

King Fahd University of Petroleum & Minerals
CIVIL ENGINEERING DEPARTMENT

CE 441

DESIGN OF PAVEMENT

Fall 2002-2003

HOMEWORK # 2

STRESSES IN FLEXIBLE PAVEMENTS

1. Consider a tire having a load of 18,000 lbs and pressure of 80 psi is applied on an earth road (Fig. 1). Assume road material is characterized by $E = 6000$ psi and $\mu = 0.5$. Using one layer theory calculate:
 - a) State of stress σ_z , σ_r , σ_t at points 1, 2 and 3, 4
 - b) Vertical strain ϵ_z at points 1 & 2
 - c) Vertical deflection Δ_z at points 1 & 2
2. For the same conditions in problem (1), if an asphalt concrete layer was constructed on the top of that earth road (Fig. 2) with thickness 4" and $E = 150,000$ psi and $\mu = 0.35$, calculate the change in vertical stress σ_z and the change in the vertical deflection Δ_z as well at points 1 & 2.
(or ELSYM5)
3. Use BISAR Program to check your answer in problem (2).
4. Do problem 2.8 of the textbook, page 78.
5. Redo problem 2.8 of the textbook, page 78 using BISAR Program, compare your results.
(or ELSYM5)

