Equivalency Chart
For Concrete and Asphalt Pavements

Concrete and asphalt pavements are not only made of different materials, but they also carry traffic loads in entirely different ways. This means that the thickness design procedures for concrete and asphalt pavements are also different. The structural number concept has, however, been used to estimate concrete and asphalt pavement sections.

The structural number of a particular pavement section is simply the summation of the layer thicknesses multiplied by their respective layer coefficient, as shown in Figure 1.

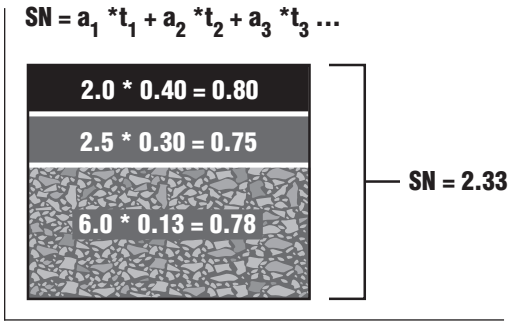


Figure 1: Calculation of the structural number for a proposed asphalt section.

The concept of layer coefficients was developed during the road test conducted by the American Association of State Highway Officials (AASHO), to account for all of the materials and layers in an asphalt pavement structure.

In the 1960's, shortly after the AASHO Road Test was complete, satellite studies in Louisiana proposed that deteriorated existing concrete pavement that is overlaid with asphalt has a structural coefficient of approximately 0.50. This value has since been often cited in some older design manuals. In reality, this is a conservative value, which can be used to estimate comparable pavement sections.

The following table lists layer coefficients for various materials:

Material	Layer Coefficient
Concrete*	0.50
Asphalt Surface	
Plantmix (high stability)	0.30 - 0.44
Roadmix (low stability)	0.10 - 0.20
Sand Asphalt	0.20 - 0.40
Bituminous-Treated Base	
Coarse-Graded Base	0.10 - 0.34
Sand Asphalt	0.10 - 0.30
Cement-Treated Base	
(by compressive strength)	
> 650 psi	0.23
400 - 650 psi	0.20
< 400 psi	0.15
Non-Stabilized Base	
Lime Treated	0.10 - 0.15
Crushed Stone	0.10 - 0.14
Sandy Gravel	0.07

* Used for estimating purposes only.

Count on Concrete PAVEMENT

Residential

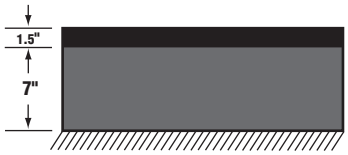
Design variables: k = 100, ADTT = 5, Light axle load category, 30 year design life, unreinforced, 600 psi concrete flexural strength

Concrete: Design thickness = 6.0 inches ($SN_{ESTIMATE}$ = 6 x 0.50 = 3.0)

Asphalt: 1.5 inches of high stability asphalt on a coarse-graded bituminous base of 7.0 inches (SN = 1.5 x 0.44 + 7.0 x 0.34 = 3.0)

Concrete

Asphalt



Collector

Design variables: k = 100, ADTT = 50, Medium axle load category, 30 year design life, unreinforced, 600 psi concrete flexural strength

Concrete: Design thickness = 7.0 inches ($SN_{ESTIMATE}$ = 7 x 0.50 = 3.5)

Asphalt: 1.5 inches high stability asphalt on a coarse-graded bituminous base of 8.4 inches (SN = 1.5 x 0.44 + 8.4 x 0.34 = 3.5)

Concrete

Asphalt

Minor Arterial

Design variables: k = 200, ADTT = 500, Heavy axle load category, 30 year design life, doweled, unreinforced, 600 psi concrete flexural strength

Concrete: Design thickness = 8.0 inches ($SN_{ESTIMATE}$ = 8.0 x 0.50 = 4.0)

Asphalt: 1.5 inches high stability asphalt on a coarse-graded bituminous base of 10 inches (SN = 1.5 x 0.44 + 10 x 0.34 = 4.0)

Concrete

Asphalt

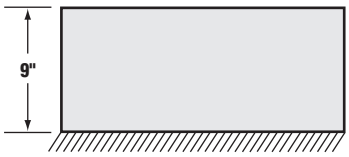
Major Arterial

Design variables: k = 200, ADTT = 1500, Very Heavy axle load category, 30 year design life, doweled, unreinforced, 600 psi concrete flexural strength

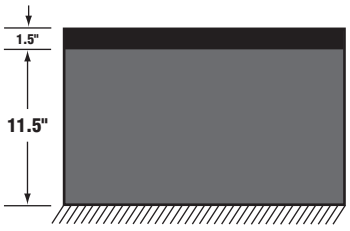
Concrete: Design thickness = 9.0 inches ($SN_{ESTIMATE}$ = 9.0 x 0.50 = 4.6)

Asphalt: 1.5 inches high stability asphalt on a coarse-graded bituminous base of 11.5 inches (SN = 1.5 x 0.44 + 11.5 x 0.34 = 4.6)

Concrete



Asphalt



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