

# CE 475

## Example on analysis of stress-strain state in a 5-layer elastic system

Consider the pavement cross-section given:

Layer	Thickness	Elastic modulus	Poisson's Ratio	Density
Surface Course (Asphalt Concrete Mixture)	4"	350,000 psi	.2	155 pcf
Base Course (Asphalt Treated Base, Emulsified Asphalt Mixture)	6"	150,000 psi	.3	150 pcf
Aggregate Subbase	6"	85,000 psi	.4	100 pcf
Crushed Aggregate Subbase (Rockcap)	12"	120,000 psi	.4	90 pcf
Geotextile Fabric	For layer separation. No structural support value			
Subgrade (Soft clay material)	N/A	5,000 psi	.45	90 pcf

Determine the state of stress and strains under a standard 18-kip (80-kN) single axle load, with 85 psi tire pressure and 13" spacing between the dual tires. Examine the difference on the stress state if the tire pressure was raised to 120 psi.

To see the effect of tire pressure on the state of stress, solve the problem for 85 psi, and find stresses and strains under point 1 (center of one tire) at all depths as shown. Note that same values will be obtained at point 4 because of similarity.

Plot results of stresses and strains under point 1 at all depths, and see the difference.

### Note

KENPAVE shows positive values for "compressive" and "negative values for "tensile", since the +z axis is in the downward direction.

