pavement Design – PID 117955

Given:

- Pavement of choice: Doweled, jointed concrete
- Subbase: 6" Item 304 Aggregate Base
- Shoulders: Tied, jointed concrete
- Number of Lanes:
  - Mainline 35 - 4 (2 per direction)
  - Ramp D - 1 (1 per direction)
- Functional Classification: #2 – Rural Expressway – so use rural interstate values
- 2024 ADT: From IOS – Appendix C of Design Build Scope
  - Mainline 35 - 7960
  - Ramp D - 4240
- 2044 ADT: From IOS – Appendix C of Design Build Scope
  - Mainline 35 - 13060
  - Ramp D - 7280
- 24 hour truck %: From IOS – Appendix C of Design Build Scope
  - Mainline 35 - 35% (listed W of interchange – no values given E) – do we want to see if LJB has truck counts on US35 East of SR435 interchange?
  - Ramp D - 31%
- Design Period: 20 Years
- Open to Traffic: 2024
- Subgrade CBR: 7 (from Appendix B of Design Build Scope)

Problem: Solve for the thickness of the concrete slab <u>using 35 Mainline traffic</u> with Global Chemical Stabilization -the contractor investigated the sulfate issue listed in the geotechnical report and there was no sulfate issue after more detailed testing.

Solution:

Directional Distribution, D = 50% (Figure 202-1)

Lane Factor, LF = 95% (Figure 202-1)

B/C ratio:

Rural Interstate – 7:1

Rural Expressway – No Ratio Given

ESAL conversion factor for B Trucks = 1.53

ESAL conversion factor for C Trucks = 0.37

Mr = 1200 X CBR x 1.36 =11,424 with GCS

Subbase Modulus =36,000 with GCS (Figure 301-1)

Edge Support – Yes – (Figure 301-1) –

Load Transfer Coefficient (J) – Doweled, Edge Support = 2.7

Loss of Support = 1 (Figure 301-1)

Reliability Levels (%) – rural freeway = 0.90 (Figure 201-1)

Overall Standard Deviation (rigid) = 0.39 (Figure 201-1)

(see Pavement Design PDF)

Problem: Solve for the thickness of the concrete slab <u>using Ramp D traffic</u> with Global Chemical Stabilization

Solution:

Directional Distribution, D = 100% (a ramp – all traffic is going one way)

Lane Factor, LF = 100% (Figure 202-1)

B/C ratio:

Rural Interstate – 7:1

Rural Expressway – No Ratio Given

ESAL conversion factor for B Trucks = 1.53

ESAL conversion factor for C Trucks = 0.37

Mr = 1200 X CBR x 1.36 =11,424 with GCS

Subbase Modulus =36,000 with GCS (Figure 301-1)

Edge Support – Yes – (Figure 301-1) –

Load Transfer Coefficient (J) – Doweled, Edge Support = 2.7

Loss of Support = 1 (Figure 301-1)

Reliability Levels (%) – rural freeway = 0.90 (Figure 201-1)

Overall Standard Deviation (rigid) = 0.39 (Figure 201-1)

(see Pavement Design PDF)